

IRISH NATIONAL INVENTORY OF
HISTORIC SCIENTIFIC INSTRUMENTS



CHARLES MOLLAN

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**SAMTON LIMITED
1995**

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ISBN 1 898 706 05 0

1995

**THE AUTHOR AND PUBLISHER
ARE PLEASED TO ACKNOWLEDGE
WITH VERY MANY THANKS
THE MAJOR SPONSORS OF THIS WORK:**

<p>THE ROYAL DUBLIN SOCIETY</p> <p>EOLAS (now FORBAIRT)</p> <p>THE NATIONAL HERITAGE COUNCIL</p>

Published by

SAMTON LIMITED

17 Pine Lawn
Newtownpark Avenue
Blackrock
Co. Dublin
Tel. (+353-1) 289-6186
Fax. (+353-1) 289-7970

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INTRODUCTION

This work of compiling an *Irish National Inventory of Historic Scientific Instruments* is the first attempt to define the extent of an important and largely ignored cultural resource in Ireland. It has been assembled, as time has allowed, over the past ten years or so, and includes information about instruments of which I was already aware, together with those discovered or brought to my attention during this period.

The work has established that Ireland has a surprisingly large number of preserved instruments. A previous study (Burnett and Morrison-Low 1989) demonstrated that there were many scientific instrument makers who practised in Dublin, Belfast, Cork, and other Irish cities, from the late seventeenth to the early years of the twentieth century, and the study gave examples of the instruments which they made. The present work considerably extends the number of known Irish-made instruments, both those preserved in Ireland and those exported to other countries. It has also found instruments by Irish makers not recorded in the earlier study.

However, this work dramatically increases our knowledge of instruments in Ireland by listing also the very many instruments preserved in Ireland which were not made here.

While the Miscellaneous section (pages 90-98) includes records of a few archaeological artefacts, which might be considered to show scientific insight, from the passage tomb at Newgrange (page 119), over 5,000 years old, to the typical Irish pillar sundials found around the country (pages 115-116), dating from about AD 800 to 1200, the Inventory consists, in addition to later sundials, of four other categories of more-recent artefacts:

1. Instruments used by professionals (such as levels for engineers, sextants for navigators, telescopes for astronomers, microscopes for biologists, and hygro- meters for meteorologists).
2. Instruments used in the teaching of science or the demonstration of scientific principles.
3. Instruments (original or commercially produced) used for scientific research.
4. Selected instruments only from categories commonly used for domestic or recreational purposes, like barometers, clocks, and toys.

Ireland is not rich in very old instruments. It does have a Syro-Egyptian astrolabe quadrant (page 50) dating to about 1373, some relics from wrecks of the Spanish Armada which perished in 1588 (pages 475-481), a fine astrolabe by Erasmus Habermel dating to around 1600 (page 152), a Nuremberg diptych dial of about the same age (page 159), and a few other instruments of similar vintage. Irish signed instruments start in 1667 with a circumferentor by "W.R. Dublin" (page 525), and several instruments dated to the 1680s by Johannes Lewis of Dublin (pages 77 and 202). But the total number of seventeenth century records is only about 21 (some dates are uncertain - hence the "about"), and even the eighteenth century is only represented by about 228 records. Thus the inventory is really a listing of nineteenth and early twentieth century instruments.

Of these, however, there are a great many. The Inventory consists of 5104 records, and many of these relate to several instruments. It lists instruments in Irish collections (see the contents page) and also Irish-made (or at least signed) instruments located outside Ireland.

A few general observations can be made. Although it could be anticipated that Ireland would have a good number of Irish-made instruments, there are many more of these than might have been expected. By far the biggest maker and supplier in the Inventory is the Dublin firm of Yeates. Of English makers, Elliott Brothers are the largest suppliers. France is fairly well represented, by firms such as those of Jules Duboscq and Rudolph Koenig. German instruments tend to be early twentieth century; and no other country is represented to any great extent.

The biggest collections are those in the Physics Departments of the six Irish universities old enough to qualify. Some schools have (or had) worth-while collections, as have the Astronomical Observatories in Armagh and Dunsink (Dublin) - the former including instruments from the King George III collection.

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It is particularly heartening to record the dramatic increase in the number and quality of the instruments in the National Museum in Dublin during the years in which the Inventory was being compiled. The major reason for this increase was the acquisition in 1994 of the fine collection amassed by Paul and Edith Egestorff, which includes sundials, microscopes, telescopes, surveying, and mathematical instruments. But the Museum has acquired quite a few other instruments by donation or purchase during this period. It now has the finest collection in the country.

Other collections contain significant instruments made or devised by some of the many Irishmen who made important contributions to science during the nineteenth century - like the electromagnetic instruments and batteries of Nicholas Callan (1799-1864) at St Patrick's College Maynooth, the critical state instruments of Thomas Andrews (1813-1885) in The Queen's University of Belfast, the astronomical equipment made by Howard Grubb (1844-1931) for the Crawford Observatory on the campus of University College Cork, and the various ingenious instruments devised by John Joly (1857-1933) at Trinity College, Dublin.

The compilation of a National Inventory of this kind is the sort of work which can never really be finished, as there will certainly be instruments in the country of which I am unaware; and the details which I have here recorded of those which I have found could be improved.

However, a decision has to be made to end the study at some stage, rather than continue to produce *Interim Reports*, two of which have already been published (Mollan 1989, 1990b). This final publication is certainly an improvement on the *Interim Reports*, both in terms of the number of instruments included, and in the amount of additional detail which it has been possible to add to earlier and new entries thanks to the steadily increasing number of relevant publications in the area. The first *Interim Report* had 2051 entries, the second 3355, and this final edition has 5104. I will be grateful to readers for corrections and for additional information about the instruments described, or for details of instruments which I have missed.

As will be clear, the Inventory is published in a basic format, without any attempt to pretend that it is a "popular" work. To have had any comprehensive number of photographs, for example, would have made publication impossible, due to the cost, and to have had only a few would add little to the value of the work as a source of information. My hope is that future publications will deal with collections or categories of instruments in detail and in context, and that such publications will include photographs and other illustrations. Indeed, the work of the Inventory was delayed due to the publication of a catalogue of the collection at St Patrick's College Maynooth (Mollan 1994), which included at least one photograph of every instrument, plus a considerable amount of additional background information. I would wish that this Inventory will lead to a greater amount of this kind of work.

I do have photographs, of varying quality, of virtually all of the instruments in the Inventory, and copies of these can be provided (for a small fee) to those who would like to see them.

I have not recorded everything I have found, and have listed only what I consider to be the more interesting items in collections. However, I have been inclusive rather than exclusive. If the instrument appears to me to have some quality, I have included it. It is more likely to get in if it has a signature, and I have included rather unspectacular instruments if they are signed. Any instrument which I reckon to date before 1915 (or so), and which has an Irish signature, is included. Only selected non-Irish instruments dating after 1900 have been chosen. There is thus an Irish bias in twentieth century instruments, but I hope this is acceptable in an Irish Inventory.

However, the process of selecting instruments to include or ignore assumes more significance in category four above (see page 6). While I list "scientific" barometers, like Fortin barometers if they are old enough, no matter where they come from, I have been much more restrictive with domestic banjo barometers, and most of those listed have Irish signatures. I have been more inclusive with stick barometers because they are generally older, and marine barometers because they tend to be of better quality. However, I have not been entirely rigid about this if, for example, a banjo barometer is part of a collection rather than in a domestic household.

In the case of clocks, I have for the most part included only marine chronometers, astronomical regulators, and clocks which are in institutions covered in the Inventory and which were part of the Dublin clock systems in the late nineteenth and early twentieth centuries. I have also included a few cameras found in some of the collections named in the Inventory, since those interested in photography might not look in these collections of scientific instruments, and this information may be of use to them. I have been more inclusive with camera lenses, particularly if the maker is known as a scientific instrument maker.

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I have not sought out medical apparatus, but have tended to include it if present in collections which would not be expected to include such instruments, again for the reason that those interested in this area might not look for such items in these collections of scientific instruments.

I suppose, in summary, I would hope that the Inventory includes all reasonably important scientific instruments, as here defined, which I have come across dating before 1900. If they are of lesser importance (in my subjective judgement), or of later date, their inclusion is based on less exact rules.

To use the term "historic" in the title of the Inventory is really a bit pretentious, since most of the entries can scarcely rate such a term. The more correct word would be "old", but I used "historic" in the *Interim Reports* and, for the sake consistency, continue to do so. However, the fact that the instruments are not truly "historic" does not distract from the usefulness of the work - quite the reverse. In an analogous way, it is being realised that a history of science which featured only the "geniuses" would be a very incomplete and misleading way to view the subject. The same is true of instruments.

As already noted, for the purposes of this Inventory, I have taken "historic" to mean instruments dating to the nineteenth century and before, together with selected instruments from the early twentieth century.

The methodology

The computer database software used for this Inventory was IBM Filing Assistant. Although this is now an elderly management system, I have found it to be extremely good and, in spite of using other more sophisticated packages for other purposes, I have seen no reason to change to one of these for this work. It has the advantages of simplicity, does not use much memory (which was an important consideration until the cost of memory became substantially cheaper), and has powerful search and sort features. The entries as printed are derived from "fields" set up in Filing Assistant, and the main Inventory (the in-Ireland entries) follow the format:

Inventory number: This is an arbitrary four-digit number which is unique to a particular instrument (or entry if this represents several instruments), and follows it, even if it is transferred to another collection, or is sold.

Code: The code gives, in three letters (e.g. BIR for Birr Castle), the collection to which the entry belongs, followed by a three-digit number arbitrarily assigned to the instrument within this collection. The meanings of the letters are given on the Contents Page.

It should be noted that the three digits are not, unlike the inventory number, unchanging. The highest one just gives a count of the number of instruments in that collection as recorded in the Inventory. Thus these numbers can be rearranged, if I change the selection of instruments for printing. Hence, ***if an instrument is being referred to in another publication, or for any other purpose, it is the Inventory Number, not the Code, which should be quoted.***

Name: The name of the instrument comes next and the list of instruments within a collection is printed in alphabetical order of this name.

The naming of instruments has not yet been standardised internationally, but I have tried to follow the accepted norms in English (as distinct from American), and have changed the names in a number of cases where my nomenclature has been updated by compelling recent publications. Inevitably, though, some of the names are my own inventions, in the areas where no author of whom I am aware has provided better authoritative guidance.

Signature: The signature on the instrument is then recorded, retaining the case of the letters (although Filing Assistant does not allow italic script to be distinguished from normal). This field also contains serial numbers, inscribed dates, or other relevant inscriptions

Size: The dimensions of the instrument are recorded in millimetres, together with abbreviations to tell which bit of the instrument is being measured. The meanings of the abbreviations used are given at the end of the Introduction.

Date: Next comes the date, with an added letter, or letters, to indicate its degree of accuracy, as follows:

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A	Derived from the address on the instrument.
AP	The date of apprenticeship of the maker.
AQ	The date on which the instrument was acquired.
c	Circa - date close to the given year.
C	Century - e.g. 19 C.
CO	The date indicated by the context e.g. found with another dated instrument, or in a setting where instruments were known to be used at certain dates.
CT	The date of a catalogue containing the instrument.
d	Date on which the maker or supplier died.
D	A date indicated by documentation found with or about the instrument.
F	The dates of the Firm which signed the instrument.
FL	The date(s) on which the maker or supplier flourished.
FR	The date on which the maker was freed (in his Guild).
G	Guesstimate - a subjective estimate of the age, based on the look of the instrument, and experience. Used if there is no better indication of age.
H	Hall Mark date.
N	Date derived from the serial number.
p	Posthumous - dated after the death of the maker or supplier although signed with his name.
P	Patent date.
PC	Dated as a result of a personal communication.
R	Dated by means of a specified reference to a book or other publication.
RD	The date on which the design was registered.
S	Inscribed with the signature.
SI	Dated with reference to a similar instrument.
W	The dates during which the maker or supplier was known to be working.

Most of the Irish entries have been dated using the work of John Burnett and Alison Morrison-Low (1989 - see Bibliography). Relevant English entries have also been improved using the recently-published British Directory (Gloria Clifton 1995).

Brief description: A very short description of some of the major characteristics of the instrument is given. This allows an abbreviated print-out of the details of the instrument (as used in the 1989 *Interim Report*), in cases where the full description is not needed.

Fuller description: This gives more details about the instrument, and it can, in appropriate cases, be quite lengthy.

Reference: The entry ends with a reference where one was used in the naming, dating, or description of the instrument. The convention used is author and date, and the full reference can be found in the Bibliography.

The Filing Assistant data base contains other fields to allow instruments in different categories to be picked out - e.g. those from a particular country, or within a particular date range, or by an individual maker or, indeed, all three, if that is what is needed.

Out-of-Ireland entries: The out-of-Ireland categories, while they have similar fields, are printed out in order of the name of the maker and, within this, the name of the instrument and its date. They are numbered in a different way - Ex (for External or out-of-Ireland), followed by four arbitrary numbers (which are permanently associated with that instrument, wherever it may go).

Printing: In order to preserve symbols, Filing Assistant records were printed to ASCII files, imported into DOS Windows Write, and then reimported into DOS Word for Windows Version 6, to be edited for printing.

Old form of "s": Where relevant, "f" is used throughout the Inventory to represent the old form of "s".

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Signatures in brackets: If a signature or other inscription is reproduced in brackets (..), this means that it has not been seen. Where there are no brackets, the signature has been seen, either on the original instrument or in a photograph.

Bull SIS: Frequent references are made to the *Bulletin of the Scientific Instrument Society*, using the abbreviation Bull SIS - see the Bibliography under "Bulletin".

Electronic Inventory: The Inventory can be made available on disk. Please enquire if you are interested.

Acknowledgements

Many people have helped me in compiling this report, by allowing me access to their collections and documents, by giving me information about instruments and makers, and through their encouragement. To these, far too many to mention individually, I give my sincere thanks. The only one I will pick out is Clara Clark, who has lived with the Inventory (and me) while it was being compiled, and who has always given support in spite of the demands it has made on my free time. The work could not have been carried out without her indulgence, and I am most grateful for this.

The compiling of the Inventory, and its publication, would not have been possible without the support of three sponsoring institutions - **The Royal Dublin Society, Eolas, and The National Heritage Council**. I am pleased to acknowledge, with very many thanks, this essential support.

Size abbreviations

A	Arm	D	Diameter	Ja	Jar
Ac	Arc	De	Depth	K	Knob
Al	Alidade	Di	Disc	L	Length
Ap	Aperture	DI	Dial	La	Large
Ar	Armature	Do	Dome	Ld	Lid
Ax	Axle	Dr	Drum	Le	Lens
B	Base	E	Eyepiece	Lf	Leaf
Ba	Ball	Ed	Edge	Lg	Leg
Bb	Bob	Eg	Egg	Li	Lip
Bd	Bridge	El	Electrode	Lm	Limb
Be	Bench	Ey	Eye	Lo	Long
Bg	Bung	F	Face	Lv	Level
Bk	Block	Fi	Finder	M	Magnet
Bl	Bellows	Fk	Fork	Ma	Magnetometer
Bm	Beam	Fl	Flask	Mi	Mirror
Bo	Bottom	Fn	Funnel	Mn	Minimum
Br	Bar	Fo	Foot	Mo	Mount
Bs	Basket	Fp	Flap	Mx	Maximum
Bu	Bulb	Fr	Frame	N	Needle
Bw	Bowl	Ft	Front	Ne	Neck
Bx	Box	G	Globe	O	Outer
c	Circa	Gi	Gimbal	Op	Open
C	Case	Gl	Glass	P	Plate
Ca	Capsule	Go	Goblet	Pa	Pan
Ce	Centre	Gn	Gnomon	Pc	Piece
Ch	Chamber	Gr	Grating	Ph	Phial
Ci	Cistern	H	Height	Pi	Pipe
Ck	Cock	Ha	Handle	Pl	Platform
Cl	Collimator	Hd	Head	Pm	Prism
Cn	Conductor	Hi	Hinge	Pn	Piston
Co	Coil	HI	Hole	Po	Pointer
Cp	Compass	Ho	Horizon	Pr	Pillar
Cr	Circle	Hs	Housing	Pt	Plinth
Cu	Cup	I	Inner	Pu	Pump
Cy	Cylinder	J	Jacket	Pv	Pivot

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Py	Pyramid	Sg	Sight	Th	Thermometer
R	Radius	Sh	Short	Tl	Total
Ra	Rack	Si	Side	To	Top
Rd	Rod	Sk	Spike	Tr	Tripod
Re	Reel	Sl	Slit	Tu	Tube
Ri	Ring	Sm	Small	Tw	Tower
Rm	Remainder	So	Stopper	Ty	Tray
Rn	Resonator	Sp	Span	V	Vessel
Ro	Rose	Sq	Square	Va	Vane
Rs	Reservoir	Sr	Sphere	Ve	Vertical
Ru	Rule	St	Stand	W	Width
S	Scale	Su	Support	Wd	Window
Sa	Stage	Sv	Sleeve	We	Weight
Sc	Screw	Sy	System	Wh	Wheel
Sd	Slide	T	Table	Wi	Wire
Se	Section	Ta	Tank		
Sf	Shaft	Te	Telescope		

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ARMAGH OBSERVATORY - ARM

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3950 ARM024 ALIDADE

Ertel & Sohn

341x20; C 369x47x35. Mid 19 C. G.

Brass; flat bottom; roof-shaped top with two small knobs; in hinged mahogany case with domed top.

The scales are marked: "Pariser Fafs = 500." and "Engländ. Fafs = 500.", each divided 10-0-9, with the 10-0 divided into 50, the others divisions, 0-1, 1-2, etc, each divided into ten; the case has black fabric lining under the alidade.

Brachner 1985,139 records that the Ertel workshop was founded in 1815, becoming Ertel & Sohn in 1834.

3695 ARM008 ANEMOMETER - ROBINSON

Unsigned[?] but made by R.W. Monroe

No measurements available. 1870. R.

White painted; cylinder base to tapering pillar; on top, bar frame for four hemispherical cups.

Just above half way up the pillar are two eight-vane propellers, and a horizontal arrow.

Butler 1990,63 records that: "This automatically recording anemometer was made by R.W. Monroe in 1870 and now sits on the 'Sector Tower' at the Observatory. No part of the early 1850 version of the Robinson anemometer with its unique recording device is known to survive.

Bennett 1990,114-5 records that Thomas Romney Robinson constructed an anemometer in 1843, and an improved stable form by 1846, when he described it to the Mechanical Section of the British Association meeting in Southampton. He described it in detail to the Royal Irish Academy in 1850. It was moved by four hemi-spherical zinc cups, each twelve inches in diameter, carried on the extremities of an iron cross, so that their centres were twenty-three inches from the vertical axis. It was mounted with a wind vane on the roof of the Observatory, and both were connected to a clockwork register in use from March 1847. It is through the Robinson anemometer that the name of the third Astronomer of Armagh is best known in science to-day.

4006 ARM080 ARTIFICIAL HORIZON

Unsigned

B 135x76x14; HsH 107, B 158x92; C 193x149x129.

Mid to late 19 C. G.

Cast-iron mercury trough; oxidised brass triangular hous-ing, glazed on two sloping sides; mercury vial; case.

The mercury vial is of heavy iron and silvered metal (BD65, H87); the apparatus is in a fitted mahogany case.

3993 ARM067 BAROMETER - ANEROID, PORTABLE

THOs ARMSTRONG & BRO. MANCHESTER & LIVERPOOL 256

D50. Late 19 C. G.

Glazed gilt watch-case housing with ring handle; silvered face 23-31" with rotating altitude ring.

The inscription includes the word "Compensated", the barometer scale "Inches", and the altitude scale "Feet".

3967 ARM041 BAROMETER - STICK

J. Newman 122 Regent Strt.. LONDON

B 1274x205; H 126; W 59; TuD 19. 1827-1856. A.

Mahogany base board; curved brackets to pivoting barometer; two brass square-section rods at sides of tube.

The base board has a rounded top; the rods (18x18) are joined on top by a rounded brass bracket with the engraved signature; at the bottom is the metal cylinder cistern, which has four rectangular windows (38x11) around the top (one broken); the scale is attached to the top of the right rod 27-31" and there is a mechanical sliding marker with a square cut key below; just above the cylinder on the bottom left is a small glass mercury thermometer 20-100°, and there is another square key on the bottom right; the cistern has the engraved words: "NOT PORTABLE" and "PORTABLE"; there is no mercury in the tube now.

Dates from Crawforth 1988,12 and Downing 1988,92.

3962 ARM036 CALCULATOR

BRUNSVIGA MASCHENWERKE AG BRAUNSCHWEIG 20 260075

H 175; MxW 408. Early to mid 20 C. G.

Curved green metal frame; four mechanical handles; three horizontal number sets; 12 curved vertical sets; black plastic dust cover.

Turner 1983,284 records that "Brunsviga" calculating machines were produced from 1892, and incorporated a wheel having a variable number of projecting teeth, replacing the earlier Leibnitz stepped cylinder; this patent by W.T. Odner in 1891 made possible a more compact design for calculators performing multiplication by repeated addition.

3707 ARM020 CHRONOGRAPH

Thr Knoblich Altona

C 727x385x355. Purchased 1865.

Glazed mahogany case; brass clock-work with two balls governor; recording drum; two electromagnetic pens.

The case is glazed on all sides, has one pointed end, and doors on this end and at the side; the clockwork and governor drive the long horizontal drum.

Butler 1990,50 records that this early electric chronograph was bought by Thomas Romney Robinson to assist in the timing of star transits. "As the drum rotates, driven by clockwork, sharp scribes scratch two sets of marks on the blackened paper. One scribe is attached to an electro-magnet that is activated by pulses from the clock and the other is attached to a second electromagnet that is operated by the observer at the instant the star crosses the crosswire in the telescope. By measuring the distance between the 'clock marks' and the 'observation mark' the exact time of transit can be determined."

Bennett 1990,130 records the purchase of the chrono-graph by Robinson in 1865, which he presented to the Observatory as a gift. It was wired to the second Earnshaw clock (3986 ARM060), which still had its original gridiron pendulum. Problems were encountered, but "serious efforts" were being made to use it from November 1868.

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3705 ARM018 CHRONOMETER - MARINE

WILLM. B. CRISP MAKER TO THE ADMIRALTY London

[Label] FRANCIS M. MOORE 102, HIGH STREET, BELFAST.

Hs 182x162x162; DIHsD 118. Mid to late 19 C. R.

Brass; gimbals mount; in mahogany double hinged case.

The silvered face has Roman hours on the outside, with a small seconds dial above the VI mark, and a small "UP DOWN" dial below the XII; it is housed in a brass-bound mahogany case with a glazed hinged panel between the chronometer and the lid; inside the lid is a trade label with "18 Donegal Place" handwritten on top: "ADJUSTER OF IRON SHIP'S COMPASSES. TIME SIGNALS FROM GREENWICH OBSERVATORY. FRANCIS M. MOORE, CHRONOMETER MAKER TO THE LORDS OF THE ADMIRALTY, WATCHMAKER, OPTICIAN &c. 102, HIGH STREET, (One door from Victoria St) BELFAST. AND 23, EDEN QUAY, DUBLIN. BAROMETERS & TELESCOPES, SEXTANTS, QUADRANTS, COMPASSES, CHARTS &c MATHEMATICAL INSTRUMENTS, MARINE CHRONOMETERS RATED BY TRANSITS, Nautical Instruments repaired with the utmost care. BY APPOINTMENT METEOROLOGICAL AGENT TO THE LORDS OF THE PRIVY COUNCIL FOR TRADE. LONDON CHRONOMETERS OF THE MOST APPROVED MAKERS. A FEW GOOD SECOND-HAND CHRONOMETERS GUARANTEED & READY FOR SEA."

Morrison-Low 1989,132 lists F.M. Moore, Dublin, 1864-1900; Clutton 1982,414 lists William Baker Crisp from 1839-d1895.

3703 ARM016 CLOCK - REGULATOR

Ard Buchanan. Dublin

H 1860; MxW 440; DIhD 240,110. Late 18 C. R.

Mahogany case and glazed dial frame; silvered dial; large seconds dial; small minutes dial; hours arc.

The large dial is divided in minutes 5-60; the 5-60 minutes dial is under the 60 mark; the Roman hours arc is under the centre, with a date square below.

Butler 1990,41 records: "A clock which bears the name of the 18th century Dublin clockmaker, Archibald Buchanan, which was probably one of the first regulators in use at Armagh Observatory. In fact it is believed by horologists that it may have been made by the London clockmakers Matthew and Thomas Dutton and merely resold by Buchanan. Its present pendulum was made by Thomas Earnshaw. This clock has been on loan to the Church of Ireland Cathedral in Armagh for the past 150 years."

Fennell 1963,6 gives Archibald Buchanan 1772-1800. Clutton 1982,432 gives dates 1771-1825, and 1776-1802 for Duttons.

3704 ARM017 CLOCK - REGULATOR

John Crosthwaite Dublin

Not measured. c1785. R.

Mahogany case and glazed dial frame; silvered dial; large minutes/hours dial; small seconds dial.

The minutes 5-60 are on the outside of the large dial; the hours I-XII are inside; the small seconds 5-60 dial is under the 60/XII mark.

Butler 1990,52 records: "The primary standard of time for Mural Circle observations was an astronomical regulator of the long-case type. This particular regulator was made by the eighteenth century Dublin clockmaker, John Crosthwaite in c1785. It originally had a diamond suspension and a glass pendulum. It has been recently restored."

Fennell 1963 records John Crosthwaite as a watchmaker in Dublin with dates 1760, 1795, and 1800. She records that he experimented with a pendulum supported by steel knife edges on diamond plates.

Bennett 1990,34-6 records that James Archibald Hamilton was in Armagh for a time from 4 June 1794 "during which he set up a clock by John Crosthwaite of Dublin. This had been made for the use of Hamilton's friend Henry Ussher at Dunsink Observatory, but he had died in 1790 and Hamilton secured the clock for 40 guineas. The new clock kept mean-time." The clock was fitted with a new suspension spring and a glass pendulum in October 1794.

3691 ARM004 CLOCK - REGULATOR

Earnshaw. London.

H 1937; MxW 495; DIhD 245,95,95.

1791 (installed 1794). R.

Mahogany case with bowed sides; silvered face; outer minutes dial 5-60, inner seconds 5-60, and hours 0-24.

Twelve brass screws secure the glazed door to the case, and twelve more the glazed dial frame to the case; a brass disc arrangement is attached to the dial glass above the winding hole; the movement, between two brass plates, according to Butler 1990,47, owes its superior accuracy to: (1) the large number of jewelled bearings it contains; (2) the small number of wheels; (3) the large number of teeth on each wheel; (4) Earnshaw's exceedingly fine work-manship. Butler also records that, in order to reduce the effects of draughts and temperature changes, Earnshaw fitted the clock with an airtight case and a gridiron pendulum. He notes though that the original pendulum was replaced in 1830 with a barometrically compensated pendulum by Sharp of Dublin (see 3692 ARM005).

Bennett 1990,26-7 records that Thomas Earnshaw had never made a clock before this one; "I told him [Nevil Maskelyne] I had never made a clock, and did not know how many wheels were in one." Earnshaw was a clock and chronometer maker whose design of spring detent escapement became standard in marine chronometers. His first clock was tested in Greenwich from 1791, and arrived in Armagh in 1794. Two clocks were ordered from Earnshaw; this Number One was built to a higher specification, for use with the transit instrument.

Butler 1990,43 records that the clock cost £100, and Earnshaw charged another £100 to travel to Armagh to set it up. It was highly praised by Thomas Romney Robinson, who believed it to be at that time the most accurate clock in the world. It is reckoned that Earnshaw produced a masterpiece, and the clock is regarded by horologists today as one of the world's most important clocks.

The clock has been refitted with the [original?] grid-iron pendulum, which has a large (Dc160) convex brass bob with the brass-bound nine-bar gridiron shaft above and a small silvered horizontal circle (with divisions including 5 and 10) plus a brass weight on a screw below.

3986 ARM060 CLOCK - REGULATOR

Earnshaw London

H 1780(1846); MxW 410; DIhD 240,101,101. c1792. R.

Mahogany case with bowed sides; silvered face; outer minutes dial 5-60, inner seconds 5-60, and hours 1-24.

There is a small mahogany box on the top right of the case; the panels at the side of the face are glazed.

McFarland 1990,163 records that Earnshaw's second clock has a five-bar compensation pendulum of steel and zinc, an eight-day movement, rated at very nearly sidereal time; its pallets and some of the pivot holes are jewelled; he gives date c1792.

A note with the instrument records that the clock was altered during the Nineteenth Century to provide electrical signals to a chronograph.

3991 ARM065 CLOCK - REGULATOR

RECORDON Late Emery LONDON.

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H 1980; MxW 377; DID 275. 1778-1817. F.

Mahogany body with tapering front to shoulders, neck and circular dial housing; silvered face with hours I-XII.

On top of the dial housing is a pointed finial, and there are brass handles on the sides of the housing; the dial has a seconds hand as well as the hour and minute hands; a brass circle housing holds the glass in front of the face; the case contains neither pendulum nor weights; part of the King George III collection of instruments presented to Armagh Observatory by Queen Victoria in 1841.

Dates from Clutton 1982,578; lists of George III instruments in Lindsay 1969,67 and McFarland 1990,160.

3698 ARM011 CLOCK - REGULATOR

Unsigned but made by John Shelton

H 1963; MxW 450; DlsD 300,135,113. c1769. R.

Mahogany case; glazed dial frame; large minutes dial 5-60; small seconds dial 5-60, and hours dial 0-23.

Silvered dials; brass candle bracket on side of face.

Butler 1990,22 describes the instrument: "This clock, by the famous London maker, John Shelton, was one of a number he made for observations of the Transit of Venus of 1769. It was used by George III in his observations of the Transit and is referred to in Demainbray's account. It is believed that it may be the clock used by George III in his trial of Harrison's Marine Chronometer at Kew which resulted in the award of £19,000 to Harrison by the Government.

Clutton 1982 gives dates for John Shelton - freedom of the Clockmakers' Company 1720-1777.

3706 ARM019 DIAL - UNIVERSAL EQUINOCTIAL RING

Unsigned

OD 225&200 Mid to late 18 C. G.

Brass; sliding suspension ring on meridian circle; pivoted hour circle; central bridge with sliding hole.

The meridian circle is divided 0-90 on one side, and 90-SN-80 on the other; the hour circle is divided I-XII(x2) on one side and is blank on the other; the pivoted bridge has a sliding (now stuck) pinhole (now filled up), and has zodiac signs with "S.D 20 10 Æ 10 20 N.D" on one side, and "DE NO OCT SEP AUG JUL NE", and "CE JAN FEB MAR APR MA JU" with day divisions on the other side; the dial has some foliate decoration.

3955 ARM029 DISCHARGE TUBES - GEISSLER

Unsigned

L 140-205; C 230x220x65. Mid to late 19 C. G.

Six clear and green glass tubes, all with elliptical bulb ends; with bulbs, coils, and spirals; in tin case.

3985 ARM059 DIVIDED CIRCLE WITH REVOLVING DISC

Unsigned

CrD 203; DiD 105. Mid to late 19 C. G.

Silvered metal circle has a cogged inner edge; a rack and pinion rotates an inner disc with three vernier arms.

The circle is divided 10-360°; the pinion is turned by an ivory rectangle (33x34), and the vernier arms read the circle; the disc has a raised centre (D203).

3972 ARM046 EYEPIECE - MICROMETER

Unsigned but by Howard Grubb, Dublin

L 258; Hs 205x64x20; C 300x149x140. 1885. R.

Brass and oxidised brass; rectangular housing with drum micrometers and linear scales on each side; case.

The drum micrometers have silvered divided edges 0-90, and three separate parallel wires in the field of view; six-sided windows on the eyepiece side of the housing cover the linear silver scales 0-10; two knobs, one at each side, move a sliding plate holding the eyepiece; behind the housing are two short angled tubes, one holding an electric lamp, the other a lens which has a push-on cover; a hood covers the screw-thread (OD46) for attaching to the telescope; in a fitted mahogany case with four eyepieces.

McFarland 1990,173 records that this micrometer was presented by Grubb for use with his 10" refractor.

3971 ARM045 EYEPIECE - MICROMETER

GRUBB DUBLIN

L 109; W 61; ScD 42; Hs 85x47x17; C 132x112x62.

1885. D.

Brass and oxidised brass; rectangular housing with drum micrometer at one end and divided silvered disc; case.

The micrometer reads 0-90 and has a silvered edge which, when turned, registers with a watch hand on the silvered disc (D30) 0-40 in the centre at one side of the housing, and moves a plate holding the eyepiece; the eyepiece optics are on one side of the housing with a screw thread (D42) on the other; the cross hairs are now gone; there are two eyepiece lenses and one cover; housed in a fitted mahogany case; a paper with the eyepiece reads: "Small Micrometer of 10in O.G.", relating it to the Grubb 10" refractor dated 1885.

4003 ARM077 EYEPIECE - MICROMETER

Thomas Jones Charing Cross London

HsL 45, D 28; DrD 21. 1816-1850. A.

Brass cylinder housing for lens system with silvered drum micrometer at side 1-10.

Lens cover with near-opaque white centre.

3970 ARM044 EYEPIECE - MICROMETER

Troughton & Simms LONDON Platina

H 65; D 65; C 110x101x76. Mid 19 C. G.

Circular brass housing for optical system with two silvered drum micrometers at the sides 10-100; case.

A knurled knob on top of the main disc of the housing moves it around, and there are four verniers to read the scale 0-80(x4); there are linear cogs in sets of five in the field of view; the eyepiece is in a fitted mahogany case containing lenses and filters. The firm flourished from 1826 into the 20th Century - Crawford 1988,15.

3978 ARM052 EYEPIECE - MICROMETER

Unsigned

D 164; H 120; W 210. Mid to late 19 C. G.

Brass; circular housing has chamfered divided silver edge and two verniers; eyepiece tube on a sliding plate.

The edge is divided 10-360°; the top disc plate is rotated with a tangent screw, and held with a clamping screw; another knurled knob and screw move a plate between slides, and this plate holds the eyepiece lens housing (D37); the lens is missing; behind the disc plate is a tube (D81) with an inner tube (D47).

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3975 ARM049 EYEPIECE - MICROMETER

Unsigned

HsL 128, D 81. Mid 19 C. G.

Brass cylinder tube has eyepiece in centre of cap on top, and a drum micrometer at the side of the cap.

The eyepiece lens is moved by a (broken) rack and pinion; the drum micrometer has a silvered edge 10-100; the field of view has a wire with two cross wires and a linear cog, but the micrometer does not (now) move these with respect to each other.

3974 ARM048 EYEPIECE - MICROMETER

Unsigned

L 188; W 96; Hs 76x32x12. Mid to late 19 C. G.

Brass and oxidised brass; rectangular housing - one drum micrometer; long tube ending in lens beyond housing.

The drum micrometer has a silvered edge 0-9, and it moves a cross wire along linear cogs in the field of view; the eyepiece lens is on an oxidised brass sliding plate which moves in a groove on the housing; the long tube on the other side (D23) ends with a screw-in lens tube (D12).

3973 ARM047 EYEPIECE - MICROMETER

Unsigned

L 243; W 448; Hs 179x63x18. Mid to late 19 C. G.

Brass; rectangular housing with two drum micrometers and linear scales; tube behind with lantern extension.

The drum micrometers have silvered edges 10-100, and the linear scales 30-0-30 are behind rectangular windows on the front; no wires remain; behind the housing is a large circle (D130) with a silvered edge 10-360° and two verniers "A" and "B", with tangent and clamping screws (now not connected); behind the circle is a tube (D87), leading to a screw-thread (OD86), with a tapered side tube to a lantern bracket.

3989 ARM063 GLOBE - CELESTIAL

W. & T.M. Bardin Sold by W. & S. JONES Holborn

Sp 530; GD 400(16"); HoHsD 600; CrD 490.

1798-1800. R.

Mahogany stand with 3 fluted legs to horizontal horizon; brass meridian; plaster globe with paper gores.

The three perpendicular legs are on rollers, and have, near the bottom, horizontal struts to a disc table (H191,D230); there are curved supports from the horizon circle housing meeting below the globe; the horizon has the months, zodiac names and signs, and compass directions; the brass meridian is divided 10-90-10°, 80-0-80°; and has a small hour circle, (D90) I-XII(x2) with pointer; the globe shows stars with scales of magnitude, and drawings of figures associated with the constellations; the inscription reads: "To the Rev NEVIL MASKELYNE. D.D. F.R.S. Astronomer Royal This new British Celestial Globe containing the Positions of nearly 6[00]0 stars, Clusters, Nebulae, Planetary Nebulae &c Correctly laid down, to the present period from lateft observations and discoveries: Dr Maskelyne, Dr Herfchel, The Revd. Fr. Wollafon &c &c. Is Respectfully Dedicated by his most obedient servants, W. & T.M. Bardin"; the last name is partly erased but has been reconstructed from a Bardin Globe offered in Christie 24:9:92, Lot 55, dated 1800; small label reads: "Sold by W. & S. JONES Holborn London". The firm of W. & S. Jones was active from 1792-1860, Crawford 1988,10, Anderson 1990,43-44.

Bull SIS No.36, March 1993, p.20-21, gives information about William Bardin (c1740-1798), his son Thomas Marriott Bradin (1768-1819), and their globes; Thomas became a partner in 1790.

Clifton 1995,17 gives working dates 1798-1800 for W. & T.M. Bardin..

3994 ARM068 GLOBE - CELESTIAL

London Made & Sold by J & W Cary. Aug 1802. [Company Name removed] College Green Dublin

GD 223(9"); RiD 255. 1802. S.

Plaster with paper gores; brass meridian and hour rings.

The globe does not show illustrations of figures associated with the constellations; the meridian ring is divided 0-80°(x2) and 10-90°(x2); the small hour ring (D47), with three spokes, is at one pivot of the meridian ring, and is divided I-XII(x2); the globe is inscribed: "CARY'S New Celestial Globe, on WHICH The whole of the Stars to the fifth Magnitude inclusive with part of the fixth are correctly laid down Calculated to the Year 1800. London Made & Sold by J & W Cary. Aug 1802."; the name of a Dublin Company has been removed under the inscription, but the address: "College Green Dublin" remains; Morrison-Low 1989,134-5 lists Thomas Saunders at College Green from 1796-1799, and Richard Spear from 1810-1837; the globe is missing its horizon and stand; it has been repaired with plaster where parts were missing.

3990 ARM064 GLOBE - CELESTIAL

Manufactured by Newton Son & Berry, Chancery Lane.

Sp 555; HoTH 810; GD 360(14"); CrD 400. 1836. S.

Wood cabriole tripod to turned pillar and four arc supports

to horizon; brass meridian; plaster globe, paper gores.

The legs are on rollers, and have turned horizontal struts to a central housed compass with 32 points on a dec-orated card signed: "NEWTON, SON & BERRY. Chancery Lane, London."; the outside is divided 10-360° and 0-90-0-90-0°; the needle is missing; the horizon circle has altitude and azimuth scales, zodiac signs, days and months; the brass meridian is divided 0-80° (x2) and 10-90°(x2); the globe has drawings of figures associated with the constellations; the globe is inscribed: "NEW AND IMPROVED NEWTON'S CELESTIAL GLOBE On which all the Stars are taken from the elaborate and most approved Catalogue of Piazzzi. the Nebulas from Bode and the double Stars and those with proper motions from South. The Right Ascensions & Declinations of the whole having been recalculated & accurately laid down for the year 1840. BY Mr W. NEWTON Manufactured by Newton Son & Berry, Chancery Lane, LONDON, Published 1st May, 1836."

3965 ARM039 GOLD LEAF FILM

Unsigned

Sd 108x108; Lf 80x80. Mid to late 19 C. G.

Slightly off-square gold leaf between two sheets of glass held together with gummed paper; boxwood box.

Handwritten on the paper on the bottom of the slide is the legend: "Gold-leaf. Transmits green reflects only yellow" (with the word "only" underlined); in non-original boxwood box, lined with silver foil, and with the word "Fragile" printed twice, together with an illustration including three plumbs.

3951 ARM025 HELIOSTAT

Unsigned

RiOD 173, ID 156; CeRiD 67; MiHsD 52; C 257x195x36

Mid 19 C. D.

Brass ring, silvered on one side, has a pivoted iron diag-onal with a brass ring holding a pivoting mirror.

On the outer ring is a turned bracket for a stand; the plane glass mirror (with its silvering now corroded) is in a brass housing; a handwritten paper label on the hinged mahog-any case reads: "Heliostat. The rest of it and the stand are in red [triangle]

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box in Sector tower NB. in this box are (May 1871) the turnscrew - hollow pillar & in it 3 screws".
The 1871 on the label gives a not-later-than date.

3953 ARM027 LAMP - OIL

Unsigned

Hs 146x89x62. Mid to late 19 C. G.

Oxidised brass rectangular housing; side tube with red glass; slide-in top with suspended pivoting oil well.

The curved top has two triangular suspension arms below, whose apices hold two triangular pivoting arms attached to a small rectangular oil well with a screw-off wick disc.

3961 ARM035 LENGTH MEASURING DEVICE

J. Whitehurst DERBY. One Deg. = 1/25400 Inch.

H 1203; MxW 413; DID 325 Mid to late 18 C. R.

Open mahogany frame at side of carved circular back for divided brass disc 10-360° with central compass design.

The frame, which has a carved end joining the two main limbs, becomes slightly wider as it approaches the (damaged) circular back to the brass disc; the central pattern has four hatched triangles at right-angles in front, each quarter being bisected by similar triangles behind, reminiscent of a design for an eight-point compass; the inscription suggests that this is a device for accurate determination of length, presumably related to the mechanism of a banjo barometer, where the change in length of a string is translated into a rotational measure determined by a (missing) hand reading the degree scale around the brass disc; the actual mechanism is hidden inside the backing, and nothing remains outside except the frame.

McFarland 1990,165 identifies this as part of a pyrometer. Taylor 1966,194 records that John Whitehurst (1713-85), from Derby, Mathematical Instrument Maker, had an address in Bolt Court, Fleet Street, London after 1775; he obtained F.R.S. in 1779; his house became "the common resort of the scientific and ingenious of all ranks & nations"; he published "An Invariable Measure of Length, etc. for the Mensuration of Time independent of the Mechanical Operations requisite to ascertain the Centre of Oscillation of the true Length of the Pendulum" in 1780, and "Attempt to obtain a Measure of Length...for the true Length of Pendulums" in 1787; he also published "Inquiry into the Original State & Formation of the Earth" in 1778, Second Edition 1786.

Clifton 1995,292 lists three John Whitehursts at Derby, 1736-1775, 1788-1810, and 1834-d1855 - only the first being designated Mathematical Instrument Maker, the others being clock or/and watch makers.

3981 ARM055 LENS - MOUNTED

Unsigned

LeD 73(3"); LeHsD 130; P 102x102; Hs 149x149x28.

Late 19 C. G.

Plano-convex lens in brass housing with spiral focus fits on a wood frame containing a ruled glass plate.

The oxidised brass frame for the lens has a spiral focus screw fitting into a brass ring with an oxidised brass thread and a (cracked) circular wood housing above a wooden frame for a (chipped) plate glass with fifteen lines ruled each way parallel to the sides; the frame is hinged to a wood block which in turn is hinged to a wood frame with rounded inner corners (inner dimensions 101x75); boxwood case (229x229x180).

4004 ARM078 LENS - PLANO CONVEX

Unsigned - attributed to Peter Dollond

HsD 62, W 10; CD 74, H 38. Mid 18 C. R.

Brass bound lens with screw thread to one side, housed in circular boxwood case; used by King George III.

A hand-written label on the case reads: "Object glafs of the Old Kew Equatorial 5f focus 2'.05 Aperture by Peter Dollond King George III observed with this the Transit of Venus (1761)".

4002 ARM076 LENS SYSTEM

Unsigned

H 57; D 43&25. Mid 19 C. G.

Brass bound; main cylinder and short eyepiece cylinder; reputed to have been used by A.J. Cannon.

A hand-written note attached to the lens system reads: "Eyepiece believed to have been used by A.J. Cannon in HD Catalogue Survey". This is just one of a large collection of lenses, minor telescopes, and optical parts.

3960 ARM034 MANOMETER

Unsigned

H 179; W 35; TuD 13; C 214x78x75. Mid to late 19 C. G.

Glass U-tube containing mercury has one end closed and other open (with a cork); central ivory scale 1-5(x2).

The open limb now has cotton wool between the mercury and the cork; on the back of the manometer is a brass plate with a screw thread below; the glass limbs are divided to correspond with the scale, but the divisions are not numbered; the instrument is protected by saw-dust and is in a boxwood case with handwritten "Mrs Robinson" crossed out and "Air pump Guage"; the case had a printed label: "LONDON ASHER & Co. 13 BEDFORD STREET, COVENT GARDEN".

3992 ARM066 MERIDIAN CALENDAR

PATENT Meridian Calendar

BD 65; H 40; MxD 85. Late 19 C. G.

Brass base; circular glass block with angled cut above silvered dial, divided 1-31; compass and two small dials.

The 1-31 (day) divisions are around the outside of the dial; the small glazed compass is at the bottom centre of the face and gives eight directions; the small dials read months "JAN" - "DEC" and days "Sun" - "SAT".

3977 ARM051 MICROSCOPE - SOLAR

Shuttleworth Ludgate Strt. London

MnL 175; BP 129x128; MiHs 183x59. Late 18 C. R.

Brass; base plate has two wing-nuts to alter the angle of the mirror and rotate it; condensing lens and tube.

The mirror (with corroded silvering) is in a brass frame housing, and the adjusting knobs on the plate function by rack and pinion; there is a lens at the plate end of the tube (D41), and a push-in tube at the other end; this reduces to a small aperture (D11) which unscrews; there is no place for a slide to be projected.

Turner 1989,52 records that Henry Raines Shuttleworth obtained his freedom to trade in 1754 and was still alive in 1797; his son Henry was free in 1787 and died in 1812.

A note with the instrument records that it is from Armagh Public Library.

3998 ARM072 MIRROR

Unsigned

ID 467(18½"); OD 497. Late 19 C. G.

Iron housing with three lugs for bolts; glass disc with most of silvering now gone; metal cover with handle.

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3980 ARM054 MIRROR - SPECULUM METAL

Unsigned but by Sir William Herschel (1738-1822)

HdD 228, H 27; C 404x360x103. Mid to late 18 C. R.

Brass shallow cylinder housing with handle at back and with removable cover; mahogany case with tube and lenses.

The mirror is chipped; the case is lined with green velvet, and has brass handles at the sides; it contains a brass tube (L320,D49) in five screw-together segments containing three lenses (one chipped); a label with the mirror reads: "A 9 inch aperture and 10 feet focus Herschel Newtonian mirror. It is said to have been made with peculiar care for George III. Presented to the Observatory by Queen Victoria in 1840 [sic]. Instructions for mounting the mirror are given in a letter from Caroline Herschel."

3966 ARM040 MOON SURFACE MODEL

A MODEL OF PART OF THE MOON'S SURFACE Shrewsbury. 1849. HENRY BLUNT.

C 161x122x30. 1849. S.

Hinged mahogany case; white plaster model of crater.

The signature label under the lid of the case reads: "This model is an accurate representation of a portion of the Moon's surface as it appears through a Newtonian tele-scope of seven feet focus, under a magnifying power of about 250. The large volcanic crater, which forms the principal object in the model, has received the name ERATOSTHENES. It is about 30 miles in diameter, and stands at the end of a lofty range of mountains, not far from the centre of the moon's disc. A hilly district, rising into two or three lofty peaks runs upward from Eratosthenes, connecting it with what appears to have been an ancient crater, now filled up. Touching the edge of this crater, and descending from it towards the right, may be seen a long line of minute volcanic cups, which are nearly the smallest objects visible with the instrument by which the observations were made. The whole is represented as seen with an inverting eye-piece; and the model ought to be held in an oblique light in order to view it to advantage."

There is also a larger unsigned model of a crater on a wood base (272x235).

3690 ARM003 MURAL CIRCLE

Thomas Jones & Sons Charing Cross London 1831

CrD 1422; LeD 97; LaTuL 1622.

1831, mounted 1832. SR

Brass on massive shaped mount; circle has 16 tapering supports to centre; telescope has right-angle eyepiece.

The latter has a micrometer adjustment; on the support are four pivoted convex mirrors (HsD115) and four reading microscopes; there are also two wood and brass turning handles; the circle scale is 10-360°.

Butler 1990,50 records that originally the circle was used for measurements of declination only, but in its later form (as here) the passage of a star across the meridian could be timed with a clockwork chronograph (3707 ARM020) which would also have given the right ascension.

Bennett 1990,79-80 records that the original meridian wall was made of Armagh marble. It was unusual in being shaped to the outline of a circle, to allow the microscopes to lie transversely along the outer surface of the pier, and read the divisions on a gold-silver alloy scale let into the inner side of the circle. The microscopes were triple achromatics by Tulley. The circular pivots turned on Y bearings within the wall, instead of the Greenwich arrangement of conical pivots in circular collars. The circle was rotated by pinions engaging teeth in a separate wheel attached to the axis or, for fine adjustments, by clamps engaging the same wheel. The first results date to April 9, 1832. Jones reground the large pivot in August, and redivided the circle, and he did both again in October 1834. Bennett gives the dimensions - circle diameter 56ins, telescope aperture 3.8ins, focal length 63ins (object-glass by Tulley), and axis 36ins long.

Bennett 1990,126 records that the instrument was modified [to its present] form between 1860 and 1863. The original telescope was given an equatorial stand, and continued in use at the Observatory. It was replaced on the circle by a seven inch aperture telescope by Thomas Grubb, only five inches longer in focal length than the 3.8 inch. The object-glass supplied by Grubb comprised two achromatic lenses (i.e four lenses in all). The circle was then used as a transit instrument, something which had "never been successfully tried before", according to Thomas Romney Robinson. Two telescopic collimators by Thomas Grubb, with object-glasses from Munich, were fitted in the north and south windows of the circle room, and supported on piers, to check the alignment of the optical axis of the telescope. A new north meridian mark, 8,000 feet from the circle, required a correcting lens in front of the object glass, and Grubb's polishing apparatus "completed it with perfect success".

3952 ARM026 NAVIGATIONAL PLOTTER

BETE C 9

MxL 593; Al 79x25; AsW 52. Early to mid 20 C. G.

Brass; brackets hold two sets of pivoted parallel arms to black metal compass circle on plastic alidade.

The bracket at one side has a frame and clamping screw for a missing holding bar (at the side of a drawing board?); the two parallel bars from this meet one of the short sides of an isosceles triangular bracket; two more run from the other short side to a second triangular bracket; pivoted at the apex of this is the compass disc, divided 10-360° with "N E W S" marked; the clear alidade is divided on one side 0-150 in black, and 0-75 in red; in the centre, on one side, parallel to the long sides, is a black arrow.

3969 ARM043 OBJECT GLASS - DIVIDED MICROMETER

T. BLUNT LONDON

L 375; W 131; TuD 111, H 30; LeD 108. 1794-1823. R.

Brass housing and shallow cylinder tube has rack and pinion mechanisms to move halves of plane glass lens.

On one side is a linear scale 1-4 with a vernier; the matching half lenses are each attached to sliding brass plates which are moved, using (missing) keys, within a brass backing plate with slide bars on each side.

Working dates from Clifton 1995,33.

3699 ARM012 ORRERY

Gilkerson & Co. Tower Hill London (LANE 1819)

Sp 323; TaH 325, D 222. 1819-1825. FS.

Brass; folding cabriole legs; tapering pillar; cylinder drum for clockwork; planetarium, tellurian and lunarium.

Ivory and brass handle at the side of the shallow cylinder drum; seven rings around the axis lead to planets, four with moons - Earth has one moon, Jupiter has five, Saturn has seven, and Uranus five; the planet of Saturn is missing; the top of the drum has a decorated six-pointed star on the centre and, on the outside, zodiac signs and abbreviated names "AQU." "PIS." with divisions 10-30 for each one, then day divisions for each month, with the abbreviated names of the months "JAN." "FEB." on the outside. The tellurium (B298x95x29; GD69), which can replace the planetarium, is stored on a wood base, and has a horizontal brass plate (L253) for its clockwork mechanism below and above; at one side is the angled Earth globe "LANE'S Terrestrial Globe. LONDON. 1819." with a silvered meridian ring 10-80°(x4) and a half ring at right-angles 10-90°; in the middle of the plate is a silvered horizontal hour ring (D56) I-XII(x2) with a watch hand; a horse-shoe brass arc (D103) is on a crook over the earth; there is a pointer at the other end of the plate lower and parallel to it, which would read the drum of the main orrery.

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McFarland 1990,193 has a photograph of the lunarium, also on a horizontal brass plate with a pointer to the orrery drum, but this was not found on the visit in September 1991.

Butler 1990,16 records that orreries were designed to illustrate the relative simplicity of the "Copernican" system, and to convince people of its authenticity. They received their name from an Irish Lord, the Earl of Orrery, for whom the first such device was made in 1705 by John Rowley.

Gilkerson dates 1809-25 from Clifton 1995,113. Uranus was discovered in 1781 by William Herschel.

3997 ARM071 ORRERY

GEORGE PHILIP & SON LTD 32 FLEET ST. LONDON MADE IN ENGLAND

Sp 400; TH 230, D 530. Early 20 C. G.

Circular table on three turned wood legs; handle drives brass clockwork mechanism for Sun, Earth and Moon.

The table has a paper ring divided for "Amplitude" 0-90-0-90-0° and "Azimuth" 0-90-0-90-0°, then compass directions, then constellations, then 10-30(x12) days of months, with months on the outside; a metal and turned wood handle at the side of the table drives the clockwork mechanism, which has three horizontal bars and, on top, a gold wood sphere (D67) for the Sun, a globe with continents (D27) for Earth, and a small white Moon; attached to the axis of the Sun are right-angled bars to small black spheres (D6) for Mercury and Venus, but these keep their positions constant with respect to the Sun; on sleeves between the clockwork mechanism and the table are horizontal rods for the other planets, which are stored in a box with the Trade Label: "CHADBURN BROTHER[S] OPTICIANS, &c. SHEFFIELD"; there are five of these - Mars (2 moons), Jupiter (8 moons), Saturn (10 moons), Uranus (4 moons), and Neptune (1 moon).

Jupiter's eighth moon was discovered in 1908 - late date supported by "LTD" and "MADE IN ENGLAND".

3692 ARM005 PENDULUM - COMPENSATED

Unsigned[?] but made by Christopher Sharp

Not measured. 1830. R.

Mercury; compensated for pressure and temperature; first such pendulum in the world; in Earnshaw clock No.1.

Butler 1990,47 records that the original pendulum of the Earnshaw regulator "was replaced in 1830 with a pressure and temperature compensated pendulum by Sharp of Dublin which was the first such barometrically compensated pendulum in the world. This pendulum led to a dramatic improvement in the accuracy of the clock. Regrettably it is no longer complete."

Bennett 1990,73 records that clockmaker Christopher Sharp (sometimes "Sharpe") was brought from Dublin in September 1827 to open and clean the Earnshaw clock for the first time since it had been set up in 1794. In October 1827 Sharp was sold the larger of the old transits for twenty guineas. In September 1830 he was entrusted with substituting a mercury compensation pendulum for the original gridiron.

Fennell 1963,34 records a regulator by Christopher Sharp (Sharpe) dated 1824.

4005 ARM079 PENDULUM - SIPHON BAROMETER

Unsigned but by Thomas Romney Robinson (1792-1882)

L 1110; BD 64; CysD 18, H 24. c1831. R.

Black iron bar holds frame with brass disc below, sliding disc and two small cylinders for tubes above.

The frame is made of two parallel metal bars with the brass disc below (having a raised edge) and a cross-bar on top holding the cylinders for the barometer tubes; part of one tube remains, as does a vial of the same diameter, with a brass cap, holding mercury; there is an adjusting screw top centre.

McFarland 1990,168 describes this as: "Syphon Baro-meter Pendulum by Romney Robinson. Used to correct the clock rate for changes in the atmospheric pressure" and gives the reference: Monthly Notices of the Royal Astronomical Society 2,40,1831.

3948 ARM022 PLATE MEASURER

SPENCER BUFFALO USA 101338

H 537; W 900; PFr O 289x258, I 240x189. Early 20 C. G.

Black metal and brass; angled horizontal and vertical supports for sliding brass frame; binocular eyepiece.

A robust wide frame holds runners for horizontal adjust with brass knurled knob and linear scale 1-23; above this is a vertical support on which slides the brass photo-graphic plate frame with two cylinder counter-weights over pulleys above; an arm in front, with side scale 1-28 and double knob rack and pinion adjust, holds pivoted brackets for a binocular prism microscope coupled by cogged arcs (one eyepiece is detached and its housing is missing); there is a modern electric light fitting behind a white glass screen under the plate frame.

3947 ARM021 PLATE MEASURER

TROUGHTON & SIMMS LONDON

H 515; W 678; SCrOD 273; PFr 161x161. 1899. R.

Brass and oxidised brass; robust support; angled slide bar for silver scale around frame; microscope above.

The support structure holds a slide bar at an angle to the vertical with a linear scale "B" 0-15 having a vernier for a plate (272x265) holding a silver ring scale 10-360° with a frame for the photographic plate to be measured; there are clamping and adjust screws, and a brass cylinder counter-weight on a chain over a pulley; on a wide frame above this is another sliding plate (369x110) on a horizontal bar with linear scale "A", to which the microscope (now detached and held in a wood table frame) can be attached; the instrument is contained on a table stand with a hinged boxwood housing.

McFarland 1990,173 records that the Royal Society provided £70 towards the purchase of this measuring machine. A survey of the positions of all stars and other objects within 25 arc minutes of the centre of the spiral galaxy in Triangulum, Messier 33, was conducted using photographic plates exposed by Isaac Roberts (see Proceedings of the Royal Irish Academy, 25A, 1904).

Date from McFarland 1990,173.

3949 ARM023 QUADRANT

Burton London

R 151(6"); W 245; SisL 174. Late 18 early 19 C. G.

Brass; right-angled open bracket with arc scale 0-90; pivoted arm ends in window vernier.

Each decade on the scale has twenty divisions; the bracket is strengthened by two cross-bars parallel to the sides; there are two holes on one side, one on the other, and two on the pivoted arm.

Clifton 1995,44-5 lists seventeen London Burtons with dates from 1713-1849!

3696 ARM009 QUADRANT - ASTRONOMICAL

J. Sifson LONDON

R 516; HoCrH 905; MnH 1480. Pre 1769. R.

Brass; mahogany pillared stand to horizontal circle; T-frame for eight-spoke wheel supporting quadrant.

The triangular mahogany foot has three extensions, one sawn off short, the other two with level screws; from this rise six outer mahogany pillar supports for the brass horizontal circle, divided 0-90-0-90-0°; a central tapering mahogany pillar rises through the centre of the horizontal circle, to a T-frame; the axis of the brass eight-spoke wheel is held below the horizontal

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bar of the T, on which is a brass spirit-level; the two right-angled supports, and the arc quadrant, which is divided 0-90°, touch the circumference of the wheel; no telescope remains.

Butler 1990,22 describes the instrument: "A quadrant which was described by Thomas Romney Robinson as 'a curious specimen of an early instrument'. Quadrants were used prior to the invention of the Transit Instrument to measure the positions of stars. This instrument was part of the collection at [George III's Observatory at] Kew and was used in the observation of the Transit of Venus in 1769."

Crawforth 1988,14 gives working dates of 1722-47 for Jonathan Sisson, and 1749-88 for Jeremiah Sisson.

3700 ARM013 SEXTANT

Dollond London

R 208; SW 282; TuL 158, D 20. Early 19 C. G.

Brass; curved T insert; reinforced index arm; silver window vernier to silver scale 0-140; handle below.

The top of the T frame insert has a convex curve; there are three index glass filters in square frames, and three horizon filters in circular frames, each set consisting of green, orange, and dark orange; the index arm and the horizon glass mount are both loose, and the horizon glass is gone; there is a long telescope eyepiece, and a mahogany handle below the frame.

3688 ARM001 TELESCOPE - EQUATORIAL

Troughton London

LeD 70; H 2680; CrD 1290. Acquired December 1795.

Brass; equatorial circle held by two sets of four cones; telescope on conical axes within two declination circles.

The bottom set of cones from the equatorial circle, which is silvered and divided I-XII hours (x2), rest on an angled disc, and the upper set are supported by a curved bracket; two side supports hold micrometer microscopes to read the scale on the circle; brackets within the circle hold the conical axes for the telescope, which is held between the two eight-spoke declination circles, one of which has a silvered scale, divided 5-180°(x2) and read by two microscopes, one above the equatorial circle, and one below; above the telescope is a double spirit level.

Butler 1990,41 records that the telescope was made by J.E. Troughton (1753-1835), and that it is a masterpiece of English instrument-making of the Eighteenth Century. It was purchased by Archbishop Robinson, on the recommendation of the Astronomer Royal of England (Nevil Maskelyne). A simple transit instrument had the disadvantage that it could observe stars only once per night. This instrument was able to measure the positions of stars in any part of the sky, and many times during the night.

Bennett 1990,40 records that the instrument was built close to Troughton's original design. He writes: "The polar axis was established by a framework whose principal members were eight brass cones, attached directly to the equatorial circle...The same framework also supported the axis of the double declination circle, and both circles were divided to five minutes of arc and read by pairs of micrometer microscopes to single seconds. The 44-in telescope between the two declination circles had an aperture of 2.75 inches."

Butler 1990,38 writes: "The astronomers were somewhat dubious that the instrument makers of the day could accomplish the high standard of stability and accuracy, in this more complicated design, than in the simple and well tried meridian and transit circles. Manufacturers, and particularly Troughton, felt they could. To improve stability Troughton used massive stone pillars for support and for rigidity used conical brass tubes to support the central telescope ring. In the final outcome...the astronomers were proved right, in that the telescope could not match the accuracy of the simple transit and meridian circle. It was an expensive mistake."

Bennett 1990,31 shows a drawing of the equatorial sent to Armagh in 1792, and this is signed "John & Edw. Troughton". The "J.E. Troughton (1753-1835)" recorded in Butler 1990,41 may refer to John (d1807) and Edward (1753-1835)?

3999 ARM073 TELESCOPE – PORTABLE ALTAZIMUTH

G. Adams London

Sp 120; BD 106; CrsD 96&89; TuL 157, D 20.

Late 18 C. R.

Brass base ring; curved trunnions to double part-circle for hour circle; bar on this holds tube and full circle.

The base is on three level screws, has an outer ring divided 0-180-0°, and contains a revolving disc with cross-ed spirit levels; curved trunnions from this revolving disc rise to the axis of parallel arcs 80-0-90; on these is the hour circle I-XII(x2) in the form of a complete disc with raised edge rather than a ring; a revolving diagonal on this (D9) has one vernier reading a four-spoke circle 0-90-0-90-0° with tangent and clamping screws, at one end, and holds the telescope tube at right-angles at the other end; on the other side of the axis of the double arc is a spherical counterweight (D23) on a short tube; the instrument is in a mahogany case (226x176x140).

Goodison 1977,117 records: George Adams Senior c1704-72, Junior 1750-95 - this is attributed to Adams Junior.

3988 ARM062 TELESCOPE – PORTABLE ALTAZIMUTH

Gilkerson & Co, Tower Hill London

Sp 410; H 1260; HoCrH 673; C 1381x730x510.

1809-1825. R.

Brass; base circle; two vertical pillars to pivot with part circle; two full circles at right-angles; telescope.

The base circle (D261) has three side feet with level screws and supports two vertical pillars (D58) to the axis of a five-spoke circle arc (D310) with tangent and clamping screws; the instrument pivots about this axis with a cylinder counterweight on the other side; the eight-spoke "horizontal" hour circle (D310) is divided I-XII(x2) and is adjusted by a double tangent screw (the clamping screw is gone); and the inserted silver scale is read by four window verniers, with two rotating magnifiers; above the circle is a sphere (D111) with conical side arms, from the ends of which rise supports to a tube (D37) which has the eight spoke "vertical" circle (D310) at one side, read by two window verniers and rotating magnifiers; on the other end of the tube is the telescope (L762,D63), with a drum micrometer eyepiece and an objective lens hood with hinged flap; at the circle end of the conical side arm is a double spirit level with ivory scales, and there is a single level replacement with ivory scale 60-0-60; in a mahogany fitted case, with two pairs of brass handles at the sides.

Dates from Clifton 1995,113.

3963 ARM037 TELESCOPE - REFLECTING

G. Adams No.60 Fleet Street London Instrut Maker to his MAJESTY

Sp 360; PvH 350; TuD 110; C 987x365x168.

1767-1795.A.

Brass; folding tripod cabriole legs; pivot to tube.

The folding legs are on hinges below a disc from which rises a turned pillar to a pivot below a bracket to the tube; above the tube are pin-hole and point sights, and it has a turned objective end cover; focus is by a knob and screw thread outside the tube with an internal sliding bracket to the secondary mirror; a smaller signed tube leads to the eyepiece; in a fitted mahogany case.

Dates from Clifton 1995,2-3.

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3693 ARM006 TELESCOPE - REFLECTING

Unsigned[?] but made by Thomas Grubb

Mid 381 (15"). 1834. R.

Mirror cell and mounting; shallow cylinder with three plates each having three pairs of dumb-bell-shaped support pads.

Butler 1990,54-5 records that Thomas Romney Robinson was a close friend of Thomas Grubb, who built a fifteen inch diameter reflecting telescope for Armagh in 1834. This incorporated several revolutionary innovations which have subsequently become widely accepted in telescope design - it was a Cassegrain reflector (in which a curved secondary mirror projects the image down through a hole in the primary to a focus just below the bottom of the telescope); it was the first large reflecting telescope to be mounted on a polar axis with a clock drive; and it incorporated a novel lever system [still preserved] for the primary mirror. The latter allowed the supporting pressure to be distributed evenly over the back surface of the mirror. If the mirror simply rested on a flat bed, small humps on the back surface of the mirror took a disproportionate amount of weight and, as a result, the mirror bent slightly and the image became distorted.

Bennett 1990,81-3 records that the Armagh reflector was Thomas Grubb's first telescope other than small instruments made privately for his own use. By 1834, Grubb had completed an equatorial mount for a 13.3 inch object glass by Cauchoix of Paris, which had been purchased by Edward J. Cooper for his private Observatory at Markree, Co. Sligo. Thomas Romney Robinson recalled that the Armagh mounting "was constructed by Mr Grubb as an experimental model of Mr. Cooper's". This emphasises the importance of Robinson and Armagh in launching one of the most influential careers in the history of telescope making. By 1835 an equatorial mounting was installed at Armagh with the fifteen inch reflector, which had provision for use either as a Newtonian [in which the observer views from the top side of the telescope] or a Cassegrain. The setting circles were only ten inches in diameter, but Robinson found he could take positions from them, and later had some reading micrometers fitted.

Butler 1990,54 records that the telescope was dismantled and largely broken up in the 1920s. Other parts, in addition to the mirror cell, remain, notably the metal mounting with its disc counter-weight.

McFarland 1990,197 also lists and illustrates the secondary mirror and the clock drive.

3697 ARM010 TELESCOPE - REFLECTING

THOMAS SHORT LONDON 2/1371 24

Sp380; PvH465; TuL720,D154(6"); C902x413x223.

c1768. R.

Brass; folding tripod foot; disc rack; pillar to pivot for tube bracket; Newtonian/Cassegrain optics.

An ivory and brass key pinion allows the telescope to revolve around the disc rack on top of the foot; a support rises at an angle from the foot to the bottom of the tube; there is a finder (L385,D27) above the tube, which also has two hinged D-handles; there are eyepieces in the centre of the primary mirror at the bottom of the tube, and at the top side of the tube; a knob near the bottom of the tube is connected to a rod to adjust the secondary mirror.

Butler 1990,22 describes this instrument: "The actual telescope used by George III to observe the Transit of Venus [in 1769] at [his Observatory at] Kew. It is made by the famous London instrument maker, James Short (1710-1768) and includes a number of alternative configurations. It can be used as a Newtonian telescope, or alternatively as a Cassegrain or Gregorian."

The telescope is actually signed by Thomas Short, brother of James. Turner 1969,100 indicates that the last serial number of James's telescopes is 1370, and records (p.95) that Thomas completed some orders left unfinished. Since James died in 1768, the serial number of this telescope is 1371, and it was used in 1769, this would appear to span the two makers.

The fitted mahogany case for the telescope remains, with a variety of accessories, including eyepieces, secondary mirrors, objective lens, solar and variable density filters.

3995 ARM069 TELESCOPE - REFLECTING

Unsigned

Sp 348; PvH 377; TuL 594, D 102. Late 18 C. G.

Brass; folding cabriole feet; turned pillar to revolving horizontal disc and cut-off disc attached to tube.

The cut-off vertical turned disc (D136) has a bracket attached to the tube by two wing-nuts; the secondary mirror is adjusted by a knurled knob from the eyepiece end; objective end cover; part of the King George III collection of instruments presented to Armagh Observatory by Queen Victoria in 1841.

Lists of George III instruments given in Lindsay 1969,67 and McFarland 1990,160.

3701 ARM014 TELESCOPE - REFLECTING

Unsigned[?]

BD c150; SrD c85; TuL c220, D c90. Mid 20 C. G.

Full size model of Newton's original telescope; wood base, turned pillar; sphere; brass-bound double tube.

The disc base has two vertical brass bars to brass brackets at the sides of the wood sphere, which sits on the turned pillar at the centre of the base; on top of the sphere is a brass rod, parallel to the tube, which supports the tube at each end, and the position of the sphere and tube can be altered at will; the wood tube is in two parts, an outer tube and an inner extension, and the brass eyepiece is at the upper end of the inner tube.

Butler 1990,17 records that the original Newton reflecting telescope belongs to the Royal Society. It was the first telescope to use mirrors rather than lenses to focus the light and is the progenitor of most of the large telescopes built to-day.

3983 ARM057 TELESCOPE - REFRACTING

Dollond London

MnL 670; HsL 603, D 80. Early 19 C. G.

Boxwood cylinder tube (cracked); turned brass eyepiece end; one lens only remains - at the eyepiece end.

The eyepiece end has a (stuck) lens flap; the tube has two knurled knobs for a (missing) stand bracket.

3982 ARM056 TELESCOPE - REFRACTING

Dollond LONDON

LeD 69(2.75"); MnL 1136; TuD 56-84. Early 19 C. G.

Tapering mahogany tube with brass ends for lenses (eyepiece missing); rack and pinion eyepiece focus.

There are two screws on the tube for a stand bracket (missing).

The telescope is photographed with a tripod stand in McFarland 1990,190.

3694 ARM007 TELESCOPE - REFRACTING

GRUBB DUBLIN 1885

LeD 254 (10"). 1884-5. R.

Blue iron base and angled mount with glazed panels; tube tapers to both ends, with counterweights at axis.

The mount above the base is at an angle of about 40°; at right-angles to this rises a slightly tapering pillar to the cubic mount for the axis of the tube and counterweights on the other side of the mount; the clock drive and gearing are held in and above the angled support; the telescope is housed in a dome near the Observatory main building.

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Butler 1990,67 records that the J.L.E. Dreyer, the Director who succeeded Thomas Romney Robinson, obtained a grant for £2000 with which he purchased this ten-inch refracting telescope from Howard Grubb.

Bennett 1990,162-4 records that the price agreed by a contract of 22 September 1884 was £945 with a separate contract of £100 for the dome. Dreyer made the first observations with the telescope on July 28 1885. The telescope was housed in a detached building about fifteen feet in diameter, comprising an iron framework sheeted with wood, and set on a stone foundation. The dome had diameter sixteen feet, and had an iron frame-work covered with papier mâché. The telescope had two alternative eyepiece micrometers. One with a single screw and fixed and movable steel bars could be used for observing faint nebulae without illumination. The other - a bifilar presented by Grubb - was illuminated by electric light. There were separate bulbs for bright wire and bright field illumination, and one each for reading the declination circle (which could be done from the eyepiece), and the micrometer screw heads.

McFarland 1990,173 records that one of the most energetic stellar flares ever observed was seen by Dr A.D. Andrews with this telescope in 1969 - it may still be a record.

4001 ARM075 TELESCOPE - REFRACTING

Unsigned

L 2490; TuL 2156, D 115-127; SmTuD 51.

Mid to Late 18 C. R.

Mahogany main tube with brass fittings; brass eyepiece tube with lens and lens flap; no objective lens.

Lindsay 1969,67 and McFarland 1990,160 list this as one of the King George III collection of instruments presented to Armagh Observatory by Queen Victoria in 1841; McFarland attributes it to Peter Dollond.

3996 ARM070 TELESCOPE - REFRACTING

Unsigned

Sp 447; PvH 511; TuL 1009, D 111. Mid to late 18 C. R.

Folding brass cabriole legs and pillar to pivot for part-circle bracket to brass-bound mahogany tube.

The tube has brass fittings at objective and eyepiece ends and part of the way along the tube; it has an objective lens cover.

McFarland 1990,160 lists this as one of the King George III collection of instruments presented to Armagh Observatory by Queen Victoria in 1841; it was loaned to Queen's College, Belfast, in c1851, and was returned without object glass and eyepieces.

3984 ARM058 TELESCOPE - REFRACTING

Unsigned

LeD 64(2½"); L 900; Hs 763x216x122. Late 19 C. G.

Rectangular boxwood housing; divided object glass, one part on sprung slide; eyepiece tube with only one lens.

The lens at the eyepiece end is at the point where the tube (L100,D46) meets the housing; the divided object glass is in an oxidised brass housing; a knob at the eyepiece end presumably altered the adjustment of the divided objective, but does not do so now.

McFarland 1990,161 identifies this as the refractor by John Dollond, of 42-inch focal length used by Dr J.A. Hamilton to make a series of measures of the Sun's apparent diameter in 1794-95, in order to test the relative accuracy of a wire-micrometer and an object-glass micro-meter (both by Dollond) - see Transactions of the Royal Irish Academy, 10, 109-117.

3702 ARM015 TELESCOPE - REFRACTING

Unsigned

L c940; D c50-60. Mid 20 C. G.

Model of one of Galileo's telescopes; slightly tapering leather-covered tube with gold foliate decoration.

The latter is in ring bands at intervals along the tube.

Butler 1990,14 records: "With simple refracting telescopes of this type Galileo discovered the moons of Jupiter, the Craters of the Moon, and Sunspots. From his observations he became convinced that Copernicus was right and that the Earth and planets moved around the Sun..."

3964 ARM038 TELESCOPE DRIVE

Unsigned (Attributed to Thomas Grubb)

Sp 308&179; H 285. 1835. R.

Cast iron base; clockwork mechanism between two vertical brass plates; cogwheel with handle outside plates.

The base has two transverse feet; the plates (173x133) hold a drum for the wire from the driving weight (missing); the outside cog-wheel (D115), with the handle, has an extended axis above one long side of the base; on top of the inner plate is a horizontal side arm ending in a ring (D41) with a central bolt and three adjusting bolts around the circumference. The drive seems identical to that illustrated in McFarland 1990,197 (except that the bases are different, that in the illustration being shorter); the drive is listed as part of the 1835 Thomas Grubb 15-inch reflector, and this drive is thus attributed to Thomas Grubb.

3954 ARM028 TELESCOPE DRIVE GOVERNOR

Unsigned

HsB 305x305, H 580. Mid to late 19 C. G.

Glazed mahogany pyramid case; iron and brass frame for four suspended rotating balls; clockwork underneath.

The sloping frame has a brass ring below (D250) and a revolving pillar for the four brass knobs (D55) on iron rods; a screw thread on each rod allows adjustment of the knobs, which are spherical with a neck and disc above; in the base of the case, from which the glazed pyramid lifts, is a drum and wire for a driving weight, and a cog system with a flywheel which turns the governor through two cog wheels at right-angles; the bottoms of the bars holding the knobs are in frames each with a pivoted stop at the end holding brake pads which would make a frictional breaking contact with the ring should the knobs be rotating too fast; one pane of glass in the pyramid frame is broken, and another is cracked.

3987 ARM061 TELESCOPE MOUNT

Unsigned but attributed to Adams

Sp 820; TH 1205; P 406x87; MosH 270. Late 18 C. G.

"Reversing apparatus for Adams transit instrument"; tripod mahogany stand; revolving top; metal mounts.

The stand has one remaining brass level screw - the other two feet have been cut off; there are strengthening cross bars between the feet and between the legs; the revolving table on top has four protruding turned knobs; on the table is a brass-bound metal plate for two brass vertical mounts with mahogany and velvet at the arcs which supported the telescope.

McFarland 1990,159 records that this is the reversing apparatus for the Adams transit instrument (which member of the Adams family is not recorded), part of the King George III collection presented to the Observatory by Queen Victoria in 1841; the instrument, minus its object glass, was loaned to Queen's College, Belfast around 1851, and is now lost; the observing chair for the transit remains at Armagh.

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3979 ARM053 TELESCOPE MOUNT

Unsigned

CyL 475, D 163; H 452. Mid to late 18 C. R.

A copper cylinder is mounted on a milled brass arc, and both pivot on Y-supports to the cylinder centre.

A worm screw below the milled arc (no longer working) alters the angle of the copper cylinder; under this is a brass boss (D39) leading to a bracket with a milled arc (W115) at one side, which now has no obvious purpose; another bracket is hinged to this and on the other side is a knurled knob and screw to alter the angle; each end of the cylinder has three holes, presumably for missing parts.

McFarland 1990,161 identifies this as an "Equal Altitude Instrument by Sisson", one of the instruments listed by Lindsay 1969,67 as belonging to the King George III collection presented to the Observatory by Queen Victoria in 1841.

3968 ARM042 TELESCOPE MOUNT

Unsigned

Sp 805; MnH 1320; Cr D 146; P 458x70x11.

Mid to late 18 C. R.

Mahogany central pillar with three folding legs to bracket for brass part circle holding a mahogany angled plate.

The central pillar is hexagonal in cross-section; the tops of the folding legs are attached to a sliding sleeve on the pillar and have hinges at floor level to horizontal struts, which are in turn hinged to the bottom of the pillar (one leg is broken); on top of the pillar is a revolving brass bracket with an adjust screw, with two brass pillars to the axis of the part circle (greater than a semi-circle), which has two pairs of curved spokes, making two tulip shapes; the edge of the part circle is milled and would have been turned by a worm screw, but this no longer functions; the upper flat edge of the part circle holds a mahogany strut secured by two brass wing nuts; to this strut is attached the angled mahogany plate.

McFarland 1990,160 lists this as one of the King George III collection of instruments presented to the Observatory by Queen Victoria in 1841, and he calls it a "Trial Telescope Stand".

4000 ARM074 THEODOLITE - TRANSIT

Dollond London

Sp 156; BD 200; Ho&VCrsD 150; TusL 183,D27.

Mid 19 C. G.

Brass; base plate; pillar to horizontal circle, telescope between; frame to axis of vertical circle.

The base plate has three level screws, and double tangent and clamping screws; between this and the horizontal circle is a telescope tube with a small vertical circle 90-0-90 at its side with a window vernier and tangent and clamping screws; a lattice frame strengthens the horizontal circle above a central pillar; this has a silver scale 10-360°, and tangent and clamping screws, read by four verniers "1 2 3 4"; above the horizontal circle is a horizontal and vertical bracket to the axis of the vertical circle, again with a strengthening lattice frame and divided 10-360°, read by four verniers "A B C D", with tangent and clamping screw; on the same axis is another telescope and, on the other side but higher, a spirit level 15-0-10(x2); the instrument is in a fitted mahogany case 532x353x296, and there is a small case with accessories, including a plumb-bob and various eyepieces.

3958 ARM032 THERMOMETER - GLASS MERCURY

L. CASELLA MAKER TO THE ADMIRAL[TY] & ORDNANCE LONDON

L 318; SP 285x24. Late 19 C. RG.

Silvered metal scale plate 10-100°; glass tube with white back extends beyond plate to spherical bulb.

The "TY" of "ADMIRALTY" has been lost due to a hole drilled in the scale plate.

Historical Technology 107,1973,126 records that the firm became Makers to the Admiralty in 1856.

3956 ARM030 THERMOMETER - GLASS MERCURY

J. NEWMAN 122 Regent Strt LONDON

S 202x24. 1827-1856. A.

Ivory scale plate (bottom half discoloured); -10-0-120° "FAHt" and -20-0-40° "REAUr"; spherical bulb.

The thermometer is held onto the scale by two oxidised brass clamps (one with a screw missing); the discolouring suggests that the thermometer bulb was held under a liquid for a prolonged period.

Dates from Crawforth 1988,12 and Downing 1988,92.

3959 ARM033 THERMOMETER - GLASS MERCURY

Unsigned

B 365x25. Late 19 C. G.

Corroded metal base plate; broken white ceramic scale 30-120° at one side of glass tube; bulb broken off.

The latter would have projected below the base plate.

3957 ARM031 THERMOMETER - MAXIMUM

CASELLA FECIT LONDON GARDEN MAXIMUM THERMOMETER

B 249x32; SP 192x13. Mid 19 C. RG.

Mahogany base; grey metal scale plate -20-0-160° along glass stem which bends to the spherical mercury bulb.

Brass hanging rings allow the thermometer to be hung vertically or horizontally; there is a hole behind the bulb (D19), and a brass semicircular protecting arm above it.

Historical Technology 107,1973,126 gives firm dates from 1848; the "FECIT" suggests it is early.

3689 ARM002 TRANSIT INSTRUMENT

Unsigned but made by Thomas Jones (1775-1852)

W(-Sus) 770; TeL c1600; TeD 103; LeD 95.

Acquired 1827.

Brass; two conical axes from pillars hold the telescope; which has twin divided circles near the eyepiece.

The small six-spoke circles (D150) are divided 0-90-0-90 inside, and 0-90 10-80 0-90 10-80 outside; they are held at the sides of the telescope tube by two pairs of bars; a knob at the side of the tube was presumably for rack and pinion focus, now not working; at one side of one conical axis is an eight-spoke wheel with a silvered scale 0-350°, but Bennett 1990,71 records that this setting circle on the horizontal axis is not original.

Butler 1990,30 records that the instrument: "is basically a telescope mounted on a horizontal axis which can be exactly aligned east-west. To reduce wear, the supports of the axis, which rest on solid stone piers, were made of polished agates. As a star crosses the observer's meridian he notes the time on the adjacent clock. This gives the star's right ascension."

Bennett 1990,70 records: "The new transit had a focal length of 63 ins, an aperture of 3.75 ins and an axis of 30 ins. The 6-ft piers carried Y bearings, one with a levelling, the other an azimuth adjustment; both were screw adjustments read by verniers to 0.001 ins. The level was found by a striding bubble-level, resting on the pivots, and the meridian from the marks erected for the former transit. The ball-metal pivots projected beyond the Ys, to connect to counterpoises. The counterpoises

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and the Y bearings were adjusted during the first few years, and [Thomas Romney] Robinson's mechanical sense and skill were valuable in making changes in Armagh and in conducting distant negotiations with Jones. Another early change was a new object glass, sent from Jones in December 1827. The micrometer too was improved in the early years, and a nine-wire micrometer (with two horizontal wires) was replaced in July 1829 by a similar one by Jones having a tenth wire moved by a micrometer screw. The tube's vertical setting was made by small divided circles with bubble levels, positioned near to the eye-end."

3976 ARM050 VERNIER RULE

Unsigned METRE LONDON

330x64x11. Late 19 early 20 C. G.

Boxwood; parallel rules each reading 30 cms "METRE" and 12 inches "LONDON", on base with vernier slide between.

This appears to be identical to the rule illustrated in Harris 1908,27, which is described: "Vernier, Boxwood, 30 cms. long, reading inches to 1/100ths and cms reading into 1/10th mm.; 10 divisions of vernier equal 9 on scale" (cost 2s 3d).

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BIRR CASTLE - BIR Historic Science Centre Birr Castle Co. Offaly Telephone 0509-20056

2416 BIR091 AIR PUMP - DOUBLE BARREL

Unsigned

H 209; W 180; WhD 124. Mid to late 19 C. G.

Brass and iron; central fly-wheel has right-angled side arms from axis for piston rods to two pivoted barrels.

Handle (missing) at one side, would have raised and lowered the near piston rod into one cylinder barrel and revolved the fly-wheel, which would, in turn, lower and raise the second rod into the second cylinder barrel, giving a rocking motion to the pivoted barrels, one rod rising while the other falls, and vice-versa; input and output pipes at the bottom, which is on an L-shaped base plate.

2415 BIR090 AIR PUMP - SYRINGE

THAYER & CHANDLER CHICAGO

B 740x101x19; TuL 313, D 38. Early 20 C. G.

White-metal; tube on four wheels, foot brackets on top; piston rod pivots on/secured to iron boss; wood base.

Remains of rubber tube on outlet pipe, from which a pipe connects to the centre of the piston ring; seems to be a foot-operated pump; there is an iron heel bracket on top of the tube away from the pivot, and a bracket raised on both sides for the ball of the foot/shoe; the whole device can rise from the pivot, perhaps to make it easier to secure the shoe.

3435 BIR137 AMMETER

AMPERES EDISWAN LONDON No 8606

BD 185; HsD 160, W 72. Early 20 C. G.

Blackened metal base and cylinder housing with white-metal and black hatched top; arc window and scale 30-0-30.

Face now somewhat rusted; on Edmundsons' switch board.

3420 BIR122 AMMETER

J. EDMUNDSON & CO LTD ELECTRICIANS 35 CAPEL ST DUBLIN

B 197x120x32; Hs 139x87x51. Late 19 C. G.

Two; mahogany base and glazed housing over U-magnet; brass fittings; scales 100-0-100 and 50-0-50 "AMP-ERES".

The horizontal magnet has a green-covered coil (D21, L47) parallel to its arms, stretching both inside and outside the U; the needle is attached to a small moving magnet in the centre of the coil, and it reads the white paper scale; in the 50-0-50 instrument, the signature plate is gone, the needle is broken, and the scale is detached.

3404 BIR106 AMMETER

EDMUNDSONS ELECTRICIANS DUBLIN. 2479

BD 190; HsD 163, W 63. Early 20 C. G.

Brass glazed cylinder housing; silver-metal face; white enamel or ceramic arc scale 0-50 "AMPERES".

Small central arrow to show "CHARGE" or "DIS- CHARGE"; two bars below housing for electrical contacts.

With other components on switching frame signed: "EDMUNDSONS LTD ENGINEERS & ELECTRICIANS DUBLIN".

3406 BIR108 AMMETER

AMMETER ELWELL-PARKER LTD.

BD 175; HsD 132, W 78. Early 20 C. G.

Brass base and glazed cylinder housing; silver-metal face and arc scale 0-50; two electric bar contacts below.

With other components on switching frame signed: "EDMUNDSONS LTD ENGINEERS & ELECTRICIANS DUBLIN".

Firm not listed in Pearsall 1974.

3418 BIR120 AMMETER

AMPERES PATERSON & COOPER, MAKERS. LONDON. 10 28

BD 159; HsD 132, W 50. 1885-1900. W.

Brass glazed cylinder housing; silver face; (detached) white arc ceramic (or enamel) scale marked 30-0-30.

Two iron and brass screw contacts below; scale rather crudely marked.

Second similar instrument has scale 120-0-120, and has an ebonite and brass spring contact between its two brass screw contacts.

Dates from Crawforth 1988,18.

3405 BIR107 AMMETER

Amperère-Meter S. Schuckert, Nürnberg. Syst. Hummel

No 8668

BD 200; HsD 173, W 70. Late 19 early 20 C. G.

Black metal base; brass glazed cylinder housing; white arc scale 0-60.

Needle pivots from the centre of a coil in a brass spool (D59) above the scale; two brass screw contacts on the black base below the housing.

With other components on switching frame signed: "EDMUNDSONS LTD ENGINEERS & ELECTRICIANS DUBLIN".

3433 BIR135 AMMETER

AMMETER STANLEY D'ARSONVAL DEAD BEAT 2446 U

BD 243; HsD 211, W 90. Early 20 C. G.

White-metal and hatched black top to metal cylinder housing; arc window and silvered scale 0-10.

At the back are six brass bolts with screws.

3419 BIR121 AMMETER

"WALSALL" AMMETER 2 8 1 3 0 4 6

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Hs 97x82x57. Late 19 C. G.

Glazed mahogany housing; brass bound coil; needle reads white-metal scale 0-3; two brass screw contacts on top.

3431 BIR133 AMMETER

Unsigned 617

HdD 101, W 50. Late 19 early 20 C. G.

Brass glazed cylinder housing; silver-metal arc scale 0-10 "AMPERES"; needle pivots from under brass disc.

The latter (D26) is at the bottom of the face, under the scale; there are two brass screw contacts on the top of the housing, one labelled "+".

3436 BIR138 AMMETERS & VOLTMETERS

GEC [General Electric Company]

HsD 162-212. Early to mid 20 C. G.

Two ammeters and two voltmeters; all in blackened cylinder metal housings with glazed arc scales.

One ammeter, scale 0-30, has a white-metal and black hatched face, and is on a board above the Edmundsons switch board; it looks earlier than the other instruments, which have all-blackened housings; the voltmeters are smaller and have scales 0-300; the other ammeter is larger and has scale 0-100.

2405 BIR081 ANEMOMETER - ROBINSON

L. CASELLA Maker to the Admiralty & Ordnance LONDON. No.383

Hs 114x98x48; VaW 418; CusD 75. Third ¼ 19 C. G.

Glazed oxidised brass housing for white scale 25-505 and 0-4; four copper cups on X-bar on top.

Latter attached to sleeved rod with ratchet and worm screw mechanism in the housing; boxwood case.

Low serial number 383; firm became Maker to the Admiralty in 1856, Historical Technology 107,1973,126.

0980 BIR021 ANEMOMETER - ROBINSON

Unsigned

H 334; Hs 166x114x51. Late 19 C. G.

Oxidised brass housing for two silvered dials 0-4 and 505-5000; screw mechanism to pillar; cups missing.

3430 BIR132 ATLANTIC CABLE SAMPLES

Unsigned

L c100-160. Third ¼ 19 C. G.

Ten samples; mostly iron and somewhat rusted; nine with paper labels giving hand-written details.

The details include: "New Cable from Sirewell Bay to Holland below 12 Miles"; [on more recent labels] "A piece of the first Atlantic Cable", "Section of the 1st original cable laid under the Atlantic between Europe and America"; "...ends at Howth and Holyhead ...2 miles of Irish Cable"; "New Cable from England to Holland" [twice on different samples]; "First Cable Laid down from Holyhead to Howth. It failed in three Days"; "Irish Cable from Holyhead to Howth."; "Orfordness to Scheremingen this was the other end at Orfordness for 5 Miles. beyond that each stretch is laid down separately."

The Encyclopedia Britannica 1968, Vol.21, p.771 records that the first transatlantic attempt in 1857 was a failure when the cable broke at 2,000 fathoms' depth during laying and could not be recovered; however, the Atlantic was spanned in 1858 between Ireland and Newfoundland; after a few weeks, the cable's insulation failed, and it had to be abandoned; it was 1866 before the first permanently successful transatlantic cable was laid and, in the same year, another cable, partly laid in 1865, was also completed; the U.S. financier Cyrus Field, and Lord Kelvin, were closely associated with the successful cables, and these remained the only transatlantic cables until 1869, when the French laid a cable.

3841 BIR150 BALANCE - EQUAL ARM

F.E. BECKER & CO 33-37 HATTON WALL Hatton Garden LONDON E.C. Speciality: Balances & Weights

B 339x170x15; H 449; BmW 250. 1884-1900. A.

Mahogany base; vertical pillar with sleeve for beam.

The brass pillar (D8) has an oxidised brass sleeve, with a clamping screw, attached to a horizontal bracket for a pivot at the top of the shears, from which the beam (with a right-angled pointer) is pivoted; the beam has open box ends, one missing its suspension hook, and the other retaining part of its hook; there are two glass pans (D62) with green suspension strings, which may belong to this balance.

Dates from Crawforth 1988,4 and Anderson 1990,10-11.

2394 BIR070 BALANCE - EQUAL ARM

(Trade Card) R. WENBORN, Scale, Weight, and Measure MANUFACTURER No. 172, HIGH HOLBORN...

BmL 156; PasD 63; C 202x100x30. 1839-1860. PC.

Rusted white-metal beam; box ends; shears; pointer.

Trade Card printed inscription continues: "...TWO DOORS FROM DRURY LANE. From Young's, SCALE MAKER TO HIS MAJESTY. Patent Scales of every description. Scales and Weights Repaired and Adjusted by the Quarter of the Year."; this is pasted on the inside of the lid of the damaged mahogany case, which contains three weights, including one for 1½ scruples signed "W. & T.A." (W & T Avery)

R. Wenborn was at this address from 1839-1860, (Diana Crawforth-Hitchins, personal communication); He was trained by Susanah Astill, bound 1795, freed 1819; As Queen Victoria's accession date was 1837, he evidently used an old label with a new address.

3842 BIR151 BALANCE - EQUAL ARM

Unsigned

B 253x126x60; MnH 340. Mid 19 C. G.

Remains of mahogany drawer base; brass pillar for crook raised by knob on base; beam and pans missing.

While the balance is in a distressed state, the lifting mechanism is in good condition; from the base rises a square cross-section pillar with two horizontal brackets for the flat vertical beam support; this bends in a crook on top to suspend the missing beam; at the bottom, it is raised or lowered by means of a horizontal knob attached to an egg-shaped vertical plate pushing the bottom of the support.

2423 BIR098 BALANCE - EQUAL ARM

Unsigned

H 479; BmL 360; PasD 232&159. Mid 19 C. G.

Cast iron; decorated pillar; beam, on knife edges, has swan-neck ends; one pan on three chains, other on iron hook.

2399 BIR075 BALANCE - EQUAL ARM

Unsigned Apothecaries' Weight.

BmL 154; PasD 63; C 175x87x36. Mid 19 C. G.

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Rusty white-metal beam, shears and pointer; tassel; swan ends; brass pans; mahogany case; weight guide on lid.
Pans hanging by three green strings to each; hand-written inscription on paper inside lid: "Apothecaries' Weight. 20 Grams = 1 Scruple = 20 Gr; 3 Scruples = 1 Drachm = 60; 8 Drachms = 1 Ounce = 480; 12 Ounces = 1 Pound = 5760; 60 Minims = 1 Drachm; 8 Drachms = 1 Ounce; 20 Ounces = 1 Pint; 8 Pints = 1 Gallon"

4069 BIR160 BALANCE - PRECISION

L. OERTLING LONDON

BmL 305; C 502x482x205. Late 19 C. G.

Brass, in glazed mahogany case with drawer below; knob to raise beam, divided 1-9, with mechanism for riders.

The beam, in the form of two open triangles, is supported by a vertical pillar, and is raised from its resting supports by means of the knob at the bottom of the front sliding glazed panel; a knob at the side allows riders to be placed on the beam; the pans are of white metal; there is a mahogany case (114x86x33) of weights from 10-1000 grains, with smaller wire weights and riders.

Ludwig Oertling operated from 1849 into this Century, Crawforth 1988,13.

2392 BIR068 BAROGRAPH - ANEROID

Unsigned PRESENTED TO LORD OXMANTOWN ON THE OCCASION OF HIS MARRIAGE 19th OCTOBER 1905.

B 355x211; H 223. 1905. S.

Mahogany drawer base; glazed frame; brass mechanism; eight evacuated capsules.

Capsules of silver-metal; oxidised brass chart drum; ivory backed glass/mercury thermometer 20-120° "FAHRT" and 0-60° "CENTE"; cut glass ink vial.

3421 BIR123 BAROMETER - ANEROID, PORTABLE

POUZET OPTICIEN RUE DU MT-BLANC GENEVE

HsD 45, W 17; CD 54, H 32. Late 19 C. R.

Silver-metal watch type housing; glazing and hand gone; outer rotating scale ring 0-3000, fixed 54-77; case.

The scales are of silver-metal; as well as the divisions, the inner fixed ring reads: "PLUIE VARIABLE BEAU PUZET GENEVE"; the mechanism can be seen through a central hole, and consists of a single white-metal evacuated capsule, a brass mechanism with a hair spring, and the mount for the missing reading hand; the case is leather-covered with purple silk and velvet lining, but the hinge is detached and the case in poor shape.

The Perret, Geneva, Catalogue, Spring 1992, Lot 77, records Pouzet as an Optician in the late 19 C.

2362 BIR048 BAROMETER - STICK

YEATES & SON, 2 Grafton St, Dublin

H 950; MxW 121. 1840-1864. G.

Rosewood?; flat top; glazed ivory scales 27-31"(x2); front glass/mercury thermometer; disc cistern cover.

Two slides on the scales 1-10, for readings "10 A.M. Yesterday." and "10 A.M. ToDay."; thermometer scale -10-130° "FAHRENHEIT" and -20-50° "CENTIGRADE"; rect-angular thermometer housing damaged and glass front slipped down; cut-away ivory knob above cistern cover to adjust mercury; single turned ivory-topped key to adjust slides.

2421 BIR096 BATTERY - LECLANCHÉ

PILE LECLANCHE INDIARUBBER SILVERTOWN

VSe 90x90/78x76; H 159/173; ApD 88. Post 1866. R.

White glass vessel; circular aperture with lip on top; another complete with ceramic cylinder element system.

Latter does not include "INDIARUBBER" but does include "LONDON".

Chaldecott 1989,165 notes that the India Rubber, Gutta Percha, and Telegraph Works Co. Ltd was the only firm licensed by Leclanché for the manufacture of his cells within the United Kingdom and the Colonies; the cell was patented in France in 1866; the firm had an office in London [100&106 Cannon St EC in 1894, Pearsall 1974, 259] and a factory in Silvertown, Essex.

There are two more vessels identical to that with the ceramic insert, but without their inserts.

2420 BIR095 BATTERY - LECLANCHÉ

LECLANCHÉ BARBIER PATENT R A L & CO LONDON

VSe 87x87, H 176; ApOD 68. Post 1866. R.

Two; green glass vessel, circular aperture without lip on top; various ceramic cylinders do not match.

The "L & CO" on the fused signature is contained in an ellipse, with "R" on the left side and "A" on the right.

Chaldecott 1989,165 records the patenting of a new galvanic cell by Georges-Lionel Leclanché, France 1866.

2422 BIR101 BATTERY - LECLANCHÉ

YEATES & SON DUBLIN

VSe 78x78, H 130; ApD 72. Mid to late 19 C. G.

Two; white glass vessel; circular aperture with lip on top; ceramic cylinders/element systems do not match.

3438 BIR140 BELL - ELECTRIC

Unsigned

Hs 155x104x93; H 172. Mid to late 19 C. G.

Damaged mahogany housing holds brass plates for bell, clapper, two electromagnetic coils, and cog mechanism.

The housing had four feet (two remain), has a door, and a frame presumably for a missing glass panel in front of the bell and clapper; the two parallel horizontal coils are mounted on top of the two vertical brass plates holding the mechanism; the instrument, with a mahogany base having two brass screw contacts, slides out of the housing.

2384 BIR060 CAMERA - BELLows

W. WATSON & SONS 313 HIGH HOLBORN LONDON

B 372x257; H 285. Late 19 early 20 C. F.

Mahogany base and frames both sides of damaged bellows; brass fittings.

Another bellows camera is more recent and more complete.

Older camera has hinged frosted glass focus plate at back; lens missing from front.

Firm assumed this name in 1882, Clarke 1989,87.

2349 BIR035 CAMERA - FOLDING

(Invented by Mr Ottewill)

L 737; Hs 675x485x418. Mid 19 C. G.

Folding double box camera; mahogany; brass fittings; one box can slide into the other; hinged door behind.

Used by Mary, Countess of Rosse (1813-1885) for photography by Le Gray's waxed paper process; picture size 12x15";

"Among the many ingenious contrivances which have been from time to time derived for the purpose of producing a really

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portable camera, few perhaps have been so simple as that invented by Mr. Ottewill, and there is none which more fully combines the requisite strength and firmness with a high degree of portability and efficiency. It consists of two folding bodies, one sliding within the other as in the ordinary sliding camera, and possesses therefore all the advantages and conveniences of that useful form, but is at the same time capable of being readily folded up in a few moments into a small and convenient package for travelling. The outer body is fixed to the bottom board, its sides folding inward, and is rendered firm and rigid when in use by the introduction of the front board and lens; the inner or sliding body also folds inward, and is in like manner held rigid by the insertion of a light frame or diaphragm sliding in its front, and also by the focusing glass or frame behind; in closing the camera the diaphragm is withdrawn from the inner body, allowing it to sink flat; it is then thrust into the outer body, which, after the withdrawal of the front...." (copy ends). Camera sits on a four-legged stand.

Extract from "COMMUNICATIONS, &c, OTTEWILL's Registered Double Folding Camera." - origin not given.

2383 BIR059 CAMERA - 'LUZO'

THE 'LUZO' J. ROBINSON & SONS MANUFACTURERS 172 REGENT ST LONDON. W

Hs 167x167x102. 1871-1896. R.

Mahogany; brass fittings; external spring shutter.

Inside, moving arm with four stops; bubble level on side of housing near "DISTANCE" dial 8-25 "FEET"; back of camera missing; angled mirror view finder on one edge of housing; hand inscription on housing: "FOCUS = 5.5 Stops 5/8 1/2 7/16 3/8 = f 8 11 13 14 1/2".

Details of the 'Luzo' camera, which was designed by Henry J. Redding, employee of Robinson & Sons, London, are given in Lothrop 1982,61, and these suggest that this is an example of Model No.4, which "had the additional feature of a rack-and-pinion focusing mechanism with a dial distance-indicator"; the 'Luzo' was introduced in 1889, and appears to have been made until 1899.

Further details are given under Robinson & Sons, CAMERA - 'LUZO', in the out-of-Ireland section, Ex0487.

Dublin firm with a branch in London, see Morrison-Low 1989,133; dates from Lothrop 1982,61.

2348 BIR034 CAMERA - STEREO

J.H. DALLMEYER, OPTICIAN, London.

H c140; W c185 (in display case). c1858. PC.

Twin lens; mahogany; brass fittings; flap over two apertures; frosted glass focus plate; rack and pinion focus.

One aperture missing; two brass knurled knobs to turn the hinged black flap over the apertures; mahogany and brass plate holder; used by Mary, Countess of Rosse (1813-1885).

Date on card, 1858, seems early, as Dallmeyer did not part from Thomas Ross until post 1859, Turner 1981,72.

2347 BIR033 CAMERA - STEREO

KNIGHT FOSTER LANE LONDON

C c270x244x175 (in display case). c1853. PC.

Single lens; mahogany; brass fittings; sits on top of case; two pivoted arms to move it to two taking positions.

The case also contains six collodion plate holders; a card notes silver nitrate staining, from the wet collodion process, and the silver corner wires to suspend the plate, but only two holders are stained - perhaps the dry collodion process was also used; earliest type of stereo camera superseded by the twin lens after the invention of J.B. Dancer; used by Mary, Countess of Rosse (1813-1885), for most of her stereo photographs.

Information from Davison 1989,33.

0977 BIR018 CAMERA LUCIDA

Unsigned

BD 98; PrD 12; H 265; PvH 248. Mid to late 19 C. G.

Brass expanding stand; pivots at bottom and top; prism in oxidised brass mount on arm on top, turned by knob.

Prism is in a kite shaped cross-section housing (L27, MxW18) with one edge exposed by a V-cutout on two faces of the housing and with a circular hole on another face.

4066 BIR157 CAMERA LUCIDA MICROSCOPE EYEPIECE

Unsigned

SvHsD 50, W 20; H 63; PmSis 54x39x34. Mid 19 C. G.

Oxidised brass sleeve housing; two supports to axis allowing small rocking action to right-angled prism.

The sleeve has two slits at its sides; the supports are attached to oxidised brass triangular plates holding the prism, which has frosted edges around circular windows (D36); the prism seems likely to have been used at the eyepiece end of a microscope tube, set horizontally, in order to allow the image to be drawn, as illustrated in Hammond 1987,117.

4072 BIR163 CENTRIFUGE

PICCOLO.

MxL 532; H 218; TusD 27, L 162. Late 19 C. G.

Iron bracket screwed to bench holds handle, rod, and cog-wheel driving a smaller wheel to rotate four tubes.

A turned boxwood handle on a right-angled bar turns the horizontal rod and the large cog-wheel (D92); a vertical rod from the base has the small cog-wheel (D12) on it leading, above a support, to the revolving bracket holding two sets of three horizontal tin cylindrical tubes.

2413 BIR089 CERAMIC WARE

WEDGWOOD; BATES ELLIOT & CO POTTERS; C B L & W; PORZELLAN MANUFACTURER TEKNICE

Various sizes. Mid to late 19 C. G.

Large amount - with pestles/mortars, trays, crucibles.

2412 BIR088 CHEMICAL GLASSWARE

Unsigned

Various sizes. Mid 19 C. G.

Large quantity including retorts, round bottom flasks, woulff bottles, reaction vessels, test-tubes, etc.

2411 BIR087 CHEMICALS

Various signatures

Various sizes. Mid to late 19 C. G.

Large collection of assorted chemicals, many associated with photography, plus glass and ceramic jars.

Chemicals include: "ACID PYROGALLIC BISUBLIMED DR HENRY BYK"; tannic acid: "John Evans Chemist to the Queen AND TO H.R.H. THE PRINCE OF WALES &c 49 Dawson Street DUBLIN & 112 Up George's St. Kings-TOWN"; "CARBAZOIC ACID HOPKIN & WILLIAMS Manufacturing Chemists, 16, Cross St., Hatton Garden, LONDON"; ceramic pot: "JOHN ALLAN & CO Druggists 4 Mary Street DUBLIN PRICE BRISTOL".

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2363 BIR049 CLOCK - REGULATOR

Arnold & Dent, Strand, London. 368
H 1982; MxW 466; DIsD 305,114&114. 1830-1840. F.
Rosewood?; silvered dials; large, 5-60 minutes; small, 10-60 seconds and I-XII hours; brass cylinder pendulum.
Latter on wood rod, with scale below 3-0-3; brass cylinder weight below pulley wheel.
Dates from Clutton 1982,354.

2364 BIR050 CLOCK - REGULATOR

James Shearer, Devonshire Street, Queen Square,
LONDON
H 2000; MxW 513; D 1295x295; DIsD 115&115.
1825-1842. A.
Mahogany; glazed front; silvered dial; minutes 5-60; sec-onds 10-60, hours I-XXIV; glass/mercury pendulum.
Latter brass bound; seconds and hours dials are contained within the large minutes dial; photocopied document in case:
"Directions for fitting up the Astronomical Clock".
Clutton 1982,599 gives address 23 Devonshire Street from 1825-1842.

2403 BIR079 CORK BORERS

Unsigned
L 116; MnD 7-21. Mid to late 19 C. G.
Set of 10 brass cylinder borers with knurled tops and holes for missing cross-bar to aid turning.

3425 BIR127 DIAL - DIPTYCH

Faict & Inue par Charles Bloud Dieppe
78x74x15. Second ½ 17 C. R.
Hinged ivory; on top, hour circle; inside, lunar/solar volvelle and inset compass; bottom, perpetual calendar.
The hour circle on top is divided 1-12(x2); the red string gnomon holding the hinged leaves is broken; the pewter-coloured volvelle in the inside top has a fixed outside ring with months engraved around the edge, then days e.g. "10 20 31", then hours 1-12(x2); inside this are two revolving discs, the outer one divided 1-30 with a pointer to the day (10 20 31) scale, and the inner a decorated disc with a pointer to the 1-30 scale of the middle ring, and with a hole to show the phases of the moon; on the bottom inside is a circle divided as a horizontal dial with hours 4-12-8, and inside this an indented compass with a paper hand-engraved rose showing eight points and also divided 90-0-90-0-90°; on the bottom is a pewter-coloured disc, with a day scale e.g. "10 20 30" outside a month scale; in the centre is a perpetual calendar - 5 7 4 12 6 3 11; 2 10 0 19 0 0 8; 1 2 3 4 5 6 7; 8 9 10 . 12 13 14; 15 16 17 18 19 20 21; 22 23 24 25 26 27 28; 29 30 31 0 0 0 0 - the 15 was wrongly engraved 13, but has been corrected; the ivory frames are decorated with a trefoil design around the circles and edges.
Bryden 1988,27-28 names such diptych (from the late Greek and Latin word for a pair of folding writing tablets, and subsequently used for any pair of folded tablets) dial a "MAGNETIC AZIMUTH (BLOUD-TYPE) DIAL", and notes that the distinguishing feature is the hour scale, set out on an elliptical ring or analemma within the compass bowl. In this example, this analemma is missing and has been replaced with a hand-drawn standard compass rose. Had the analemma been there, it would have been adjustable along its minor axis, by means of a cam (missing here) running in a circular groove around the calendar scales of the perpetual calendar on the bottom of the instrument. The setting of the date would have allowed for solar declination. Bryden notes also that little is known of Charles Bloud beyond his inclusion on a "Role General des Nouveau Convertes de Dieppe" of 1686, listing protestants living in the town.
The dial came from the family of the mother of the present Earl of Rosse.

3426 BIR128 DIAL - DIPTYCH

Two crowned snakes (Mark of Tucher family, Nuremberg).
120x80x21. 1622-1645. R.
Ivory; on top, wind rose; inside zodiac circle and latitudes, compass and two schapies; bottom, lunar volvelle.
The top has green and red foliage decorations surrounding a circular wind rose, which has the compass points (e.g. no[re] nore/nore nore ost [with the old form of s]) in semicircles or on lines on the outside, then a circle numbered 1-32, and inside a compass rose decoration with 32 triangular points; a pivoted arm, ending in a pointed finger reads the 1-32 scale; there is a small viewing hole to the compass near the north point; inside the top is an upper circle with zodiac signs labelled: "QVANTIDAS DIEU", interrupted by a lower circle having six lines of longitude and three lines of latitude (54,48,42°), the central one retaining the broken red string gnomon, engraved: "POLLVS HEH"; under this is a grid for 15 towns: ROMA, 42; WENA, 48; POLN, 54; ROANA, 42; RAW, 48; KRACKA, 54; LOSANA, 42; PARIS, 48; DANZICH' 54; PALMA, 42; LEON, 48; PRESLA, 54; CRADISZ, 42; REGENS PVRO, 48; SWETEN, 54; again, this leaf has red and green foliage decoration, but also blue lines; on the bottom inside is a string gnomon dial with three scales, the outer being slightly off centre 4-12-8, and engraved: "POLLVS CA MPASSUS", the central IIII-XII-VIII, and the inner 4-12-8 hours; in the centre is an indented bowl for a compass, with a pin for the missing hand; in the bowl are the two crowned snake marks, a fleur-de-lys on top, "OCCI DENS" on one side and "ORI ENS" on the other, and the letters "S" above and "M" below; under these are two schapies for Italian and Babylonian hours "Px5G" and "Px9G", the former engraved: "WELSCH VHR" on the left and "PEMISO VHR" on the right, both with pin gnomons, and numbered 9-23; under this leaf is a box having only blue line decoration around its sides, but having an elaborately decorated lid, with green and red foliate and circle designs, and featuring the letters "T" and "P" separated by a snake with a beaked bird's head; on the bottom of the dial is a lunar volvelle of brass, with numbers around its edge 1-12(x2) and with a pointer to the second of four concentric circular scales; the innermost has divisions 1-12(x2), the second 1-29, the third, engraved: "EPAGTA IVILLIANA" with numbers 26 15 4 25 12 1 19 8 27 16 5 24 13 2 21 10 29 18 7, and the outermost, engraved: "EPAGTA GREGORI" [with the first "A" of "EPAGTA" corrected from a "C"], and numbers 6 25 14 3 22 11 29 18 7 26 15 4 25 12 1 20 9 28 17; the bottom is also decorated with red and green foliage.
Could be Hans II (W1560-1614), Hans III (W1567-1614), or Thomas Tucher (W1622-1645); Gouk 1988,57,117, 122,123.

3423 BIR125 DIAL - HORIZONTAL BUTTERFIELD

Butterfield AParis
L 79, W 67; CL 87, W 78. c1690. R.
Brass; elongated octagon; glazed compass, 16 points; folding bird gnomon 40-60°; hour scales 52,49,46,43°.
The hour scales are engraved 4-12-8 (52°), IIII-VIII (49°), 4-7 (46°), and V-VII (43°), three of the 12 or XII hour points being covered with the gnomon; on the back of the compass is engraved: "Premier Cadran", "Liege 50.36 Lisle 50.40 Calais 50.57" on an inner circle, and: "Bruxelles 50.51 Londres 51.31 La Haigue 52.6" on an outer ring; on the back of the dial are listed 24 cities with latitudes, including Paris 48.5, Basle 47.40, Vienne 48.14, Milan 45.20, Madrid 40.26, Rome 41.54; the dial is contained in a shaped black case with green velvet lining.
Similar dials dated to c1690 in Bryden 1988,32-33.

3424 BIR126 DIAL - HORIZONTAL BUTTERFIELD

Butterfield AParis
L 70 W 59; CL 89, W 82. c1690. R.

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Brass; elongated octagon; glazed compass, 8 points; folding bird gnomon 40-60°; hour scales for 52,49,40°. The hour scales are engraved 4-8 (52°), III-VIII (49°), 4-8 (no degree), and III-VII (40°), with the 12 or XII points covered by the gnomon; on the back of the compass is engraved: "Calais 50.57 Liege 50.36" on an inner circle, and: "Bruxelles 51.50 Lisle 50.40 Londres 51.31" on an outer circle; on the back of the dial are listed 16 cities with latitudes, including Paris 46, Vienne 49, Milan 45, Madrid 41, Rome 46; the centre of the compass hand is off-centre, so that it can only rotate through part of the indented housing; the dial is contained in a red/black shaped case with red velvet lining. Dates of similar dials given as c1690 in Bryden 1988, 32-33.

2396 BIR072 DIAL - HORIZONTAL PEDESTAL

CONS By W M For LAT 53°30" Birr CASTLE FEBr 20th 1839
485x454. 20:2:1839. S.

Slate; rather crudely made; hours IV-[XII]-VIII; "N E S W" at corners; no gnomon; sketches of fish, swan &c. The "F"s of "For" and "FEBr" in the inscription are upside down; also inscribed "THE SUN THE MOON AND ALL THE HEAVENLY STARS" "X BOHERNA" and the date is followed by "A.D."; sketches include the sun, a coronet, a fish, a spade [as in playing cards], a viol, a butterfly, a swan, a flower, and others.

2409 BIR085 DIVIDERS - PROPORTIONAL

Thomas Jones 62 Charing Crofs
AsL 218, MxW 16. 1816-1850. A.

Two brass pivoted sliding arms, clamping screw, rusted metal points; scales "Lines" 1-10, "Circles" 6-20. Dates from Crawforth 1988, 10.

2410 BIR086 DRAWING INSTRUMENTS - SET

Unsigned

Various sizes. Mid to late 19 C. G.

Collection of instruments and remains of cases; dividers compasses, pens, parts of pantograph or beam compass.

3415 BIR117 ELECTRIC MOTOR

C.W. [Crocker Wheeler] Electric Motor The Central Electric Co. Ld of London & Manchester. Type 0 No.9040

Not measured. Late 19 early 20 C. G.

Iron frame; two vertical electromagnets; eight-coil armature.

The coils are between ebonite ring ends; two bent iron supports from the coil centres, with the signature plate on top, contain the armature, which is marked: "CROCKER-WHEELER ARM No9014 23 WIRE", and which has eight coils parallel to its axis; this has a copper cylinder with sixteen strips, beyond the coils, for wire mesh brushes; at the other end of the axis are two pulley wheels D28&33; on the signature plaque also are the details: "1/6 HP [the HP letters inter-twined] Speed 1600 Volts 65"; the motor is in pristine condition, clearly never used.

2419 BIR094 ELECTRIC MOTOR

Crocker-Wheeler Motor Co. New York Pat. Ap'l'd For Speed 1900 No. 178 Type IX 6 Volts Approved by Sprague Ry. & M. Co.

B 230x157x68; H 265. Late 19 early 20 C. G.

Wood base; iron frame; two coils; 12 strip armature.

On top of the two vertical coils is a cylinder housing, presumably for unseen coil windings, with the (stuck) armature through the centre; the latter is a cylinder with 12 parallel horizontal copper? strips, which connect with two brushes on adjustable brass? arms.

2395 BIR071 ELECTROMAGNET

Unsigned

B 613x297x78; H 460; CosOD 145. Mid to late 19 C. G.

Wood base (with woodworm); two vertical coils with red-covered wire; rusted adjustable iron poles on top.

2393 BIR069 ELECTROSTATIC GENERATOR - CARRÉ

2 E CARRE 36 24 9 72

B547x478x50; H1005; DisD500&388. 24:9:1872. S.

Open mahogany base; two wood and glass pillars; two ebonite discs counter-rotated; on top, large brass cylinder.

A handle and (missing) belt drive rotate the discs; comb on top of upper large disc attached directly to large cylinder conductor on top (L880,MxD185); another comb at the bottom of the upper disc is held by a bracket on one of the glass pillars and a continuation of this has a right-angle limb leading also to the large conductor; charge is generated by friction pads on the lower, smaller, disc.

Van Camp 1988,66 notes that this machine is: "an additive induction machine which means that the charge increases in an arithmetical series"; he notes also that the modern Van de Graff machine bears a resemblance to this machine; he describes the action thus: "By friction a charge is generated on the turning glass disc. The lower brass comb transfers the charge to the ebonite disc, by means of induction. The upper comb transfer [sic] this charge also by induction to the cylindric conductor." In this example, both discs are ebonite.

The base (only) of the instrument with the next serial number 3 37, and the same date, is in the collection of University College Cork 3307 UCP307.

Illustrated in Yeates 1877,2; instrument introduced in 1868, Van Camp 1988,63-67.

2350 BIR036 ELECTROSTATIC GENERATOR - NAIRNE

Not possible to see if there is a signature.

Not measured - H c580; CyD c250. Mid 19 C. G.

Not now extant - in Mary Rosse photo of her Saloon; two vertical supports from base to glass cylinder axis.

The photograph shows a cluttered Victorian room with many easy chairs and ornaments and, looking rather out of place, the generator on a table in the foreground; the base is clamped to a table with a G-clamp; a handle at the axis turns the cylinder, which is wrapped with static material; a glass pillar from the base supports an unseen conductor; the table also has a separate cylinder conductor and a Leyden jar.

2390 BIR066 EXPOSURE METER

Watkins Exposure Meter Patent

L 47; HsMxD 35. Patented 1890. P.

Brass cylinder housing; cap on internal silver chain on one end; glass-covered aperture on other; three moving rings.

Rings can move along scales which are labelled: "P DF ASE" with scales "1-400 F4-F90 1-200&15-3 1-200 1-100-1".

A similar instrument is described in Turner 1989,329: "This is an example of an important class of photographic exposure meter, the tintmeter. In this class the time is measured for a piece of sensitive paper to darken to a standard tint when exposed to light falling on the subject. The exposure is then found, in the present case, from the rotary calculator. The actinic paper is

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in the form of a disc that is placed behind a blue glass at one end; this is called the actinometer. The other end has a pull-off cap attached to the cylinder by a chain, which forms a half-second pendulum to time the darkening of the sensitive paper. The calculator has indicators marked: P, D, A, E, standing for: speed of plate, diaphragm f numbers, light and enlarging. The Watkins 'Standard' exposure meter was patented in 1890 (No 1388) by A Watkins of Hereford."

2389 BIR065 EXPOSURE METER

WATKINS EXPOSURE METER

L 60; HsMxD 36. Late 19 C. G.

Brass cylinder housing; cap on internal chain on one end; aperture plus glass on other; four rings with scales.

Rings can move along scales which are labelled "A P S D E" and numbered "2-100 1-100 1-500S1-356 F4-64 1-900".

0961 BIR025 EYEPIECE - MICROMETER

[Thomas] Grubb Dublin

L 230; Hs 230x109x20; TuD 127. Third ¼ 19 C. R.

Brass; large silvered scale 0-360°; housing turned with endless screw; two side drumhead micrometers.

Silvered scales for micrometers; in front, two windows with linear scales 0-5 to move cross wires; one wire bisects the opening at right-angles to cross wires.

Burnett 1989,107 records that Thomas Grubb made an eye-piece micrometer for the 72-inch telescope - see Bennett 1981,218.

Observing took place 1848-1878 - Scientific Transactions, Royal Dublin Society, 2,1-178,1879.

2426 BIR102 GALVANOMETER

JUL... SAX, Great ...ell St LONDON.

Hs 111x90x69. 1859-1864. F.

Two; glazed mahogany housing; white scale 90-0-90°; brass mount (over part of signature) for blue pointer.

One instrument has been modified by adding a strip to the pointer, and by inserting stops on each side so that the pointer can no longer go all the way to the 90° reading on each side; there are two brass contacts on top of the housing.

Downing 1988,116 lists Julius Sax from 1859-1864, but not at a "Great ? Street".

2556 BIR104 GAS PRESSURE REGULATOR

BEARD'S PAT RRB 072

L 111; W 100. Late 19 early 20 C. G.

Brass; knurled knob on top with an arrow; side outlet below this on top of long pipe; screwed T-bracket.

The latter screws onto the long vertical pipe, using an anticlockwise thread; it also has a screw thread on the outside; the instrument is illustrated in Beck 1909,97.

Crawforth 1988,17 lists a Richard Beard W1841-1865, Downing 1988,9 a Charles Beard W1891-1900+.

3412 BIR114 GAS PRESSURE REGULATOR

BEARD'S PATENT No1887 J.H. STEWARD. 406, Strand LONDON.

L 164; CyL 80, D 59; BrL 100, W 15. 1862-1904. A.

Brass cylinder; small output pipe at right-angles underneath, then main pipe with T-tightening bar.

The cylinder unscrews to show the (perished) rubber bellow sheath between two brass discs, joined by a crosswork double pivoted bar; the disc away from the pipes presses against a brass spring in the cylinder.

Dates from Downing 1988,128 and Anderson 1990,82.

2557 BIR105 GAS PRESSURE REGULATOR

MANCHESTER OXYGEN (BRINS PATENT) CO LD

L 125; W 93. Late 19 C. G.

Brass; wing top for inner screw; right-angled side arm on top of pipe with long vertical screw thread.

3410 BIR112 GLASS BELL JAR

Unsigned

BD 207; ToD 65; H 278; MxD 220. Mid to late 19 C. G.

Light-weight glass; ground bottom; becomes wider in diameter before narrowing quickly; ground ring on top.

3429 BIR131 GLOBES - CELESTIAL & TERRESTRIAL

Unsigned - attributed to Dudley Adams.

D 70 & 75. Late 18 C. G.

Spherical plaster celestial globe in black hinged case containing the terrestrial gores.

The terrestrial globe has the inscription: "A Correct GLOBE with the new Discoveries", and is nearly identical to that by George Adams in Van Der Krogt 1984,37, except that this one has the route of "Cook's Track 1780", rather than 1760 [sic] in Van Der Krogt, and this would date it after George Adams' death (1772); it has 12 gores from pole to pole, and shows "The Ecliptic", the equator and the 15°W meridian; the boundaries of countries and territories are coloured; inscriptions include "Parts Unknown" in Canada, and the "Antartick Circle"; the celestial globe has the inscription: "A Correct Globe with New Constelations of Dr. Halley & c.", (Halley's dates are 1656-1742); it has 12 pairs of gores, and shows stylised drawings of the zodiac constellations in yellow, red, pink, and green.

3836 BIR145 GRAPHITE CRUCIBLE

THE PATD PLUMBAGO CRUCIBLE CO BATTERSEA WORKS LONDON .2 1862 10.

H 97; BD 55; ToD 78. 1862. S.

Tall slim crucible with pouring lip on top rim.

3422 BIR124 GRAPHITE FLASK

FAURE'S PATENT

BD 70; H(+Bg) 217; H(-Bg) 188. Mid to late 19 C. G.

Cylinder bottle entirely made of graphite[?]; tapering bung (L55,D16-23) on top with a brass contact and wire.

Through the bung is a brass rod with a tightening knob at one side from which a brass wire extends (L130,D4).

2398 BIR074 HYGROMETER - MASON

YEATES & SON 2 GRAFTON ST. DUBLIN

B 267x127x10; ThsL 191, BusD 7. 1840-1864. F.

Mahogany base; two white-metal scales "DRY" and "WET" 20-110° on wood supports; mercury/glass thermo-meters.

Liquid reservoir and wick gone.

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2407 BIR083 LAMP - ELECTRIC

SUNBEAM LAMP

H 265; MxD 150. Late 19 early 20 C. G.

Five; glass globe; U-shaped element; one has brown ceramic fitting with four brass strip holders and spring.

Fitting has two brass contacts at its base; only three have the signature, but others are identical; there are some other domestic lamps in the studio, including two signed: "JANDUS PATENT LAMP NO. 16034 25 AMPERES TO WORK DIRECT ON 200 VOLTS"; also a glass bell with a white-metal disc on top, perhaps a lamp globe, signed: "THE. WENHAM. COMPANY. LIND" (MxD101,H90).

2427 BIR103 LAMP - LIME LIGHT

OXYGEN CO. LTD MANCHESTER

L 265; MxW 89. Late 19 early 20 C. G.

Brass and oxidised brass; two stop-cocks "H" & "O" control gases for cylinder; double cog rotator; cylinder gone.

Sleeve with clamping screw for mounting light; cylinder turned by right-angled cogs, one with a long arm to a knurled knob above the stop-cocks; in boxwood box with pressure regulators 2556 BIR104 & 2557 BIR105; instrument in pristine condition.

2356 BIR042 LAMP - OIL

Unsigned - attributed to H. Ausfeld.

MnL 840; TuD 26; CyH 49, D 99. 1851-1867. FL.

Brass tube and draw; lead weight at one end; at other, metal cup and cylinder container on right-angled arms.

The cylinder has a closed top except for a hole from which rises a small funnel, obviously to add liquid, since there is a side arm leading to a glass tube to view the liquid level inside the cylinder; the shallow goblet cup beside the cylinder also has a closed top except for a central hole, but with no funnel; mid way along the tube are two more brass side tubes, which fit into mounts in the Ausfeld telescope 0985 BIR026.

Herman Ausfeld took part in exhibitions between 1851 and 1867, Brachner 1985,135 and Turner 1983,309.

2375 BIR051 LANTERN - TRIUNIAL

W.C. HUGHES. PATENTEE & MANUFACTURER. BREWSTER HOUSE. MORTIMER RD. KINGSLAND. LONDON. N.

H 780; Hs 613x265x198; W 535. 1892-1900. A.

Mahogany; brass fittings; six doors; lime lights inside.

Doors have blue discs in their centres to inspect the lime lights; brass lens housings have double-knob rack and pinion focusing; Russian iron lid with fluted cowl on top; spring clips between lenses and housing for slides; hinged lens covers; for showing coloured photographs, using three colours.

Also another unsigned lime light system for use in projection, on a mahogany base, with a tin arch surround and a lens in front.

There is, in addition, a collection of mahogany bound slides (mostly 176x114) and accessories for use with the lantern; they include a rural scene with children, signed: "W.C. HUGHES BREWSTER HOUSE, 82, MORTIMER RD. KINGSLAND ROAD, LONDON, N."; and two circles with cross wires, signed: "W.C. HUGHES"; there are various other slides with handwritten capitals, e.g. "VILLAGE CHURCH", "EFFECTS FOR RUINS OF ATHENS", "HOLYROOD PALACE"; there are bright blue and green filters; there is a mahogany frame with a circular hole and a fabric screen which can be rolled across the hole; there is a (distressed) device which uses a brass handle and (missing) thongs to rotate two brass framed glass discs with curved black lines radiating from the centre; there are also two copper plates (204x127x1.6) signed: "HUGHES SHOE LANE FLEET STREET LONDON".

Dates from Downing 1988,66.

2380 BIR056 LENS - CONCAVE CONVEX

J.H. Dallmeyer LONDON. No 11702 PATENT 3. Sold by WATSON & SON 313 High Holborn London

H c70; HsMxD c65. Late 19 early 20 C. G.

Brass cylinder housing; off-centre disc of five apertures.

Leather-covered hood on string.

2379 BIR055 LENS - CONCAVE CONVEX

HOWARD GRUBB DUBLIN. APLANATIC. 8½ X 6½ 5281

L67; HsMxD 73. Mid to late 19 C. G.

Brass cylinder housing incorporating an off-centre disc with five apertures.

Kingslake 1989,28-9 notes: "A few attempts have been made over the years to improve the French Landscape lens, but without much success. In 1857 Thomas Grubb (1800-1878) made a lens that he called the Aplanat because of its low spherical aberration. In this lens the meniscus crown element was placed in front of the meniscus flint element. Because of the absence of spherical aberration the coma could not be reduced by a choice of stop position, although the field could be readily flattened by this means. In spite of the inherent coma, many hundreds of these Grubb lenses were sold during the next forty years, and a similar type of construction has been used in some recent soft-focus portrait lenses. Grubb's lens was so similar to the rear half of the Rapid Rectilinear lens announced in 1866 that one wonders whether Dallmeyer merely assembled two of Grubb's objectives about a central stop to make his famous lens."

2378 BIR054 LENS - CONCAVE CONVEX

[Thomas?] Grubb PATENT 3863

L 50-61; HsD 34-75. Third ¼ 19 C. G.

Brass cylinder housing with push-out back section extending the length; air bubble now between elements.

2386 BIR062 LENS - PLANO CONVEX

Bland & Long 153 Fleet Street London 1593

L 145; HsMxD 127. 1854-1857. F.

Brass cylinder housing; stuck cover at end away from lens; bracket for missing and stuck rack and pinion focus.

Dates from Downing 1988,11.

4075 BIR166 LENS - PLANO CONVEX

LEREBOURS et SECRETAN à Paris

HsL 116; D 95. 1847-1855. F.

Brass cylinder housing; screw thread at large end; small diameter sleeve (D37,L20) at other end.

Dates from Payen 1985,175.

2387 BIR063 LENS - PLANO CONVEX

LEREBOURS et SECRETAN à Paris

L 137; HsMxD 100. 1847-1855. F.

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Brass cylinder housing; rack strip present, but missing pinion mount and knurled knob.
Dates from Payen 1985,175.

2382 BIR058 LENS - PLANO CONVEX

A. Rofs LONDON 4926
L 174; HsMxD 118. c1879. N.
Brass cylinder housing with (stuck) rack and pinion focus, using one knurled knob.
Turner 1989,160-61 gives serial numbers 3229 c1875, 5015 c1880.

0978 BIR019 LENS ON STAND

W. LADD & CO. LONDON
H 390; D 93. 1873-1883. F.
Pair of biconvex lenses in oxidised brass frames on semicircular mounts on top of expanding brass stands.
Dates from Crawforth 1988,11.

2376 BIR052 LENS SYSTEM

No.828, Edward Liesegang Elberfeld
L 161; HsMxD 87. Mid 19 C. G.
Brass cylinder housing with (stuck) rack and pinion focus using one knurled knob.

2381 BIR057 LENS SYSTEM

Ross, No 22571 LONDON 7¼ X 4¼ Rapid Symmetrical Sold by WATSON & SON 313 High Holborn, London
L 47; HsD 36-77. Late 19 early 20 C. G.
Brass cylinder housing; two Waterhouse stops on string.
Turner 1989,164 gives Ross Serial No 5461 as 1888.

2388 BIR064 LENS SYSTEM

W. WATSON & SONS 313 HIGH HOLBORN LONDON 10 X 8 1652
L 92; HsMxD 76. Late 19 early 20 C. F.
Brass and oxidised brass cylinder housing with iris diaphragm; in case of plate holders with Trade Card.
Latter reads: "W. WATSON & SONS, MANU-FACTURERS OF Optical & Photographic Instruments, WAREHOUSES:- 313, High Holborn, LONDON, W.C. 78, Swanston Street, MELBOURNE, AUSTRALIA. EST-ABLISHED 1837. STEAM FACTORIES:- MECHANICAL:- 9,10,11, OPTICAL 16 & 17, FULLWOODS RENTS, High Holborn, LONDON, W.C."
Firm assumed this name in 1882, Clarke 1989,87.

4074 BIR165 LENS SYSTEM

Unsigned
L 238; D 122&152; Fp 179x170. Mid 19 C. G.
Brass cylinder housing with oxidised brass flap on one end; the outside surfaces of the two lenses are convex.
The housing has a wider section near the flap, which has a circular hole, a hook at one side, and is opened by means of two knurled knobs at the hinge.

4063 BIR154 LENS SYSTEM

Unsigned
HsD 213; W 99. Mid to late 19 C. G.
Brass cylinder housing; two lenses, plano on outside, convex on inside; presumably objective of telescope.

4062 BIR153 LENS SYSTEM

Unsigned
HsD 222; W 104. Mid to late 19 C. G.
Brass cylinder housing; two lenses, plano on outside, convex on inside; presumably objective of telescope.

2377 BIR053 LENSES

J.H. Dallmeyer LONDON No 27022 3.D. PATENT; 43118 No.3.C.; No. 51482 4. B. PATENT
L 122,142&278; HsMxD 80,110&160. Mid to late 19 C. G.
One brass housed lens and two lens systems; stuck focus.
Lens system 27022 has one stuck Waterhouse stop; lens 43118 has a set of eight Waterhouse stops (ApD13-75); lens system No 51482 has one Waterstone stop (ApD105) and has two mahogany struts joined by three strings around the housing; all have stuck rack and pinion focus with one knurled knob.

3416 BIR118 LEVEL - SPIRIT

Unsigned
B 525x33x29; LvsL 390&105, D 25&14.
Mid to late 19 C. G.
Metal base with two black brass vertical hooks at ends holds large parallel level and small transverse level.
Both levels are made of brass, hold colourless liquid, and have glass covers; the large level has two brass knurled knobs on top of its ends; presumably the level is specially designed to be hung from some larger apparatus, likely at Birr to be astronomical.

0969 BIR009 LEVEL - TELESCOPIC

BUCKLEY DUBLIN (J. Buckley 14, Lower Sackville Street.)
L 397; TuD 36; LvD 22; C 425x153x81. 1832-1859. F.
Brass; focus by rack and pinion; spirit level below telescope; damaged mahogany case, trade label in lid.
Sleeve with screw below level for missing stand; label reads: "J Buckley Optical Mathematical & Philosophical Instrument Maker 14, Lower Sackville Street. Dublin. Late Moira Hotel."
Dates from Morrison-Low 1989,121.

2406 BIR082 LEYDEN JAR

Unsigned
L 498; TuL 448, D 29. Mid to late 19 C. G.
Greenish glass "test tube" with foil outside (inside now powder) near bottom; brass wire and crook conductor.
Conductor goes through a cork at the open end of the "test-tube", and its bottom also has a cork.

2418 BIR093 MEASURING CYLINDER

Negretti & Zambra, London Gauge Diamtr 8.0 in's M.O 1500

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BD 79; H 218; CyD 61. Mid 19 C. G.

Glass; rather crude finish; scale .01-.50 "1/2 INCH".

Also selection of other unsigned measuring cylinders of various shapes and sizes - e.g. for 1/4 & 1/2 "IMP PINT" or 1-10 "Fl=oz"; 10-60 "m"; 1/2 and 1 "F/3".

3843 BIR152 METAL CHAMBERS WITH SLIDING TOPS

Unsigned

63x58. Late 19 C. G.

Three shallow white-metal rectangular containers, blackened inside, with covers which slide out.

The covers have rings for pulling, and are restrained from coming away from the frames by a ridge; the numbers "2", "3", "4" are scratched on them, indicating that one is missing; each has a paper label with hand writing, which is difficult to read, but is something like "Hartley (or Horsley) Front (or Flat)"; the purpose of the chambers is unclear, but presumably involves light as the insides are blackened[?].

3840 BIR149 METRONOME

BEST ENGLISH MAKE METRONOME DE MAELZEL LONDON

B 123x117; H 231. Mid to late 19 C. G.

Narrow pyramid mahogany housing; boxwood scale 200-40 and 200-42; broken lead bob pendulum; distressed state.

A panel on front, with a brass belt and crown for the signature, comes off to reveal the sale and the broken stem of the inverse pendulum; incomplete.

There is also a more incomplete, unsigned metronome.

0973 BIR014 MICROSCOPE - COMPOUND

E. DAVIS LEEDS

L 330; C 268x203x177. 1853-1923. W.

Brass; V-base with vertical sides has a pivot for a mount to hold the mirror, stage and tube bracket; optics missing.

Upper plate of object stage moved by sprung lever in ball and socket joint; rack and pinion coarse focus; fine focus of objective by knurled knob; three aperture diaphragm under stage; microscope unscrews and fits into case; back of case missing.

Dates from Crawforth 1988,6.

0979 BIR020 MICROSCOPE - COMPOUND

ELLIOTT BRO LONDON

BD89; H193; PvH125; L205; MiHsD48.

Second 1/2 19 C. G.

Brass; pillar to pivot; cylinder bench holds revolving mirror housing, condenser, slide clip, and analyser.

At the eyepiece end of the analyser is a circular dial with Roman numerals I-XII twice; mirror housing on semi-circular mount, is now missing the mirror on one side, but has a black glass disc on the other; push focus by eyepiece sleeve; stage rocks on two screws on top of the condensing lens, has a plate glass disc in the centre, and has two spring clips for slide; the dial suggests polarisation use, but no nicol prism.

0986 BIR027 MICROSCOPE - COMPOUND

NEWTON & CO LONDON NEWTON & CO. PATENT

MnH 136; MxW 144; DiD 80. Late 19 C. G.

Brass and oxidised brass; missing foot, optic tube and lenses; condenser, stage and tube mount present.

Stage has brass knurled knob and arm for two silver-metal clamps for slides; coarse focus by rack and pinion; four aperture disc above under-stage biconvex lens.

0972 BIR013 MICROSCOPE - COMPOUND

A. ROSS LONDON NO 509 (Dollond; J.H. DALLMEYER)

H(-E) 485; C 575x318x280. 1852. S.

Brass; Y-foot; revolving mirror; condenser; adjustable stage; fitted case; Dollond/Dallmeyer eyepieces.

Plane and convex mirrors; condenser adjusted by rack and pinion; sample stage with two right-angle adjust screws; microscope coarse adjust with rack and pinion, fine adjust by knobs on top of pillar; wood case, six drawers of accessories, including three Ross objectives (one dated 1852), "Dollond London" micrometer eyepiece, "J.H. DALLMEYER, LONDON" eyepiece, circle of 23 apertures; one drawer has letter dated 2:4:1887.

Objective dated; letter 2:4:1887, Henry Dooly, Clerc, Parsonstown Union, calls Earl of Rosse to a meeting.

2354 BIR040 MICROSCOPE SLIDES

W. WATSON & SONS 313, HIGH HOLBORN LONDON. (On slides)

C 310x262x259; Sds 76x26. Late 19 early 20 C. F.

Glazed mahogany case with 19 drawers for 16 glass slides each, mostly biological; ivory handles A-K.

Handles E, G, and K missing; only some of the glass slides have the Watson paper signature disc - the case is not signed.

Firm assumed this name in 1882, Clarke 1989,87.

2361 BIR047 MIRROR - CONCAVE

C.A. PARSONS & CO LTD ENGINEERS HEATON WORKS NEWCASTLE-ON-TYNE, NO?? 1918

HsD 770; MiD 600. 1918. S.

Glass; in black wood housing with gold decoration.

Earl of Rosse notes that this was probably a search-light mirror; this is supported by a letter in private ownership 2633 PRI266 from Sir Howard Grubb, Parsons & Co., Newcastle-on-Tyne, dated 3:5:1927 (probably to the Municipal Technical Institute, Belfast) sending a publication with "particulars of Searchlight Reflectors manufactured by C.A. Parsons & Co. Ltd., Heaton Works, Newcastle-on-Tyne."

4064 BIR155 MIRROR - CONCAVE

Unsigned

D 870; Hs 990x990x225, Bx 330x330x96.

Mid to late 19 C. G.

Glass, with some silvering gone; in wooden protective housing, with removable box in front.

The diameter measurement is for the exposed part of the mirror, the full diameter being about three feet; this would suggest a connection with the three foot reflector of 1839; however, Moore 1981,14 reports that: "to cast a really large glass disc of the required quality was out of the question in the 1820s, or for that matter until less than a hundred years ago", so this is unlikely to be contemporaneous with the original instrument; it seems likely to have been made for it later, while the instrument still survived, which it did until at least 1927 (Moore 1981,67).

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3409 BIR111 MIRROR - CONVEX

Unsigned - Attributed to C.A. Parsons & Co.

D 612. Late 19 early 20 C. G.

Glass; with silvering now in distressed condition; white-metal edging with two clips.

Of similar size to concave mirror 2361 BIR047, and probably manufactured by C.A. Parsons & Co, Newcastle-on-Tyne.

3839 BIR148 MIRROR - SPECULUM METAL

Unsigned - attributed to the Third Earl of Rosse

W 85. c1845. G.

Fragment of shattered concave mirror from the three-foot telescope; focal length 8280 (27'2"), see 0988 BIR029.

When found on May 15, 1991, it was thought that this might be a fragment of the missing second speculum for the six foot telescope; however, it was rather thin for a six foot mirror, and measurement by Patrick Wayman of the focal length as 27 feet, 2 inches, confirms that it belonged to the three foot instrument.

Also a small concave speculum mirror (D95,W14), and a speculum elliptical flat (D120x85,W10).

Bennett 1981,217-8 records two six-foot specula, one in the Science Museum, one "not now in existence [1914]".

3439 BIR141 MIRROR - SPECULUM METAL

Unsigned

107x78, 117x84, & 210x146. Mid 19 C. G.

Three; elliptical flats for Newtonian reflector; cut from metal cylinder; brass mount; screw for telescope.

Listed by J. Bennett, who also notes a broken speculum metal primary mirror (D450) for a Gregorian reflector, and a circular flat (D210) of speculum metal for a Newtonian reflector; the middle sized elliptical flat has a cylindrical brass cover, the largest a cylindrical metal cover, and the circular flat a metal case with a lid; these are in display cases near the Leviathan telescope. Manuscript list of astronomical instruments in Birr, compiled by J. Bennett.

3441 BIR143 MIRROR GRINDER

Unsigned

D 887, W 70. Mid 19 C. G.

Cast iron disc with pattern of grooves, rim, and re-inforcing ribs behind; grinder for three-foot mirror.

J. Bennett, in his manuscript list of instruments at Birr includes a smaller disc (D212), also with a pattern of grooves and a central hole, which he suggests is a small experimental grinding disc.

2404 BIR080 MORSE KEY

REID (stamped below one of pair)

B 156x139x18; L 245; H 79. Mid to late 19 C. G.

Pair; mahogany base and supports for two ebony(?) tappers on brass springs; central rusted iron spring.

Other brass fittings including two-pillar frame with contact screws; ivory discs on tappers (missing from one instrument) labelled "Z" and "C" on each.

2424 BIR099 MORSE KEY

Unsigned 653

B 280x130x38; H 120. Mid to late 19 C. G.

Mahogany base; pivoted brass beam; turned wood handle;

spring; two contacts on base, one on each side of pivot.

Circular shadow remains at end of base away from handle for missing part of instrument.

2414 BIR097 MORTAR

Unsigned

D 204; H 64. Mid 19 C. G.

Exceptionally large agate mortar with flat lip on top circumference; underside heavily scored.

2425 BIR100 PANTOGRAPH

J. CONTE BREVETÉ S.G.D.G. PARIS

AsL 412, W 10. Early 20 C. G.

Boxwood and white-metal; two arms "A" & "C" pivoted above small wheel; sliding brackets plus one for arm "B" (gone).

The bracket on arm "A" is double, the upper pivoted sleeve presumably for the missing arm "B".

Maker not listed in Brieux 1980 nor Payen 1986.

0965 BIR005 PANTOGRAPH

Troughton & Simms, London

AsL 510,510,252&232, W 15;C 531x77x61-122.

Mid 19 C. G.

Brass; two long limbs hinged to two shorter limbs; ivory wheels; pencil sleeves; in fitted mahogany case.

Cloth-covered lead base weight, short iron pillar with brass base disc; pencil in tube with brass cylinder holder on top (H11,D24) for weight.

2391 BIR067 PHOTOGRAPHIC CHANGING BOX

G. HARE'S PATENT AUTOMATIC CHANGING BOX 26 CALTHORPE ST London

Hs 156x130x79. Late 19 early 20 C. G.

Mahogany housing; brass fittings; inside, frame for glass plates; top slides, pointer to ivory scale 1-12.

Hinged brass handles on sides of housing.

0983 BIR024 PHOTOMETER - WHEATSTONE

Unsigned

D 55; H 38. Mid 19 C. G.

Brass; cylindrical; castellated ring around top, with rotating disc; inside, disc with cogs; incomplete.

Bottom is held by circular nut and comes off to reveal cog wheel mechanism.

Christie 28:8:89, Lot 94, was a complete instrument, described thus: "The cylinder with internal gearing and ivory handle winder, the rotating stage with five pins and counterweight, arranged to carry cork discs, each with silvered glass beads, all contained in a leather-covered case. This instrument was the invention of Charles Wheatstone and was devised to show that the intensity of reflected light indicates the relative luminosity of light sources. When rotated, an intricate geometrical pattern is seen, the relatively [sic] intensity of this geometrical pattern produced by light sources is adjusted for equal intensity by moving the instrument nearer to the weaker light source."

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2345 BIR031 PLANIMETER - AMSLER

ELLIOTT BROS LONDON. 6305

AsL 235&160, Se 5x5. c1875. N.

German silver; main arm in sleeve; pivoted side arm; divided vertical cylinder and horizontal disc.

Main arm, sliding in sleeve, has divisions 22018, 21035, 20815, and 20845 on one face and 1dcm, 0,1f, 200M 1:500, 10in, 0,5dcm on another; both arms end in pins, that on the longer arm with a small spherical knob on top; both cylinder and disc are divided 0-9; in black leather-covered case with faded purple velvet lining.

This is Model No.4 of the instrument invented by Jacob Amsler (1823-1912), Professor of Mathematics at Schaffhausen, Switzerland, about 1854 (see Bull SIS No.35, P.27).

Dated by Dr Joachim Fischer from the serial number.

3417 BIR119 PLOTTING RULE

STANLEY PATENTEE GREAT TURNSTILE HOLBORN LONDON

635x37x6; MxW 72. Early 20 C. G.

Boxwood; scales for "ACRES" from 0-6 "3 CHAINS" and "ACRES" from 0-4 "2 CHAINS"; rectangular metal slider.

The latter is of grey-metal, the open rectangle (82x33) away from the rule having two struts attached to a bar running along a central groove in the rule; at one corner, above the groove, is an ivory peg to help push the slider along the groove; the side of the slider against the rule has a reading line, and opposite this, away from the rule, a small knurled knob.

Not illustrated in Stanley 1890.

0971 BIR012 POLARISCOPE

APPS, OPTICIAN 433 Strand London

CrD 195. Third ¼ 19 C. G.

Divided brass circle (0-360°) with one diagonal spoke; in centre, broken mounting for two small nicol prisms.

One of the prisms is stationary, the other revolves.

Firm was at 433 Strand from 1866 until at least 1900, Downing 1988,4 - this looks early.

3413 BIR115 PRESSURE GAUGE

DANIEL ADAMSON & CO. DUKINFIELD No.1702963 U.pr.[] Made in Germany. Bourdon Pressure Gauge TRADE MARK

BD 204; HsD 178, W 46. Early 20 C. G.

Glazed metal housing; (peeling) white scale 0-160.

Inside the housing is a brass backing for the brass mechanism, having a spring and cogged arc to drive a small cog wheel to turn the needle; this mechanism is seen under a brass bound hole (D68) in the centre of the scale ring; the number 80 on the scale is printed in red.

3835 BIR144 PRISM - HOLLOW

Unsigned

H(+So) 128; MxW 73. Mid to late 19 C. G.

Glass bottle with one rounded side and two frames for missing plane glass sides; ground glass stopper on top.

The stopper is now stuck.

4065 BIR156 PRISM - HOUSED

Unsigned

Hs 82x82x67; Pm 53x54. Mid 19 C. G.

Glass; rusting tin rectangular housing with circular holes at two sides (D58), and a screw at one end.

2401 BIR077 PROTRACTOR - CIRCULAR

Baker, 244 High Holborn London.

OD 194; ID 147. Second ½ 19 C. G.

Brass; ring with single diameter, having mid point of upper side at centre of ring; scales 10-360 and 360-10°.

Charles Baker worked from 1851-1909, Clifton 1995,14.

0976 BIR017 PROTRACTOR - CIRCULAR

TROUGHTON & SIMMS, LONDON

D 156. Mid 19 C. G.

Brass; silvered scale 0-360°; and folding pricking arms; moved by knob and racked rim; glazed centre; case.

Arms have blue metal springs at hinges; centre has engraved cross; silvered verniers to read scale; in turned hinged mahogany case.

0970 BIR011 QUADRANT - ASTRONOMICAL

Lord Oxmantown, 1840

R 220. 1840. S.

Open work 90° iron frame in two triangles; silvered arc scale 0-90°; brass index arm with spirit level.

Window on end of arm with one division to read scale; adjusting and clamping screws; attached to wood mount at side for telescope (missing).

Similar quadrant illustrated in Randier 1980,202.

2408 BIR084 SCALE

Unsigned No 258

HsL 364, MxW 272. Mid to late 19 C. G.

Oak? triangle; curved boxwood non-linear scale 20-100 on arc side; central hole for missing part (pointer?).

The triangular base is cut off before its apex, and has an oxidised brass "wall" on three sides with a guide for a missing glass top(?); behind the hole, away from the arc is a small bracket with two short horizontal rods; as the instrument is incomplete it is difficult to suggest its purpose, though the fact that the scale is not linear, the divisions being shorter at the 20 end must be particularly significant.

0974 BIR015 SEXTANT

Elliott Brothers, 30 Strand London.

R 198; AL 240; CW 83-320, H 120. 1858-1863. A.

Brass; open work frame; index mirror with four filters; reinforced index arm; silvered scale; two telescopes.

Pivoted reading lens for vernier; clamping and tangent screws; horizon glass with three filters; eyepiece mount

with lateral adjustment underneath by knurled knob, threaded to accommodate telescopes; extra eyepiece; wood handle; three brass feet; mahogany case which also contains a bone mount for a lens (missing).

Dates from Crawforth 1988,8.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2385 BIR061 SEXTANT - BOX

Thomas Jones 62 Charing Crofs London

HsD 70, H 30; CL 99, MxW 82. 1816-1850. A.

Brass cylinder used as cover and support; silver scale 0-150, vernier and magnifier; two pivoted filters.

The cylinder cover, open at one end, screws onto the instrument either to cover it when not in use or to act as a base when in use; the vernier on the index arm is moved by a knurled knob on top and an internal rack; detached telescope with double right-angle bracket clearly belongs as it fits in the case, but it is not clear where it attaches; red leather-covered red velvet-lined case, with top cover detached.

Dates from Crawforth 1988,10.

4071 BIR162 SPARK CHAMBER

Unsigned

BD 330,255,230; TuL 203, D 100; BasD 18.

Late 19 C. G.

Base of three circular plates; angled brass tube with slit; inside, two brass balls with electric contacts.

The largest base plate has an angled edge, and has three clips (to secure to a telescope?), the smallest plate has two arcs cut off; inside the tube are two brass parallel bars, and a graphite plate, for the two balls; was this apparatus used to produce sparks at the end of a reflecting telescope to test the focus or optical quality?

0967 BIR007 SPECTROSCOPE - ASTRONOMICAL

John Browning, London.

L 385; TeD 22; HsD 48; PmTD 66. c1865. R.

Brass; two prisms on table; cylinder collimator and table shields; moving telescope with drumhead micrometer.

Push focus telescope focus; telescope moves around circular brass frame; right-angled bracket from this holds collimator in oxidised brass and copper shield, with bracket to hold mirror or prism (missing); adjustable slit; pillar and circular frame for missing lens to read micrometer vernier; refurbished; type of instrument made with the advice of William Huggins.

Bennett 1984b,7 notes that the Annual Report of the Cambridge Observatory for 1865 records: "Considerable interest has lately been excited by the observation of the Spectra of certain of the Fixed Stars and Nebulae, and in order that we may be able to take part in these investigations, a complete Spectrum Apparatus has been ordered from Mr Browning, in the construction of which Mr Huggins, who has particularly distinguished himself in this class of observations, has kindly offered to aid by his advice and suggestions."; the Whipple Museum has an incomplete example of the resulting 'star spectroscope'; this one is complete.

Bennett 1984a,9 quotes Huggins in 1866: "So unexpected and important are the results of the application of spectrum analysis to the objects in the heavens, that this method of observation may be said to have created a new and distinct branch of astronomical science."

2400 BIR076 SPECTROSCOPE - DIRECT VISION

John Browning London

MnL 86; MxD 19. Fourth ¼ 19 C. G.

Brass; slide focus eyepiece; external prism (chipped); slit adjusted by ring around tube before prism.

0968 BIR008 SPECTROSCOPE - DIRECT VISION

John Browning, London.

L 485; D 22; PmHsB 124x41, H 36-48. Late 19 C. G.

Brass; prism housing house-shaped with flat centre on roof; collimator and telescope screw into housing.

Slit arrangement held on brass sleeve which fits into collimator tube and rotates to expose or close a circular hole at each side of tube (D14); slit adjusted by small knob, but little screw to hold the stationary side is missing so the slit does not open properly; two lens eyepiece with push focus.

0966 BIR006 SPECTROSCOPE - DIRECT VISION

YEATES & SON, DUBLIN

L 230; Ds 25,19,19,18,15. Third ¼ 19 C. G.

Brass and oxidised brass; in four segments; push focus eyepiece; slit with brass jaws; tube covers missing.

Bennett 1984b,8 notes that: "Thomas Romney Robinson

wrote to William Parsons, third Earl of Rosse in March 1863 of recent results in stellar spectroscopy, suggesting that he apply his great telescopes to the study: 'The best apparatus that I know is Hofman's [sic] (of Paris) spectroscope....I am writing to Hofman on Monday for information about one for myself and will tell you what he says'." (Archives L/6.1). However, this spectroscope does not match those in Ireland signed by Hofmann (e.g. 0097 UCP014), since it does not have a two-screw pivot at the eyepiece end.

Bennett 1984a,8 - instrument type added at late stage to 1862 London Exhibition.

3838 BIR147 SPECTROSCOPE - DIRECT VISION, McCLEAN

McCleans Star Spectroscope PATENT John Browning London

CyL 48, D 22; EOD 26, ID 6. Fourth ¼ 19 C. G.

Brass cylinder has screw-on peephole eyepiece over a prism, with a lens at the other end of the cylinder.

This example, unlike 3837 BIR146, has no sleeve with a screw thread.

3837 BIR146 SPECTROSCOPE - DIRECT VISION, McCLEAN

McCleans Star Spectroscope John Browning 63 Strand London

CyHsL 63, D 22; EOD 27, ID 6. 1872-1900. R.

Brass cylinder has screw-on peephole eyepiece over a prism, with a lens at the other end of the cylinder.

The cylinder housing slides into a brass sleeve with a screw thread.

Dates from Crawforth 1988,4.

4067 BIR158 SPECTROSCOPE COLLIMATOR

Unsigned

L 310; TuD 46&39 Fourth ¼ 19 C. G.

Brass tube with screw-thread near end with lens; on other end, screw device to adjust slit width.

The slit device is on an oxidised brass mounting on the end of a short brass tube, which can be screwed into the main tube.

2417 BIR092 SPINNER

Unsigned

L 629; PrMxSe 73x50; WhD 353. Mid to late 19 C. G.

Tapering wood pillar holds six-spoke wheel with turned wood handle and groove around circumference.

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Pillar has a broken threaded wood peg at one end - so it was attached to some missing object; it also has two parallel metal plates, with a hole through them and the pillar, at the end away from the wheel axis; the wheel is secured by means of a wing nut.

2346 BIR032 STEREO VIEWER

(Reported to be by Smith, Beck & Beck)

Not measured. 1857-1866. F.

Not now extant - in Mary Rosse photo of Mary Ward; wood base and housing; two pivots; rack and pinion focus.

The Hon. Mary Ward (1827-1869) was a cousin of the Third Earl of Rosse - she died tragically in a steam carriage accident at Birr; the photograph is a fine portrait, by Mary, Countess of Rosse (1813-1885), of Mary Ward looking at the viewer on a table; the housing turns on two pivoted arms from the base and focus uses two knurled knobs at the sides; card notes that the viewer was by Smith, Beck & Beck, c1860.

Photograph in Davison 1989,21; dates from Turner 1989, 171 and Nuttall, Bull.SIS, 4,1984,16.

4073 BIR164 STEREO VIEWER - WHEATSTONE

Unsigned

BD 260; H 677; TH 368, W 810. Mid to late 19 C. G.

Mahogany; turned base and pillar to curved horizontal table; vertical supports at ends for picture brackets.

The vertical supports are tapered with a half-circle section; three of the four grooved brackets on these supports remain, secured with brass screws; the central mirror system used to observe the pictures is gone; the signature plate on the thin curved horizontal table is missing.

An elegant version of the basic viewer, as illustrated in Turner 1983,300.

3437 BIR139 SWITCH

Unsigned

W 225; AcD 117. Late 19 C. G.

Marble fan-shaped base has 19 brass contacts, 17 with screws; a pivoted brass arm makes the connections.

3408 BIR110 SWITCH

Unsigned, on "EDMUNDSONS LTD DUBLIN" switching frame.

B 356x308x20; BrsL 242-94. Early 20 C. G.

Marble base; eight brass bars in parallel; two pivoted contact switches, each connecting a bar to a brass arc.

The largest bars are on top and bottom, and the top three and bottom three have bent ends; the bars are labelled 108,105,103,101,99,97,95,93; the pivoted switches have turned wood handles, and one refers to "CHARGE", the other to "DISCHARGE"; with other components, including several simpler switches, on a switching frame, signed: "EDMUNDSONS LTD ENGINEERS & ELECTRICIANS DUBLIN".

3411 BIR113 SWITCH - BATTERY

THE NEVILLE PATENT AUTOMATIC BATTERY SWITCH No.2371

B 380x178x34; CoHsD 90, H 99. Early 20 C. G.

Marble base; vertical electromagnet; bent pole pieces to a gap for a pivoted arm ending in rods into mercury.

The pole pieces are bent at right-angles; one end of the pivoted bar is between them, and there is a screw counterweight to adjust the balance; at the other end of the bar are two vertical rods which dip into or out of two brass mercury reservoirs; on the base are four brass screw electric contacts; the signature plate includes the words: "108 CELLS 25 AMPS"; the instrument is in "brand new" condition, clearly never used.

3407 BIR109 SWITCH - BATTERY

No 1177 NEVILLS AUTOMATIC BATTERY SWITCH CELLS 10[?] AMPS 40

B 382x178x32; CoHsD 90, H 100. Early 20 C. G.

Marble base; vertical electromagnet; bent pole pieces to a gap for a pivoted arm ending in rods into mercury.

The pole pieces are bent at right-angles; one end of the pivoted bar is between them, and there is a screw counterweight to adjust the balance; at the other end of the bar are two vertical rods which dip into or out of two iron mercury reservoirs (D28H33); on the base are four brass screw electric contacts; with other components on "EDMUNDSONS LTD" switching frame.

0975 BIR016 TELESCOPE - PORTABLE ALTAZIMUTH

Robinson. 38 Devonshire Street Portland Place LONDON.

H 208; CrsD Ve87, Ho92; C 130x137x230. 1825-1841. A.

Brass and oxidised brass; three feet; horizontal circle; pillar to vertical circle; telescope, angle eyepiece.

Horizontal circle on three feet with level screws has silvered scale 0-360°, three verniers, clamp and slow-motion screws; vertical circle also has silvered scale 0-90-0-90-0°, two verniers, clamp and slow motion screw, pivoted arm for two scale reading glasses; telescope has a push fit and right-angled eyepiece; bubble level; second telescope clips onto sleeve on base; adjustable shade on top; fitted wood case contains counterweight.

Dates from Clifton 1995,235.

2351 BIR037 TELESCOPE - REFLECTING

W. OTTWAY & CO. EALING, W.

B 720x462x53; PvH 720; TuMxD 672, L 624.

Late 19 C. G.

"Lunar Heat" telescope of 4th Earl (1840-1908); brass, oxidised brass and iron; short tube with mirror at base.

Cast iron base and two vertical supports to turning axis at top end of tube base; right-angled cog wheels between supports to alter position of tube; three spokes at the top of the tube to two-holed disc at focus, with four electrical contacts on damaged ebonite bar; objective brass tube with reflecting prism at right-angles to tube near mirror; brass finding refractor (L405,MxD46); removable tube cover.

Two framed graphs are preserved. One, dated 28 January 1888 shows "LUNAR RADIANT HEAT DURING A TOTAL ECLIPSE BIRR CASTLE OBSERVATORY". The other shows a "PHASE CURVE" and an "EXTINCTION CURVE" for "LUNAR RADIANT HEAT".

Instrument mentioned in Bennett 1981,218.

0984 BIR001 TELESCOPE - REFLECTING

Unsigned but made by 3rd Earl of Rosse

L 158000; D 18000. 1841-1845. R.

The "Leviathan of Parsonstown"; from 1845-1909 largest telescope in world; wooden barrel tube on metal pivot;

large stone walls for missing hoist mechanism.

The six foot metal speculum mirror is in the Science Museum, London.

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The Leviathan is due to be restored as the centre-piece of the display at the Historic Science Centre planned for Birr Castle

Learner 1981,79 notes: "It took 12 years to build at a cost of £12,000 using entirely local labour. The telescope was mounted on a pair of hinges fixed behind the main mirror. The hinges were at right-angles, one to allow up-and-down motion, the other side-to-side...an altitude-altitude mount...". He records that the Leviathan is almost the only instrument to have used the altitude-altitude mount.

A display at Birr records that: "It was with this instrument that the discovery of the spiral nature of nebulae was made - nebulae now known to be galaxies like our own Milky Way...The Rosse Telescope first revealed the spiral structure of M.51, the 'Whirlpool' galaxy in 1845. A modern photograph shows the great accuracy of Lord Rosse's drawings."

The trolley, which was used to transport the six foot mirror has been preserved (with the wood in distressed condition).

0988 BIR029 TELESCOPE - REFLECTING

Unsigned - after 3rd Earl of Rosse

Sp 720,450&355; H 1070. Mid 19 C. G.

Model of the three-foot telescope; triangular mahogany frame, four wheels; metal tube and pulleys.

The Illustrated London News of 9:9:1843, notes: "For the last 10 or 12 years there has been erected on his [Rosse's] lawn, a reflecting telescope...the concave speculum of which is three feet in diameter, and whose focal length is 27 feet. It is elevated and depressed with the greatest of ease [using] heavy weights over pulleys; and it is turned...by means of wheels...on a graduated iron circle, fixed in the ground."

Moore 1981,67 reports that the instrument remained "nearly intact" in 1927, but little now remains. A fragment of a speculum mirror (3839 BIR148) of the correct focal length was found by C. Mollan on 15 May 1991, and a three foot glass mirror - presumably made later - remains (4064 BIR155).

The students of St Brendan's Community School, Birr, made a model in c1984.

The original trolley used to transport the three foot speculum mirror is preserved.

0987 BIR028 TELESCOPE - REFLECTING

Unsigned - after 3rd Earl of Rosse

B 328x805; H 420; C 966x572x557. Mid 20 C. G.

Model of the Leviathan of Parsonstown; located at the speculum end of the telescope in a glazed case.

Painted grey, black and green; a plaque records that it was "Made by Mr R. Gosling, Science Museum London".

2352 BIR038 TELESCOPE - REFLECTING

Unsigned

L 1842; D 239. Mid to late 19 C. G.

Brass bound metal tube; iron ring and pivot axes at centre; mirror missing; handle and screw at eyepiece.

Optics missing from eyepiece, which was in a brass sleeve on a plate at the top of the tube adjusted by the screw and handle, but the secondary mirror (D33), on an arm to the centre of the tube, survives; the brass housing for the mirror, at the other end of the telescope, is hinged to the tube.

0985 BIR026 TELESCOPE - REFRACTING

H. AUSFELD Gotha No 17.

L 711; W 394. 1851-1867. FL.

Brass and oxidised brass; main tube tapering, reflecting prism at eyepiece; cross arm with double ring scale.

Each ring has six spokes, one is stationary, one revolves, scales 10-0-90 and 0-180-0-180°; there is another disc scale 0-350° further along arm, and a bubble level (HsD 44); a lamp system fits into two brackets on the cross arm - see separate entry 2356 BIR042.

Hermann Ausfeld took part in exhibitions between 1851 and 1867, Brachner 1985,135 and Turner 1983,309.

2359 BIR045 TELESCOPE - REFRACTING

Berge London late Ramfden

MnL 676; MxD 86. 1800-1819. R.

Brass draw, lens housings, and objective lens hood; leather-covered wood main tube; "NIGHT GLASS".

Label with instrument reads: "This NIGHT GLASS was given by Sir Jas. South to William, Earl of Rosse. It had belonged to Admiral Beaufort and with it the French Fleet was first sighted before the Battle of Trafalgar 1805 April 18, 1805."

Dates from Clifton 1995,28.

2360 BIR046 TELESCOPE - REFRACTING

Dollond London

MnL 532; MxD 80. Early 19 C. G.

Brass; single draw; outer tube leather-covered; pivoted eyepiece lens cover.

3440 BIR142 TELESCOPE - REFRACTING

WATSON & SONS, 313 HIGH HOLBORN, LONDON 654

Sp 385; LeD72; PvH395; TuL1382,D77&32.

Late 19 C. F.

Brass; folding iron tripod cabriole foot; tapering pillar to pivot; rack and pinion focus.

The tube is mounted on a bracket from the pivot; the rack and pinion focus knob drives a sleeve holding the long eyepiece tube; there is a front lens cover.

Watson & Sons were at this address from 1881-1902 when the firm became Ltd, Clarke 1989,87.

3428 BIR130 TELESCOPE - REFRACTING

Unsigned

MnL 372; MxD 44. Late 17 C. G.

Pasteboard outer tube, painted orange with flowers and leaves, plus three green pasteboard draws; ivory fittings.

The draws have flower patterns in silver; both objective and eyepiece lenses are missing, but one inner lens remains in the tube; the draws are not constrained, but each will come out of the next one.

3427 BIR129 TELESCOPE - REFRACTING

Unsigned

MnL 249; MxD 39. Mid 18 C. G.

White fish-skin-covered outer tube plus three green paste-board draws all with brass fittings; brass lens flaps.

There are lens flaps at both eyepiece and objective lenses; the draws are not constrained, but each will come out of the next one.

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2358 BIR044 TELESCOPE - REFRACTING

Unsigned
L 1565; MxD 140. Mid 19 C. G.
Tripod mahogany stand; brass pillar on this to pivot for mount for tapering brass tube; white fibre cover.

2355 BIR041 TELESCOPE - REFRACTING

Unsigned
L 1353&1044; MxD 84&85. Mid to late 19 C. G.
Several (two measured); brass/oxidised brass; no draws; presumably used as finders for the larger telescopes.
There are also many unsigned brass bound lenses and optical elements.

4068 BIR159 TELESCOPE DRIVE

Unsigned
Hs 172x112x67. Mid to late 19 C. G.
Two rectangular brass plates joined by four pillars; two thick glass sides; clockwork mechanism; T handle.

2353 BIR039 TELESCOPE DRIVE

Unsigned
B 361x340x74; H 605. Late 19 C. G.
Green open iron base and supports for brass cog wheel system; Watts governor and two pairs of electromagnets.

0989 BIR030 TELESCOPE DRIVE

Unsigned
Fr 303x140x56. Mid to late 19 C. G.
Blue open iron frame; brass cogwheels, cable drum and fittings; steel axes; pendulum regulator; renovated.

0963 BIR003 TELESCOPE DRIVE

Unsigned
193x150x101. Mid to late 19 C. G.
In part-glazed brass housing; incorporates flywheel and Watts governor; steel cord for weights; renovated.
The glazed side is at an angle to the rest of the housing.

2357 BIR043 TELESCOPE MOUNT

Unsigned
H 530; W 390; DisD 210&201. Mid to late 19 C. G.
Alt-azimuth; with oxidised brass tubes at right-angles, each leading to brass mechanical divided discs.
Declination circle disc divided 0-90-0-90-0°; right ascension circle disc divided in hours I-XII(x2); each driven by endless worm screw to cogs on the sides of the discs; verniers on each disc; brass mount plate with bolts for missing telescope.

0982 BIR023 THERMOGRAPH

NEGRETTE & ZAMBRA. LONDON.
L 372; H 167; Hs 242x139x131. Late 19 early 20 C. G.
Green iron glazed housing; cylinder grid probe cover at one side; brass fittings and drum; brass handle.

0981 BIR022 THERMOMETER - GLASS MERCURY

R & G KNIGHT FOSTER LANE LONDON
Hs 351x34; L 323; D 6; RsD 11. 1800-1838. F.
Wood housing, hinge near bottom to free reservoir, spherical mercury reservoir; scales -30-140° and -20-300°.
The hinge is 65mm from the bottom of the housing, and this allows the lower part to fold back so that the thermometer reservoir can be dipped in the liquid whose temperature is to be measured.
Dates from Crawforth 1988, 10.

2397 BIR073 THERMOMETER - MAXIMUM

YEATES & SON 2 GRAFTON ST DUBLIN.
B 265x40x17. 1840-1864. F.
Wood base; J glass tube; large yellow spirit reservoir in smaller arm; scale -30-120°; two brass hanging rings.
To be set up horizontally; maximum dumb-bell marker now surrounded by spirit, so the thermometer is not working, but could probably be readily fixed.
Assumed to be George Yeates & Son, since the address is given; dates Morrison-Low 1989, 139.

0546 BIR010 TRADE LABEL

J. Buckley Optical Mathematical & Philosophical Instru-ment Maker 14, Lower Sackville Street. Dublin. Late Moira Hotel.
On lid of Buckley level 0969 BIR009.
Dates 1832-1859 from Morrison-Low 1989, 121.

0964 BIR004 TRANSIT INSTRUMENT

Troughton London
L 885; W 550. Early 19 C. G.
Oxidised brass; tube and axis; divided ring at axis side, vernier; tangent/clamping screws; spirit level.
Ring has six spokes and is divided 0-90-0-90-0°.

0962 BIR002 TRANSIT INSTRUMENT

TROUGHTON & SIMMS
L 783; W 470; ApD 64; CrD 165. Second ½ 19 C. G.
Brass and oxidised brass; tube on axis; at axis side divided circle, silvered scale, verniers, magnifiers.
Circle has four spokes, is divided 0-90-0-90-0°, has tangent and clamping screws, and has a spirit level attached to the bracket for the verniers and other fittings.

3434 BIR136 VOLTMETER

VOLTS EDISWAN LONDON No 7467
BD 185; HsD 160, W 72. Early 20 C. G.
Blackened metal base and cylinder housing with white-metal and black hatched top; arc window and scale 0-280.

3414 BIR116 VOLTMETER

Volt-Meter. S. Schuckert, Nürnberg - System Hummel.

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BD 164; HsD 128, W 58. Late 19 C. G.

No3861; black metal base; glazed brass cylinder housing; white arc scale 0-120 (non-linear).

The needle pivots from the centre of a brass bound coil (D61) above the scale.

3432 BIR134 VOLTMETER

STANLEY APERIODIC VOLTMETER 8401 D.A

BD 190; HsD 164, W 59. Early 20 C. G.

Black metal base ring; brass and blackened brass housing with arc window and silver-metal scale 0-300.

The instrument is in pristine condition, in its original cardboard box with wrapping paper inside; around the meter is a label:

"This instrument must be used with extra RESISTANCE in SERIES bearing same number"; the box has a label in red: "THIS INSTRUMENT MUST BE CAREFULLY HANDLED. NOTICE. No responsibility can be taken for the failure of this instrument in particular, unless it is returned ??? for inspection with the seal unbroken".

4070 BIR161 WEIGHTS - IMPERIAL

F.E. BECKER & Co.. W. & J. George, Ltd Succrs. 33-37, HATTON WALL Hatton Garden LONDON, E.C.

C 183x83x42. 1884-1900. A.

Boxwood case for brass cylinder weights 1-2000 grains.

The signature is on an ivory plaque on top of the case, which contains tweezers, and small white-metal weights under a glass panel.

Dates from Anderson 1990,10-11.

2402 BIR078 WHISTLE - GALTON

S.C. TISLEY & CO LONDON

MnL 65; SvD 11; SfD 5. 1877-1888. F.

Brass; outer cylinder sleeve divided 0-9 revolves along scale 0-14; demonstrates limit of audibility.

Dates from Downing 1988,134 and Anderson 1990,84.

BLACKROCK COLLEGE - BLA

Blackrock
Co. Dublin
Telephone (01) 288-8681

2057 BLA056 AIR PUMP - FLEUSS

FLEUSS PATENT NO 4856

B 435x311x48; PvH 593; PD 176. Late 19 early 20 C. G.

Cast iron base and support to pivot for handle, other end to brass cylinder; air pump plate; glass bell jar.

End of lever away from handle moves piston in pump; lead from this through elongated egg-shaped vessel to central pipe in plate; stop-cock and pipe in centre of plate; glass bell jar MxD205 H277.

Turner 1983,103 dates Fleuss pumps c1900.

2120 BLA108 AIR PUMP - SYRINGE

Unsigned

L 380 & 293. Mid to late 19 C. G.

Two; brass; one has a red wood handle and a stop-cock; the other has a brass handle with no stop-cock.

2087 BLA075 AMMETER

HARTMANN & BRAUN A.-G.FRANKFURT A/M. No148417 D.R.G.M. PHILIP HARRIS & CO LTD BIRMINGHAM AND DUBLIN.

B 290x180x25; H 335. 1902-1911. A.

Upright; mahogany base/frame; vertical coil; 2 and 10 Amps.

"School Form of Ammeter", clearly showing the working parts; for description see matching voltmeter 2086 BLA074; ammeter also missing its needle; in each case the German signature is on the reverse of the white scale arc, where there is another scale 0-2 amps (or 0-3 volts for 2086); each has a coil on the back of the frame, the ammeter having two thick turns, and the voltmeter multiple thin turns.

Voltmeter illustrated in Griffin 1910,743 £3:12:6; Harris dates from Morrison-Low 1989,126.

2033 BLA022 AMPERE APPARATUS

YEATES & SON [sic] DUBLIN

B 254x102x22; H 210. Mid to late 19 C. G.

Mahogany base; brass; two contacts via copper plates to two pillars; horizontal bars from these to mercury cups.

Only one of the wooden mercury cups remains, and only one of four feet on base is left; a small inexpensive version of more usual Yeates & Son Ampere Apparatus.

2094 BLA082 ATWOOD MACHINE

G. CUSSONS TECHNICAL WORKS MANCHESTER

Sp 505; H 2140; Pr 2025x74x49; WhD 121.

Late 19 early 20 C. G.

Cast iron tripod foot; wood pillar, scales 1-180mm,1-71"; top pulley wheel; ring and two trays on vertical bar.

Pulley wheel on top is simple, not the complex frictionless type found in other, older, machines.

Anderson 1990,22 lists two G. Cussons catalogues dated c1880 and 1884.

2032 BLA021 BALANCE

Unsigned DEPOSE

BD 78; H 191. Mid to late 19 C. G.

Black turned wood base; brass; disc weight below scale 0-100 from pivot, side arm above for body; pointer.

The body to be weighed would be hung (on a missing pan?) from the side arm; this would alter the position of the scale and disc weight, and the weight would be read by means of the watch hand pointer; three small feet on the base, one a level screw.

Type not shown in Crawforth 1984.

2114 BLA102 BALANCE - PRECISION

F.E. BECKER & CO 34 MAIDEN LANE LONDON. W.C.

Sp 432&292; H 412; Hs 390x380x194. 1882-1889. A.

Housing only; mahogany; three brass feet, two levelling; drawer base; glazed on four sides; front slides up.

Dates from Crawforth 1988,4.

2083 BLA071 BAROMETER - ANEROID

CAHILL. OPTICIAN Dublin

BD 190; SD 120; Hs 249x230x115. Early to mid 20 C. G.

Wood base; glazed brass scale frame; silvered scale 27-31"; in glazed mahogany display case.

"MUCH RAIN" "RAIN" "CHANGE" "FAIR" "SET FAIR".

2015 BLA004 BAROMETER - STICK

Negretti & Zambra Patent. (1 Hatton's Gardens, London)

L 902; Se 19x19; B 1070x102. 1859-1867. A.

Dr Livingstone's; brass square-section tube; silver push scale 20-32" with side vernier; mahogany base.

Glass cistern reservoir protected with blue-painted iron guard with three windows; address recorded on leaflet about barometer, but appears now to be missing.

The barometer came from the Holy Ghost Fathers Mission at Bagamoyo, near Zanzibar - sent by Fr Etienne Baur to Fr Jean Ebenrecht in Blackrock College as a token of appreciation for financial help to the Mission when it was damaged by cyclone in 1872. Dr David Livingstone (1813-1873) passed through the island of Zanzibar in 1868, on his last mission to discover the source of the Nile. He was helped by the Holy Ghost Fathers at Bagamoyo, where Fr Etienne Baur was in charge. Baur was a classmate of Fr Jean Ebenrecht, bursar, architect and director of propaganda and of the Scholasticate at Blackrock. Expeditions were sent by the Geographical Society and the New York Herald (1871) in search of Livingstone. Stanley called to Bagamoyo and was helped before he found Livingstone at Ujiji - "Dr Livingstone, I presume". Livingstone praised the

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Fathers in his writings for their help. The late Fr James Burke, Science Master at Blackrock College, got the details from Fr Ebenrecht, and had the barometer filled with mercury again. It was mounted on a new base and placed in the Centenary Library by Fr William O'Meara in 1973.

Dates from Read 1985,10.

2089 BLA077 CHLADNI PLATE

Unsigned

BD 181; H 155; PD 305. Mid to late 19 C. G.

Black cast iron base; brass pillar to centre of brass disc plate.

2064 BLA046 CHLADNI PLATE

Unsigned

Sp 185; H 285; DiD 203. Mid to late 19 C. G.

Black tripod foot, gold line decoration; turned wood pillar; brass sleeve for oxidised brass disc plate.

2097 BLA085 COIL

Unsigned - attributed to Yeates & Son

Sp 199; H 372; PrD 19; CoD 37. Mid to late 19 C. G.

Green iron tripod foot; brass pillar to mahogany table for two contacts and vertical coil on hollow wood bobbin.

Tripod stand as found on Yeates & Son instruments; purpose of instrument not clear, but an iron core in the centre of the bobbin is likely to be involved.

2107 BLA095 COMPASS - MARINE

Unsigned

CpDisD 90 & 137; Hss 150x151x118 & D 145 H77.

Mid to late 19C. G.

Two; one in brass double gimbal mount in oak case (no lid); other in black cylinder metal case, glass base.

Both have jewelled bearings for the needle cards.

2036 BLA025 CONDUCTOR - CYLINDRICAL

Unsigned

BD 109; H 210; CyL 181, D 38. Mid to late 19 C. G.

Two; turned mahogany base, boxwood sleeve; glass pillar; wood cylinder, rounded ends; were foil-covered.

Also black wood cylinder only L266D44.

2035 BLA024 CONDUCTOR - CYLINDRICAL

Unsigned

BD 151; H333; CyL 250, D 52. Mid to late 19 C. G.

Turned mahogany base; brass sleeve; (broken) glass pillar; brass cylinder with rounded ends.

Cylinder has screw holes on top on each side for pith ball indicators.

2034 BLA023 CONDUCTOR - SPHERICAL

Unsigned

BD 155; H 490; SrD 102. Mid 19 C. G.

Turned hardwood weighted base; brass sleeves; glass pillar; on top, hollow brass sphere with top cut off.

2105 BLA093 CRYOPHORUS - WOLLASTON

Unsigned

L 606 & 405; SrsD 68/67 & 51/50; TusD 14 & 10.

Mid to late 19 C. G.

Two; glass; sphere at one end; long tube bent 180° to a second sphere at other end; part-filled with liquid.

A third, broken, is slightly larger than the smaller of these two.

Name from Griffin 1910,458.

2081 BLA069 CUP OF TANTALUS

Unsigned

BD 67&59; H 121&118; MxD 72&80. Mid to late 19 C. G.

Two; glass; disc base, short stem, bell-shaped cups; siphon tube from base turning 180° back to near base.

2023 BLA012 DIP CIRCLE

Yeates & Son Dublin

B 216x141x24; CrD 240; H268. Mid to late 19 C. G.

Mahogany base, four feet; brass; circle 0-90-0-90-0°; tapering supports from base to centre for iron needle.

Part of frame running underneath base missing.

2063 BLA045 DIP CIRCLE

Unsigned 214

Sp 182; BD 145; H 315; CrHs 198x194x58.

Mid to late 19 C. G.

Brass; horizontal (with vernier) and vertical silvered circles 0-90-0-90-0°; tribach base; needle in case.

Horizontal circle covered by red disc with fan window to read scale and vernier; tangent and clamping screws; vertical ring scale with brass ring inside; two brass diagonals hold needle; vertical circle housed in glazed mahogany frame; number 214 on mahogany needle case.

2099 BLA087 DISC SPINNER

Unsigned

Sp 184; AxH 300; WhD 154. Mid to late 19 C. G.

Cast iron tripod base, support, five-spoke turning wheel; axle on top for brass pulley and wing nut for discs.

Handle on turning wheel broken off and gone; variety of home-made discs.

2037 BLA026 DISCHARGE TUBE

Unsigned

L 550-565; SrsD 70; CeBus D66&60. Mid to late 19 C. G.

Three; glass; one has five spheres joined by zig-zag tubes; two are straight tubes with three bulbs, centre elliptical.

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One of latter has three elliptical bulbs, the largest in the centre, the other is similar but one of the end bulbs is cylindrical; all three have point electrodes, three of six brass caps for these remain.

2061 BLA060 DISCHARGE TUBE - DE LA RIVE

Unsigned

BD 80; H 223; MxD 87. Mid to late 19 C. G.

Black turned weighted wood base; iron pillar; pear shape discharge tube on this; ring and point electrodes.

A hollow cylinder set into the egg fits over the iron pillar; the twisted wire ring electrode fits around this, and is connected to a terminal cap at the side; on top, another cap leads to a red-covered wire electrode.

This instrument, mounted on a coil, is called a "De la Rive vacuum tube...to demonstrate the rotative motion of an electric discharge around a magnetic field" in Van Camp 1988,137.

See also Griffin 1910,947, which lists three versions, including this one.

2093 BLA081 DISCHARGE TUBE - GEISSLER

Unsigned

L 133 & 386. Mid to late 19 C. G.

Two; glass; elliptical bulb plus floral/spiral tube; other straight tube, with 10 spheres and mercury inside.

2072 BLA052 ELECTRIC EGG

Made by Yeates & Son Dublin

H 540. Mid to late 19 C. G.

On base; with coil inside glass egg; noted on visit in May 1986, but not seen on return visit in July 1989.

2024 BLA013 ELECTRIC EGG

Unsigned

BD 202; H 565; GMxD 210. Mid 19 C. G.

Turned hardwood base; brass fittings; glass elliptical globe; stop-cock on base; brass spherical conductors.

Upper conductor can be moved up or down using a brass rod with a ring on top (now stuck).

2103 BLA091 ELECTRIC MOTOR

Unsigned

B 298x163x13; H 140. Late 19 early 20 C. G.

Mahogany base; brass fittings; three horseshoe magnets; double coil armature with pulley wheel; two contacts.

2102 BLA090 ELECTRIC MOTOR

Unsigned

BD 100; H 205; RiD 86. Mid to late 19 C. G.

Mahogany base; brass pillar to iron ring with stepped inside for two revolving coils; brush from axle to base.

Base has four brass contacts plus the brush contact; the axle has a screw thread.

Van Camp 1988,89 illustrates this, or a very similar, instrument, which is described: "Within a soft iron ring, two coils can rotate on a central axle. On the axle an interruptor and a Geissler tube holder are also mounted."; the holder is missing from this instrument.

2025 BLA014 ELECTRICAL MACHINE - CLARKE

R. KING LITHO SHEFFD. 35/- FANNIN & CO. 41, Grafton-street, Dublin.

Hs 250x115x113. Mid to late 19 C. G.

Mahogany housing; brass cog mechanism; two blue coils.

Handle missing; it would have turned a large cog-wheel (D78) which engages a small cog wheel at the centre of a larger pulley wheel (D67) with a leather thong to the axis of an iron frame for two blue velvet-covered coils; "NEWLY INVENTED IMPROVED MAGNETO-ELECTRIC MACHINE FOR NERVOUS DISEASES"; trade label: "FANNIN & CO. Medical Booksellers and SURGICAL INSTRUMENT MAKERS, 41, Grafton-street, Dublin."; plus "DIRECTIONS".

2026 BLA015 ELECTRICAL MACHINE - CLARKE

Unsigned

Hs 229x123x98. Late 19 C. G.

Boxwood housing; brass fittings; red painted horse-shoe magnet; two rotating purple coils; handle detached.

Electrodes missing; "MAGNETO-ELECTRIC MACHINE FOR NERVOUS & OTHER DISEASES....In applying it for the Toothache, Tic-Doloureux or Neuralgia, the operator takes one Handle and places his fingers or sponge over the part affected, while the patient holds the other Handle..."; the crank handle would have turned a decorated wheel attached by a thong to the frame axis of the coils rotating over the poles of the magnet.

2075 BLA063 ELECTROMETER - GOLD LEAF

Unsigned

BD 179-139; H 332-163. Mid to late 19 C. G.

Four; turned mahogany bases; glass jars; brass sleeves with brass disc and rod insert to leaves.

Tallest has painted silver cage on jar; that with the widest base has an ebonite cross bar near the top of jar supported by two glass insulating rods; the second smallest has two brass rods with sphere tops rising from the base; the smallest is missing its brass sleeve at the neck, and has an 1862 Victoria penny instead of its brass disc, it has two tapering and two rectangular foil strips at the sides; the widest has two side foil beacons also.

2104 BLA092 ELECTROSTATIC GENERATOR

RECONDITIONED BY ELECTRICAL & MECHANICAL ENGINEER F.C. HAYES 5, CROSS AVE, BLACKROCK, CO. DUBLIN INSTRUMENT MAKER

B 726x329x53; AxH 335. Late 19 early 20 C. G.

Open mahogany frame, trunnions and black wood axle only.

Ivory maker's plaque but no signature remains; plate electrostatic generator without plate, conductors etc.

2121 BLA109 EXPANSION APPARATUS - BAR BREAKER

Unsigned

B 290x102; H 94. Mid to late 19 C. G.

Cast iron; shaped base, vertical plate; side supports for expansion rod with screw thread and hole for bar.

Rod would be heated and then placed on the supports with the bar at one end, and screwed tight at the other; when the rod cooled, the bar would break.

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2084 BLA072 EXPANSION APPARATUS - O'TOOLE

MADE BY PHILIP HARRIS & CO LTD BIRMINGHAM & DUBLIN

Sp 263&190; H 732; JD 37. 1902-1911. F.

O'Toole Extensimeter; mahogany base and housing; steam jacket; spirit level and micrometer screw for expansion.

Three brass level screws; steam jacket, with input and output pipes and central thermometer sleeve, surrounds expanding bar; this pushes up a wooden bar on top; a (missing) spirit level has one end on this bar and the other on a brass bar, attached below to the micrometer screw; thus, by zeroing the spirit level and then measuring the distance to zero it again, the expansion of the bar is determined; see prototype 2062 BLA044.

Dates from Morrison-Low 1989,126.

2062 BLA044 EXPANSION APPARATUS - O'TOOLE

Unsigned (prototype EXTENSIMETER by Fr Hugh O'Toole)

B 271x148x20; H 707; TuD 36. Early 20 C. PC.

Mahogany base, frame and box for bar with steam jacket; spirit level on top; change in bar length measured by micrometer screw.

Instrument adjusted to make top of bar and micrometer screw contact at its other end level; bar then heated, in the steam jacket, which has a hole for a thermometer in the centre; the micrometer is then adjusted using the spirit level, when the expansion can be measured; prototype instrument made in Blackrock College, and patented by Fr O'Toole; commercial instruments made by Philip Harris - see 2084 BLA072.

2065 BLA047 FARADAY NEEDLE

YEATES & SON DUBLIN

Sp 192; H 314; RsD 59. Mid to late 19 C. G.

Cast iron tripod base; vertical magnet; wood mercury reservoir on top; wire from crook above into mercury.

Now painted grey; paper scroll with signature torn, but clearly Yeates & Son; electrical contacts on foot at base of crook and into mercury; the wire will rotate when a current is passed.

See Yeates 1877,31.

2030 BLA019 FIRE SYRINGE

Unsigned

MnL 379; CyD 26. Mid to late 19 C. G.

Thick wall glass cylinder; brass sleeves on ends; piston on iron rod; turned boxwood stationary handle.

Handle on top of piston rod missing.

2040 BLA029 FROSTED GLASS SCREEN

Unsigned

Sp 256&188; H 400; W 291. Mid to late 19 C. G.

Mahogany frame with some carving, on two feet, holds glass pane frosted on one side; purpose unknown.

2080 BLA068 GALVANOMETER

Unsigned Walmsley-Mather Galvo. List No 3646

BD189; H 164. Late 19 C. G.

Mahogany base for two coils; three brass contacts; brass support for needle fibre; scale 0-90-0-90-0°; dome.

Fibre support rises from side of base and turns in a right-angle; mirror in centre of base for parallax readings; below this, in the base, are the two coils wound on semi-circular boxwood bobbins; label on base with printed "DES-CRIPTION:...List No...Tested" and with hand-written "Walmsley-Mather Galvo. Res 580° & 5.9"" List No "3646" Tested "18.5.04 D.C.".

2028 BLA017 GALVANOMETER - ASTATIC, NOBILI

YEATES & SON, DUBLIN.

BD 185; H 265. Mid to late 19 C. G.

Mahogany base and coil frame; astatic double needle from brass arch reads scale 90-0-90 on copper disc; dome.

Three brass level screws and two contacts on base; brass arm below base moves coil housing; mirror is later addition to needle suspension fibre; paper ring scale; glass dome has hole in middle on top through which a screw fitting from the brass arch protrudes.

2027 BLA016 GALVANOMETER - TANGENT

JOSEPH M. MAIBEN & CO. 31 EDEN QUAY DUBLIN

B 306x202x24; H 446; CoHsD 341. c1912. A.

Mahogany base and wire housing; grooves of three diameters, 162, 245, 326, to add wires; magnetometer table.

Three brass level screws and six brass contacts on base; wires can be connected to the terminals and wound around the grooves, secured by turned mahogany bobs; the horizontal magnetometer table juts out from the centre of the wire housing.

Bill/letter heads 2636 PRI269 include card 27:8:1912 with this address over stamped by 11 Westland Row.

2077 BLA065 GALVANOMETER - TANGENT

Unsigned

BD 304; DiD 252; CoHsD 375; H 430. Late 19 C. G.

Mahogany base, disc and coil housing; two brass pillars to mahogany table for brass cylinder housed magnetometer.

Three brass level screws; five brass contacts on disc; magnetometer scale 90-0-90° and 10-0-10 (log).

2076 BLA064 GALVANOMETER - TANGENT

Unsigned

B 455x305x14; CoHsD 368; H 385. Late 19 C. G.

Mahogany - base, coil housing to one side, turned pillar at edge holds double arc magnetometer in coil centre.

Base has four brass contacts, magnetometer has two; latter has scales 40-0-40 and 50-0-50 in the two quadrants, with mirrors below; parallel to axis of coil, on the base, is a brass rule, secured by two brass knurled knobs, and with scales outside the knobs 1-3; there are two holes on the base parallel with the coil for a missing part; base contacts labelled 3, 4, 5, 6.

2067 BLA049 GALVANOMETER - TANGENT, GAUGAIN

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST, LONDON. W.

Sp 250; H 428; CoHsD 336; MaHsD 101. Late 19 C. F.

Mahogany and brass; disc base, pillar to magnetometer 0-90-0-90-0°; and sets of single and multiple turn coils.

Three level screws below base table; pillar supports diagonals of coil housings on each side of magnetometer; ebonite bar on base table has four brass contacts; rest of galvanometer revolves on disc base.

"Gaugain" from Griffin 1910,742; firm founded in 1884, Downing 1988,57.

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2070 BLA051 GALVANOMETER - TANGENT, STEWART

W. GROVES 89 BOLSOVER ST LONDON. W.
B 534x130x15; H 297; CoHsD 306. 1877-1885. F.
Boxwood and mahogany; central coil housing; sliding magnetometer, 0-90-0-90-0°; scales on arms 110-360mm.
Single or multiple turn coils around central housing; glazed magnetometer has mirror behind for parallax readings.
Another similar Stewart Tangent Galvanometer is unsigned.
Name "Stewart" from Griffin 1910,742; dates from Downing 1988,54.

2112 BLA100 GLASS BELL JARS

Unsigned
BD 137-190; H 160-346. Mid to late 19 C. G.
Four; tallest has cylinder shape; others have curved sides; smallest only has opening on top D42.

2012 BLA001 GRAPHOMETER

MOLTENO AINÉ. A PARIS.
L 187; ½CrD 83; CpHsD 61. Late 18 early 19 C. G.
Brass; moving and fixed (one gone) line and window sights; sunken compass, silver scale; ball and socket joint.
One of the fixed sights is broken off and missing; the moving sights have verniers at their bases, reading the scales, 0-180° and 180-0° on the semi-circle; compass marks eight main directions "N,NE,E,SE,S,SO,O,NO", and has scale 0-90-0-90-0°; red jewelled bearing and clamp on back for compass needle.
Payen 1986,159 records the foundation of the workshop of Molteni in 1782: signature here definitely Molteno.

2038 BLA027 GUINEA & FEATHER APPARATUS

Unsigned
L 919; TuD 34. Mid to late 19 C. G.
Glass tube; brass sleeves at ends; securing nut one end; stop-cock at other; fake "guinea" remains in tube.

2053 BLA042 HYDROMETER

ARGENT R TEMP 60
L 140; MxW 25. Mid to late 19 C. G.
Glass; sphere mercury weight; pear bulb; ivory scale 0-90; plus assortment of glass and mercury hydrometers.
Four have sphere mercury weights, pear cylinders and ivory scales 40-P-70, 40-P-70, 40-P-60, and 50-5 W; L 251-226, MxD 32-35: two are long and thin with slim bulbous weights and small irregular cylinder bulbs, with paper scales 1000-700 and 1500-1000 "Hydrometer Sp. Gr. Temp. 60°F."; L 299&292, MxD 20&19: there are also more modern and home-made hydrometers, some of latter with names and dated 1911.

2017 BLA006 HYDROMETER

CLARKES EXPORT HYDROMETER MADE ONLY BY DRING & FAGE..NO 20 TOOLEY ST NEAR LONDON BRIDGE NO. 14241
L 173; BuD 35; C 229x120x49. 1804-1844. A.
Brass with copper(?) sphere bulb; two scales on thin top stem 10-0 and .1[-.9-.]0; 26 weights; mahogany case.
Stem below bulb is triangular with a pear-shaped weighted bottom; space for 42 weights on small iron pegs; space for missing thermometer; case lined with green silk (now in poor shape) and green velvet; signature rather crudely stamped on boxwood elliptical plaque on top of case; instrument inscribed: "CLARKE EXPORT 14241" with a dagger and crescent moon; some weights marked e.g. "WARMISH .2." "VERY:COLD .5."
Dates from Cawforth 1988,6.

2054 BLA043 HYDROMETER

HICK'S PATENT NO. 2701 TEMP 200°
L 208-220; MxD 36-38. Late 19 early 20 C. G.
Three; glass; sphere with lead shot weight; pear bulb; white frosted stem; scale 0 1/32 2/32 3/32 4/32.
One looks older than the others; scale has "LIMIT" near 3/32 and "BLOW" below 2/32.
Two more-recent instruments have a black band around mid scale at 2/32.

2049 BLA038 HYDROMETER

J. ROBINSON & SONS OPTICIANS 65, GRAFTON ST., DUBLIN
CL198,D27; (hyd L171;MxD20). 1885-1903. F.
Blue cardboard case stamped as above; handwritten "Petroleum Spirit Hydrometer"; glass, scale 0700-0750.
Mercury weight; "Hydrometer Specif. Gravity Tp60F made in Germany."; cylinder bulb; may not be original instrument received in case.
Dates from Morrison-Low 1989,133.

2055 BLA054 HYDROMETER

TOWNSON & MERCER, LONDON TEMP 60°
L 225; MxD 27; C 280x151x88. Late 19 early 20 C. G.
Glass; mercury sphere weight; cylinder bulb; paper scale 0-25; mahogany case; cylinder/thermometer? gone.
Fitted case with blue velvet; two items missing - presumed sample cylinder and thermometer.
Anderson 1990,84-5 lists catalogues of firm from 1874-1914.

2052 BLA041 HYDROMETER

Unsigned
L 140; MxD 21. Mid to late 19 C. G.
Glass; sphere mercury weight; pear-shaped bulb; paper scale 0-100 "Grains per Oz.Tp.60°F. Made in Germany."

2050 BLA039 HYDROMETER - DIABETES

Unsigned DIABETES TEMP 60 W N S
L 131; MxD 18. Mid to late 19 C. G.
Three; glass; sphere mercury weight; cylinder bulb; ivory scale 0-60.

2044 BLA033 HYDROMETER - FAHRENHEIT

Unsigned
L 215-217; MxD 33; C 296x205x77. Mid to late 19 C. G.
Boxwood case for three glass Fahrenheit hydrometers; thermometer -5-40°, and nest of weights; cylinder gone.
Glass and mercury thermometer broken, with paper scale; hydrometers have mercury weights, a long stem to the egg shaped

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bulb, a narrow stem with white insert and a mark to the top table sealed with red wax; case is leather lined.
Name from Ganot 1890,109.

2047 BLA036 HYDROMETER - NICHOLSON

Unsigned
L 280; MxW 52. Late 19 C. G.
Two; tin; conical weight below; two arms to bi-conical cylinder bulb; stem to top pan table.

2046 BLA035 HYDROMETER - NICHOLSON

Unsigned
L 172; MxW 45; C 255x69x62. Mid 19 C. G.
Brass; pan on bottom D41; stem to elliptical bulb; rod to table; six weights "D WATER" and 20-200; mahogany case.
Weights 200,100,40,30,20; also disc weight, not matching "½ SCRUPLE Hs"; small brass clip on one of the arms below the lower stem to the pan.

2045 BLA034 HYDROMETER - O'TOOLE

Unsigned
L 297-279; MxW 44-38. C1898. R.
Three; glass; mercury weights; long stem to large bulb; smaller bulb between this and table on top for weights.
These hydrometers are similar to those of Fahrenheit (see 2044 BLA033) except that they have an extra bulb between the large bulb and the weight table; they were invented by Rev. H. O'Toole, and described in the Scientific Proceedings of the Royal Dublin Society, Vol.8, 753-755, 1898; they operate by comparing the specific gravity of a known and unknown liquid, and are independent of temperature and the effects of capillary or surface tension to which other forms of hydrometer are vulnerable; the hydrometer is immersed in each liquid and weights added until the liquid surface is at a mark between the middle and upper bulbs; further weights are then added until the liquid surface is at a mark between the upper bulb and the weight table; the difference then gives the weights of the same volume of the liquid - that of the upper bulb - "with extreme accuracy".
The Blackrock collection is rich in hydrometers, and the reason seems clearly to be this interest by Father Hugh O'Toole in the specific gravity of liquids, the accurate measurement of which, he states, is of the highest importance "in numerous manufacturing processes, in commercial transactions and in scientific investigations".

2048 BLA037 HYDROMETER - TWADDELL

Unsigned
L 195-227; MxW 25-38. Mid 19 to early 20 C. G.
Collection of 15; 1xNo1,7x3,4x4,1x5,2x6; three match, with ivory scales; nine match, paper scales "made in Germany".
All are of glass with mercury weights; three matching hydrometers have sphere weights and pear-shaped bulbs; nine matching have pear-shaped weights and egg-shaped bulbs.

2079 BLA067 HYGROMETER - DANIELL

Unsigned
BD 112; H 233; BusD 35. Mid to late 19 C. G.
Turned wood base and pillar; stem and limb thermometers, ivory scales 0-50°C; gold band around lower bulb.

2078 BLA066 HYGROMETER - DANIELL

Unsigned
BD 124; H 270; BuD 41. Mid to late 19 C. G.
Turned boxwood base and pillar; stem thermometer, glazed scale -20-60°; gauze on higher bulb; lower broken off.

2042 BLA031 HYGROMETER - MASON

WILLIAMS & WOODS LIMITED DUBLIN (on water vial)
BD 150; H 688; ThsD 18, L 534. Mid to late 19 C. G.
Turned boxwood base and pillar; turned brass fittings; two "Celsius" thermometers -15-50°; vial not original?
Mercury and glass thermometers.

2123 BLA111 INTERRUPTOR

Unsigned
B 180x102x24; H 167. Mid to late 19 C. G.
Mahogany base, three of four turned feet; iron frame for two green coils on brass bobbins; iron bar interruptor.
Latter makes and breaks contact with bars through the centres of the coils; two brass contacts on base.

2073 BLA061 KALEIDOSCOPE

Unsigned
BHs 107x68x60; H 157; TuD 22. Mid to late 19 C. G.
Three; frosted glazed mahogany frame, two knobs, one turns colours; brass vertical telescope with angled mirrors.
Rectangular base has glazed sloping side to illuminate coloured pieces arranged on a brass bar which can be pushed in and out and, by means of an outside groove, can be moved sideways also; eyepiece and lens missing from one, and eyepiece lens missing from second.

2100 BLA088 LAMP - MAGNESIUM

MAGNESIUM LAMP J. SOLOMON. BREVETÉ 8006 22 RED LION SQUARE, LONDON. NO. 3654
Sp 180&142; H 264; MiD 204; ReD 121. 1849-1880. F.
Iron and tin; ribbon reel; feed mechanism; focus mirror.
The magnesium ribbon reel is on a frame which screw clamps to the cylinder containing the feeding mechanism; this has a hinged door on top, a wing nut at the side and a rack and pinion at the bottom to adjust the position of the concave focus mirror; a spout from the feeder juts through the mirror above its centre; lamp is held with a turned mahogany handle under the reel, and has two curved feet just behind the mirror.
Dates from Crawforth 1988,15.

2071 BLA053 LEYDEN JAR

Unsigned
H 342&318; JaD 97&102, H 204&201.
Mid to late 19 C. G.
Two; one has foil linings, other foil diamonds; both have mahogany disc caps with brass rods and top spheres.

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2031 BLA020 MAGDEBURG HEMISPHERES

Unsigned
BD 107; H 57; MxD 58. Mid to late 19 C. G.
Brass; disc base with central sleeve; into this screws lower hemisphere; upper hemisphere missing.
Unusual in that the hemisphere does not have a handle.

2111 BLA099 MAGNETOMETER

HOLTZAPFFEL & CO LONDON.
Hs 256x181x113. Mid to late 19 C. G.
Mahogany housing, glass slide top; white circle scale below 30-150° and 210-330°; glass bar to suspend needle.
Disc mirror in centre of scale with black line diagonals at right-angles; needle missing; another smaller similar instrument has a needle but is unsigned.

2095 BLA083 MERCURY DIFFUSING CUP

Unsigned 172 4/9 y/m
L 180; MxD 60. Late 19 early 20 C. G.
Turned boxwood cup; hole in base for porous wood stem; screw thread below cup; two more similar cups.
Stems painted red on outside; smallest cup (L152) is more cylindrical in shape, and has no screw thread.

2090 BLA078 MICROMETER SCREW MODEL

GRIFFIN LONDON
B 294x72x51; H 273; SD 155. Late 19 C. G.
Wood base and frame for iron screw; on one end a mahogany scale disc 0-9 moves along a linear boxwood scale 0-3.

2101 BLA089 MICROSCOPE - SIMPLE

Unsigned
L 148; EMxD 18. Mid to late 19 C. G.
Turned ebony handle; brass sleeve and frame to eyepiece screw thread (lens gone); pivot for specimen needle.
Eyepiece in two parts; a brass cone-shaped black part screws into the end of the frame; into this screws a brass disc with a silver concave front, a lieberkuhn, to concentrate light on the specimen; half way along the frame is a small revolving plinth with a pivot on top for a sleeve which would fit a needle to hold the specimen.
For a similar microscope, see Turner 1989,261.

2088 BLA076 MICROSCOPE - SIMPLE

Unsigned
BD 54; H 105; MiFrD 31. Mid to late 19 C. G.
Brass; pillar holds bracket into which lens screws; rack and pinion stage focus; semicircular mirror frame.
Mirror gone; lens numbered "2" - no others present.
Similar instrument (mounted on its case) illustrated in Turner 1989,270 - "possibly French" - last ¼ 19 C.

2058 BLA057 MICROSCOPE - SOLAR

W & S JONES, 30 Holborn London
BP 141x141; MnL 240; MiHs 270x91. 1800-1860. A.
Brass; mirror pivots behind base plate; wing nut turns tube; rack and pinion extension at objective.
Mirror revolved by wing nut and endless screw; two securing knurled knobs on corners of base plate; tapering base section to microscope tube, then two cylinder sections.
Dates from Clifton 1995,155.

2115 BLA103 MIRROR - CONCAVE

Unsigned
D 300. Mid to late 19 C. G.
Nine; of thin metal with turned-back edges; one is mounted on a non-matching iron tripod stand.

2021 BLA010 MIRROR - ROTATING CUBIC

Made by Yeates & Son Dublin
BD 145; H 400; Mis 140x137. Mid to late 19 C. G.
Fluted iron base (new silver paint); handle turns disc to rotate another at right-angles to revolve mirrors.
Knob of handle missing, as is rubber washer on disc so that it does not now turn mirrors; mahogany frame on top and bottom of mirrors.

2113 BLA101 MIRRORS - ANGLED

Unsigned
BD 128; H 208. Mid to late 19 C. G.
Mahogany base; tin cylinder cut vertically to house two angled rectangular mirrors; for Geissler tube display; three turned feet.
Van Camp 1988,135 shows this, or a very similar instrument, which is used to house Geissler tubes; it has an electrical connector on top which is absent from the present instrument, though there is a hole where it would have been; it is described as: "Holder for Geissler tubes with two mirrors under 60° for multiple images."; the present instrument has recently been painted grey.

2022 BLA011 NAPIER BONES

Unsigned
Hs 253x139x56; CysL 56,D22. Early to mid 19 C. G.
Mahogany housing; 2x10 paper-covered cylinders turned by knobs; 0-9 on top, diagonal lines 9,808,70617 etc.
Frosted glass plate framed by top of hinged housing, used to write on; brass knobs on the side of the housing turn cylinders.
Cylindrical form of bones described by Gaspar Schott in his "Cursus Mathematicus" (1688), Turner 1987,167.
Boxwood/pine 1X12 set of "cylindrical Napier's bones" illustrated in Turner 1987,167 and de Clercq 1985a,9.

2106 BLA094 OCTANT

ROBINSON, DUBLIN.
L 218; MxW 185; AcD 198. 1845-1884. F.
Model; 51° wood quadrant; white arc scale 0-50; side mount for mirror; index arm, mirror mount; incomplete.
Second similar instrument has pointer and mirror; but the pointer has no mirror mount on its pivot as has this instrument; it does have the side mirror; both have a hole in the base at the side opposite the mirror, presumably for the eyepiece; but the

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identification needs to be confirmed.
Dates from Morrison-Low 1989,133.

2082 BLA070 OPERA GLASS

Unsigned
MxD 66; MnH 125. Mid to late 19 C. G.
Binocular; ivory; brass screw-focus draw and fittings; objective lenses missing and one eyepiece lens cracked.

2039 BLA028 POLARIMETER

Unsigned
BD 105; H 278; L 322; TuD 19. Mid to late 19 C. G.
Iron base; brass; pillar to table, slots for sample tube; one side telescope; other revolving silver scale.
Base painted black with gold circle; objective and eyepiece lenses missing to reveal nicol prisms; scale turned by knurled knob at eyepiece end through iron rod to small cog wheel to revolve larger wheel attached to scale; latter 0-355° read through lens at eyepiece side of sample tube table; tube labelled "100" [mm]; second tube found "50".

2074 BLA062 PRISM

Unsigned
L 90-175. 19 C. G.
Five; includes one with two glass handles; one with brass ball/socket mount for stand; one with 95° angle.
With some shorter cracked and broken prisms.

2118 BLA106 PULLEY WHEELS

Unsigned
D 32-64. Mid to late 19 C. G.
Wood; nine in frames; series with different diameters or parallel with same; four single; one double, four triple.
Three singles D64, one D40; one double series D32 and D40; three triple parallel D64; one triple series D64, 48,35; also some brass pulley systems.

2085 BLA073 PULSE GLASS

Unsigned
L 182; SrsD 36. Late 19 early 20 C. G.
Glass tube bent at both ends, with bulbs; contains (decomposed) spirit; hand heat should move spirit.
"Pulse glass, containing coloured spirit which has been boiled for some time to expel all the air from the apparatus. When one bulb is taken in the hand, as shown in the figure, the heat is sufficient to produce a pressure, which drives the liquid into the other bulb and causes brisk ebullition. The cooling of the liquid consequent on the evaporation produced is distinctly felt."; spirit now decomposed/doesn't work.
Quote from Griffin 1910,460.

2029 BLA018 PUMP - LIFT

W. LADD LONDON
L(-GI) 260; MxD 66. 1839-1872. F.
Glass cylinder, piston on brass rod; on top, brass reservoir plus bottom outlet; below, brass disc and sleeve.
A glass tube below the disc and sleeve would be placed in missing reservoir and the pump would lift the water into the top reservoir, where it would flow out through the outlet pipe.
A second almost identical instrument is not signed.
Dates from Crawforth 1988,11.

2060 BLA059 RADIOMETER - CROOKES

Unsigned
BD 83&96; H 230&250; SrD 63&63. Mid to late 19 C. G.
Two; turned mahogany or black wood base; glass; turned or tapering stem; four black/silver vanes in spheres.
First has replacement mahogany base and has a glass disc base - its stem is in the form of a tube with three raised features; second has a stem which sticks into the base and widens as it approaches the sphere.

2116 BLA104 RESERVOIR

Unsigned
Sp 95; H 225; MxD 115. Late 19 C. G.
Tin; three legs; conical vessel painted like coopered barrel; spout at base; for use with water wheels etc.
Very similar reservoir illustrated in Griffin 1910,301 and used to demonstrate both undershot and overshot water wheels.

2092 BLA080 RESISTANCE BOX

PHILIP HARRIS & CO. LD. DUBLIN.
B 166x120x99; H 151. 1902-1911. F.
Mahogany base with ebonite top; U-shaped brass bar has nine holes 1 2 2 5 10 20 20 50 0; eight ebonite and brass keys.
Two brass electrical contacts on ends of bar.
Dates from Morrison-Low 1989,126.

2066 BLA048 RESISTANCE BOX

PHILIP HARRIS & CO LD MAKERS BIRMINGHAM & DUBLIN
B 271x120 H 160; Hs 248x95x94. 1902-1911. F.
Mahogany base and housing; ebonite top; brass U-bar; 14 segments; 13 T-shaped brass keys to join segments.
Holes in middles of as well as between segments; resistances 1 2 2 5 10 20 INF 20 50 100 200 500 ohms.
Dates from Morrison-Low 1989,126.

2117 BLA105 SAND GLASS

Unsigned
BD 72; H 135. Mid to late 19 C. G.
For two minutes; boxwood frame with four turned pillars; figure-of-eight glass blown in one piece; red-brown sand.

2013 BLA002 SCALE - MARQUOIS

J. ROBINSON & SONS. DUBLIN. ROBINSON & SONS DUBLIN
SL 316, W 37; Sq 317x300x104; C 336x128x23.
1885-1903. F.
Boxwood square, scale 1-22, and two rules, scales 1-12", 1-41 & 30-0-30, 2-16, 120-0-120, 2-70; mahogany case.

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Elliptical stamp on back of case: "J. ROBINSON & SONS 65, GRAFTON ST., DUBLIN"; the two rules have slightly different signatures as above; both have inclined edges.

Tesseract 9,1985,52 notes that these scales were invented by T. Marquois, teacher of military scientists, 1 Charing Cross, London.

Dates from Morrison-Low 1989,133.

2014 BLA003 SCALE - MARQUOIS

ROBINSON & SONS DUBLIN

SL 317,W 38; Sq 321x302x108; C 337x132x23.

1885-1903. F.

Boxwood square and two rules, scales 90, 70, 40, 80-0-same, 2-52, 40, 22, 46; 120, 60, 100, 50-0-same, 2-70, 34, 58, 28.

Mahogany case; the square has no scale; the rules do not have inclined edges; written on pencil on back: "Marquois Scales Woolweed[?] Pat".

Dates from Morrison-Low 1989,133.

2109 BLA097 SLIDE RULE

GRIFFIN * LONDON

385x64x15. Late 19 early 20 C. G.

Mahogany base; boxwood; fixed rule 28-31 and unmarked side piece; between these, slide 0-5 with concave end.

A blackened boxwood unmarked slide piece has a convex end which fits into the concave end of the other slide; purpose unknown.

2108 BLA096 SLIDE RULE

PHILIP HARRIS & CO LTD BIRMINGHAM & DUBLIN

342x64x15 & 341x65x15. 1902-1911. F.

Pair; wood base; two boxwood scales each ruled 12" and 30cm; slide between for "/cm conversion is missing.

Another with a mahogany base and two thin slides ruled only 12" or 30cm is signed: "PHILIP HARRIS & CO LTD. MAKERS BIRMINGHAM" (it looks older); two more, similar to the first two are unsigned but have their slides present with vernier markings.

Dates from Morrison-Low 1989,126.

2059 BLA058 SONOMETER

J. ROBINSON & SONS 65. GRAFTON ST. DUBLIN

1146x131x81. 1885-1903. F.

Mahogany and boxwood sound box; three metal pegs at one end, two at the other; one metal string; scale at side 10-90.

Scale goes in divisions of 5; 0 and 100 not marked; 90 marked twice - second 90 should be 95.

Dates from Morrison-Low 1989,133.

2110 BLA098 SPECIFIC HEAT APPARATUS - REGNAULT

MADE BY PHILIP HARRIS & CO LTD BIRMINGHAM & DUBLIN

B 389x225x23; H 420; JD 98, H 180. 1902-1911. F.

Mahogany base and frame; brass water jacket; sliding box below for copper calorimeter; dividing arched slide.

Body being studied is heated in the water jacket, which is then turned around its securing pillar so that the body falls into the calorimeter in the mahogany box, which slides from the other side of the instrument to be positioned below the jacket; the slide keeps the box and calorimeter away from the heat until it is time for the drop; signature on an ivory plate and in elliptical plates on jacket and calorimeter.

Dates from Morrison-Low 1989,126.

2091 BLA079 SPHEROMETER

PHILIP HARRIS & CO LTD Instrument Specialists DUBLIN & BIRMINGHAM (ditto BIRMINGHAM & DUBLIN)

MxD 57; H 67; C 84x82x74. 1902-1911. F.

Brass disc, three legs; central leg with micrometer; case.

Micrometer circular scale 0-90 and linear -5-10; slide lid for wood case missing and replaced by blue glass; signature on ivory disc on case and on elliptical stamp on instrument; circular scale now moves independently of the central screw.

Dates from Morrison-Low 1989,126.

2119 BLA107 STAND

P HARRIS BHAM AND DUBLIN

Sp 184; H 373. 1902-1911. F.

Cast iron tribach foot with cast signature; three brass level screws; central brass pillar to screw thread.

Apparatus screwed on top now missing.

Dates from Morrison-Low 1989,126.

2122 BLA110 STAND

NEWTON & CO Opticians Fleet Stt. Temple Bar London.

BD 99; H 100. Third ¼ 19 C. G.

Brass; turned base with rise to centre for tapered pillar ending in a point; maybe for a magnetic needle?

2019 BLA008 TELEGRAPH - ALPHABETICAL

YEATES&SON [sic] DUBLIN

B 199x199x31; H 118; DID 153. Mid to late 19 C. G.

Pair; mahogany base, four turned feet; brass dial "A-Z" and "1-25"; arm and bone handle to engage cogs; bell switch.

Base has three brass contacts "BELL" "R" and "C"; the bell contact is engaged using a pivoted brass bent rod turned by a bone handle, with another electric contact at the pivot; probably transmitters for receivers 2018 BLA007.

2018 BLA007 TELEGRAPH - ALPHABETICAL

YEATES & SON. DUBLIN. Breguet 18 57852 & 19 57853

B 220x140x27; H 199; WdD 109. Mid to late 19 C. G.

Pair; mahogany housing; window for black/white scale "A-Z" and "1-25"; brass clockwork inside, and green coils.

Base has two brass terminals "Z and BELL" and "R"; housing held by two hooks to base; probably receivers for transmitters 2019 BLA008; four turned mahogany feet.

"Bréguet's Alphabetical Telegraph, with clockwork receiver" in Yeates & Son 1877,41.

2020 BLA009 TELEGRAPH - MORSE

YEATES & SON, DUBLIN.

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B 251x150x22; H 188. Mid to late 19 C. G.

Mahogany base and pointed frame for green morse/alphabet scale; deflect needle; ivory and brass contacts; bell. Scale also inscribed "CH-----//I" "Understand---/" and "Repeat---\"; base has two spring arms on front with ivory disc press studs; at side is a switch with a turned ivory handle; behind the scale is a double coil which deflects a metal bar connected to the deflect needle; bell at back of base has two green coils below, and there are four brass contacts at the sides behind the scale; one of four feet missing from base.

2069 BLA050 TELESCOPE - REFRACTING

Unsigned

Sp 390; MnTuL 1123; MxTuD 95; PvH 1022.

Mid-late 19 C. G.

Brass; folding tripod feet; two part pillar to pivot; three draw tube, with push focus and rack and pinion focus.

The eyepiece draw uses push focus, while the short middle draw has the rack and pinion focus.

2043 BLA032 THERMOMETER - GLASS MERCURY

J. ROBINSON & SONS DUBLIN & LONDON

H(+Ha) 296; W 44. 1885-1903. F.

Japanned tin frame, ring handle, curved can around thermometer bulb; scale 40-400°F on silver metal back.

Marked: "FREEZING", "BLOOD HEAT", "SPIRIT BOIL", "WATER BOIL".

Dates from Morrison-Low 1989,133.

2051 BLA040 THERMOMETER - GLASS MERCURY

Unsigned

L 262; MxD 14. Mid to late 19 C. G.

Long cylinder stem with paper scale 10-220°, marked "Churning" "Cheese" "Freezing" "Scalding" "Water Boil".

Markings in red handwriting.

Plus two more-modern similar thermometers, one with mercury indicator and the other with red spirit.

2016 BLA005 THERMOMETER - LESLIE DIFFERENTIAL

J. Robinson & Sons Opticians 65, Grafton St. Dublin & 172 Regent St. London

B 224x98x25; H 407. 1885-1903. F.

Matthiessen; mahogany base/U-frame; glass tube and cock.

Pendant bulbs and one foot gone; two un-numbered paper scales on U-frame; glass tube has a right-angled bend at top, bends down and turns through two more right-angles at the bottom, and rises - with the tube broken at the second top right-angle; the limbs are joined near the top by a glass bridge and stop-cock; mercury now missing from tube; Matthiessen modification of the Sir John Leslie differential thermometer.

Illustrated in Ganot 1877,243; dates from Morrison-Low 1989,133.

2096 BLA084 THERMOPILE

YEATES & SON DUBLIN

BD 64; MnH 202; MxD 69. Mid to late 19 C. G.

Brass; expanding pillar to ebonite disc holding pile; one side has cap, other cone; two brass contacts on disc.

2041 BLA030 VERNIER MODEL

Unsigned

L 357; MxW 360. Mid to late 19 C. G.

Mahogany; triangle has black scale 0-6 on curved side; brass knob clamps arm with 10-division vernier scale.

2086 BLA074 VOLTMETER

HARTMANN & BRAUN A.-G. FRANKFURT A/M. No148404 D.R.G.M.

B 290x179x25; H 334. 1902-1911. SI.

Upright; mahogany base and frame; vertical coil, moving magnet, spring; needle (gone) on pivot for 3 and 30 volts.

"School form of Voltmeter, clearly showing the working parts, an iron core being sucked into a solenoid to an extent depending upon the number of volts measured. This movement is magnified by means of a pointer fixed to a lever. The instrument reads from 0.5 to 3 volts, but is provided with an extra resistance to increase the range to 30 volts."

Matching Ammeter 2087 BLA075; voltmeter also probably supplied by Philip Harris.

Illustrated in Griffin 1910,743 £3:12:6; dates of P. Harris Birmingham/Dublin, 1902-1911, Morrison-Low 1989,126.

2056 BLA055 WATER HAMMER

Robinson & Son [sic] (on handwritten tie-on label)

L 308; TuD 18; BuD 39. 1885-1903. F.

Glass; cylinder tube has constriction at end leading to elliptical bulb; partly filled with water. Doesn't make the usual noise when inverted.

Robinson & Sons dates from Morrison-Low 1989,133.

2098 BLA086 WORM SCREW & COG WHEEL

Unsigned

B 133x46-36x15; H 155; WhD 75. Mid to late 19 C. G.

Mahogany base and frame for four-spoke brass cog wheel; on top, iron axle and screw; handle for turning-disc gone.

Disc wooden, now broken.

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Note: The Museum is to be re-located in Dublin Castle

4524 CBL001 ASTROLABE

Abd al-A'immah designed in the time of Shah Sultan Husayn AH 1171

D 191; DE 9. 1708-9. R.

Persian; brass and gilt brass; silver metal alidade, pin and wedge; six plates; heavily decorated mater and back.

The signature is taken from Holbrook 1992,226.

Gibbs 1984,18 records that Abd al-A'immah (servant of the Imams), was the most prominent astrolabe maker and decorator of the Persian city of Isfahan, whose name appears on about 50 instruments, some of them forgeries - underlining his reputation; of the five of his instruments described in Gunter 1932,II and Gibbs 1984, this instrument is most similar to, although much larger than, that illustrated in Gunter 1932,II,125, which is reported (presumably incorrectly) as AH 874 (1469); the curvilinear foliate pattern of the rete is without an east-west bar, and the tracery within the zodiac circle is of what Gunter calls the "88 type", resembling two figures of eight; on the back are two quadrants, a sinical quadrant and a zodiacal quadrant, on top of a semi-circle with six concentric bands, with shadow squares at the centre, above a cartouche; the mater is inscribed with a gazetteer; the six plates are for eleven latitudes, the final side being and a table of horizons; the main body and one plate are gilt.

4529 CBL006 ASTROLABE QUADRANT

[Monogram] J AH 1218

R 186; De 17; Sis 222&196. 1803/04 (AH 1218). R.

Turkish; painted wood; curved lines and scales on one side; sine/cosine quadrant on other; red edges; plumb line and bob missing; gilt floral decoration on both sides.

Monogram and date from Holbrook 1992,226.

4530 CBL007 ASTROLABE QUADRANT

Abu-t-Tahir Muhammad AH 775

R 171; De 10; Sis 190&188. 1373/74 (AH 775) R.

Possibly Syro-Egyptian; painted wood; curved lines and scales on both sides; velvet and silk case.

The quadrant has been cracked in two and repaired; it does not have the usual sine/cosine quadrant, but does have the "graph paper" background associated with it; plumb line and bob missing; the somewhat distressed red velvet bag is lined with silk, and has green and white stringing on the outside edges.

Signature and date from Holbrook 1992, 226.

David King (PC) - who was the first to recognise that this was a 14th century instrument - records that this piece is unique in that it is the only surviving medieval quadrant made of wood; all of about ten others from before c1500 are made of brass or ivory. But it is also unusual in that its markings are not yet fully understood. It is either from Cairo or Damascus - another quadrant in ivory by the same maker, dated about 1340, is in the Benkai Museum, and it bears astrolabic markings from both cities.

4527 CBL004 ASTROLABE QUADRANT

Ahmad ash-Sharabati AH 1230

R 129; De 16; Sis 141&156. 1814/15 (AH 1230) R.

Turkish; painted wood; curved lines and scales on one side; sine/cosine quadrant on the other; red edges; plumb line and bob missing.

Signature and date from Holbrook 1992,226.

4531 CBL008 ASTROLABE QUADRANT

al-Hajj Hasan al-Mu'arrif AH 1118

R 190; De 19; Sis 225&217. 1706/07 (AH 1118) R.

Turkish; painted wood; curved lines and scales on one side; sine/cosine quadrant on the other; leather case.

Plumb line and bob missing; one side and the edges are painted darker than the other (astrolabe) side; somewhat distressed tooled leather case.

Signature and date from Holbrook 1992,226.

4528 CBL005 ASTROLABE QUADRANT

Unsigned

R 162; De 16; Sis 174&191. 19 C. R.

Turkish; painted wood; curved lines and scales on one side; sine/cosine quadrant on the other; red edges; plumb line and bob missing; in red leather and blue paper box.

Date from Holbrook 1992,226.

4533 CBL010 ASTROLABE QUADRANT - DOUBLE

Ahmas ash-Sharabati AH 1120

No measurements available. 1757/58 (AH 1171). R.

Turkish; painted on semi-circular piece of wood, for two latitudes; listed in Holbrook 1992,226.

Could not be found in 1995; the instrument is reported as having the same signature as one of the astrolabe quadrants (4527 CBL004) but differs in date by 57 years - perhaps the two instruments were made by a father and son?

4532 CBL009 DIAL - HORIZONTAL

al-Amir Ridwan at-Tawil AH 1201

191x175x18. 1786/87 (AH 1201). R.

Turkish; rectangular painted wood; small glazed replacement compass and brass pin gnomon on one side; red edges.

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The other side has a circular indent for a missing compass; both sides have semicircular scales around the compass centre; the side missing the compass has twelve sets of rectangular lines parallel to three sides of the face.
Signature and date from Holbrook 1992,226.

4525 CBL002 DIAL - HORIZONTAL

Schebier Bordeaux

178x144. Early to mid 18 C. G.

Decorated brass outer frame; elliptical silver dial; small compass; adjustable bird gnomon; three volvelles.

This fine dial differs from others found in the country and in the available references; the dial itself is surrounded by a beautiful open-work brass foliate frame; the silver elliptical dial has hours IIII-XII-VIII on the outside, with a small glazed arc compass, having directions CC SC CR, in a part-circle shape, between hours IIII and VIII; the decorated hinged gnomon can pivot from 40 to 50°, its angle being read with a bird's beak; the point at which the gnomon meets the dial is the centre of a volvelle, with an outer pointer reading 1-29, and an inner scale 1-12(x2), with illustrations of full moon, new moon, and two crescents; on the back is a list of cities with their latitudes: Paris et Viene en Autriche 48 Madrid 40 Lisbonne 39 Rome 42 Amsterdam 52 Turin 44 Bordeaux 45 Londre 52 Cracovie 50 Venise 45 Nanci 48 Strasbourg 48 Milan 45 Florence 44; there are two small feet below these (the back of the compass provides the third foot), with the signature below these again; there are two further volvelles on the back, one with scales for "Soleil Couchant (Nuict Longue) Les Mois (Soleil Levant) Jour Long", and the other a "Calandrie Perpetual" with a list of the days of the week (in French) on the disc, and dates 1-31 on the brass below.

Schebier is not listed in available references.

4526 CBL003 MECCA DIRECTION FINDER

The instrument has a substantial amount of Persian(?) writing which may well include a signature.

D 312; De 48. 1738 (AH 1151) D.

Flat circular wood box, highly decorated; with small glazed compass, map and pointer; and Mecca illustration.

The top of the box, somewhat worn, is decorated with gilded foliate decoration, and the bottom with a wave-form design in black on blue background; the inside of the bottom of the box is divided into six triangles by radial walls, and is also decorated with wispy black marks on blue; on top of the radial walls sits a disc with the upper half depicting a map of Europe and Asia, with a small half-circle glazed compass on top, and a metal pointer pivoted at Mecca; on the lower half of the disc is a gazetteer of cities, including three in Ireland, probably Dublin, Cork, and the third somewhere around Fermanagh(!) - perhaps an approximation for Belfast or Galway; inside the top of the box is an attractive painting of walled Mecca on the top half, and an extensive commentary on the bottom half.

The date is inscribed in pencil on the back of the map disc.

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16 Lower Pembroke Street

Dublin 2

Telephone (01) 668-2511

4491 CIL004 BAROGRAPH - ANEROID

CHRISTIE & WILSON GLASGOW

B 377x234; H 220. Early to mid 20 C. R.

Mahogany glazed housing; brass mechanism; eight evacuated capsules; recording drum plus wheel scale with thermometer. The base has a drawer for barograph charts; the pressure can also be read on the silvered ring scale 28-32", which has a curved glass-mercury thermometer on the bottom, 10-60° CENTIGRADE and 0-140° FAHRENHEIT; there is a glass ink vial. A second nearly identical barograph is unsigned.

Andrew Christie and James Wilson founded their firm in 1916; it was still active in 1960, Clarke 1989,250.

4492 CIL005 BAROGRAPH - ANEROID

Unsigned

Hs 316x204x157. Late 19 early 20 C. G.

Glazed mahogany housing on four feet; brass mechanism; seven evacuated capsules; glass ink vial; narrow drawer.

The latter is not a chart drawer at the front, but a long thin drawer with a hollowed-out centre for a chart scribing arm, at the side of the housing; a note stuck to the glass reads: "Met. Office Comparison ERROR 0.14 Low 19:12:89" [1989].

4488 CIL001 DIAL - HELIOCHRONOMETER

C.J. GIBBS INVENT PILKINGTON & GIBBS PRESTON POLLOCK BROS. OPTICIANS DUBLIN

BD 210; DisD 230,207,124; H 268. 1908. D.

Brass; rectangular mount for wide half-circle to angled disc; smaller discs with hours and months; Mizen Head 1908.

The instrument sits on a (cracked) turned mahogany base; the wide half circle in divided 0-90°, and is set for the latitude (51°27'0") of Mizen Head; the largest disc, above this, has a minute scale at the side 0-60; centred on this is a slightly smaller disc divided into hours VII-XII-V, with two sights at right angles; one of these has a central line, the other has two pinhole sights, top and bottom, as well as a line; off centre is a third disc with three knobs, divided into months, with a scale of days at the edge attached to the second disc.

A brass plaque, with the instrument reads: "MIZEN HEAD. 1908. LATITUDE 51°27'0" N. LONGITUDE 49°30" W HELIOCHRONOMETER 13 MINS. 57 SECS. SLOW ON DUBLIN MEAN TIME."

A brass instruction plaque reads: "To ascertain Local Time: 1. Set month line of small dial opposite date of month on scale. 2. Using the two projections, rotate large dial until image of small hole in front gnomon is seen on line scribed on inside of rere gnomon. 3. The time is found by reading the minute against the hour line opposite the minute scale on the edge of the dial. To Convert to Greenwich Time add 25 minutes. To Convert to Summer Time add 1 hour 25 minutes. NOTE It is only possible to use this Helio-Chronometer in its present position between about 10.00 Hrs. and 1330 Hrs. GMT and when the sun is shining."

The instrument, invented by Gibbs in 1902, compensates automatically for equation of time, Daniel 1986,27.

4496 CIL009 DRAWING CURVES

STANLEY GREAT TURNSTILE HOLBORN LONDON

C.I.L. 1912 [On one curve] J. SHAW

C 678x170x40. 1912. S.

Damaged oak case contains a large variety of pearwood(?) curves some of which are damaged.

The case has a brass plaque: "COMMISSIONERS OF IRISH LIGHTS"; only some of the curves are signed.

4489 CIL002 MARINE AZIMUTH INSTRUMENT

[On inst] AZIMUTH BY F.M. MOORE BELFAST & DUBLIN No 20

[On case] MOORE'S PRISMATIC AZIMUTH INSTRUMENT

L 195; H 135; C 176x82x65. Late 19 C. G.

Oxidised brass; shaped base with spirit level; two hinged vertical sights, one with prism and two shades.

The base has three small feet, and one wider one to fit into a hollow in a marine compass; a small spirit level crosses the base; at each end is a hinged vertical sight; one of these has two pin holes and a joining line, and the other a wire in a rectangular frame; near the base of the latter is a bracket which holds, on the outside, a rotating prism and, on the inside, a blue-green and a red shade.

The case has printed instructions: "MOORE'S PRIS-MATIC AZIMUTH INSTRUMENT, AVAILABLE FOR CELESTIAL OR TERRESTRIAL OBJECTS WITH HIS NEW PATENT STANDARD COMPASS. CAREFULLY turn up the Sight Vanes, and if the object to be observed be not the sun, turn aside the shades - put the instrument on the Compass Glass, with its centre in the hollow of the glass, turn the Wire Vane towards the object, look over the top of the Back Vane, and turn the Prism till you see a perfect image of the object in it - your head may be kept 12 or 15 inches from the instrument. See that the little bubble is fairly in the centre, and, glancing through the Back Vane, keep the horizontal white line seen through it and the object in one, and read off at the small white mark in the fork or opening of the instrument. After use, turn down the Back Vane first, replace the shades, and leave the apex of the Prism upwards in the box. F.M. MOORE, BELFAST AND DUBLIN"

F.M. Moore was at Belfast and Dublin from 1864-1901, Morrison-Low 1989,132.

4495 CIL008 SCALES - ENGINEERS'

W.H. HARLING 47, FINSBURY PAVEMENT LONDON ENGINE DIVIDED

Ss 316x30; C 342x62x44. Late 19 early 20 C. G.

Mahogany case (with lock missing) for six full-length boxwood scales; the six small scales are missing.

The blue silk lining inside the lid is signed: "W.H. HARLING MATHEMATICAL INSTRUMENT MANU-FACTURER 47 FINSBURY PAVEMENT LONDON."; the scales are divided on both sides of the top: 1/32 & 1/16; 1/8 & 1/4; 3/8 & 3/4; 1/2 & 1 INCH; 1 1/2 & 3; MILLIMETRES & 10 TO THE INCH; the space for the missing small scales is taken up by one signed: "W. ERSKINE-MAYNE BELFAST ENGINE DIVIDED ENGLISH MAKE. HALF SIZE & FULL SIZE".

Harlings had this address from 1890, Downing 1988,55.

4494 CIL007 SEXTANT

Alexr. Dobbie & Son Glasgow.

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R 165; L 210; C 254x227x123. 1886-1896. R.

Brass and oxidised brass; three circle frame; silver scale 0-150; seven shades; fitted mahogany case.

The index arm has a window vernier (0-10), with tangent and clamping screws, and a pivoted magnifier, the later having a frosted glass shade; the horizon mirror is broken and detached; there are three telescopes; four of the shades are square with a rounded corner, and the other three are circular; underneath are three feet and a wooden handle; a (damaged) magnifying glass fits in a space in the case.

The firm was named Alexander Dobbie & Son from 1886, became a Limited Company in 1896, and amalgamated to become Dobbie, McInnes Ltd in 1903 - Clarke 1989,228-229.

4493 CIL006 SEXTANT - DOUBLE

Henry Hughes & Son's Improved Double Sextant 59 Fenchurch St, London. No. 2778.

D 135. Late 19 C. G.

Brass and oxidised brass; ring with silver scale 0-180 (x2); two index arms and mirrors; double horizon mirror.

The complete ring has three radial spokes, and a knob below for a turned wood handle; two revolving index arms each have a window sight and vernier (0-30), tangent and clamping screws, and a pivoted magnifier; the central index mirrors are on top of one another in the centre; at one side of the circle is a housed mirror, silvered top and bottom, with a transparent centre; opposite this is a ring with a screw-thread for either of the two telescopes; the sextant is contained in a fitted mahogany case.

Henry Hughes & Son were at this address from 1877 into this century, Downing 1988,65.

4490 CIL003 TELESCOPE - REFRACTING

POLLOCK & CO LTD DUBLIN C.I.L. 1929

L 624-805; D 64-43; LeD 52. 1929. S.

Brass; single draw (wobbly); tapering body with black-painted string; objective shade and (stuck) eyepiece flap. Some of the string protection has been replaced.

There are two other similar telescopes (in better condition):

One is signed: "POLLOCK & CO (IRELAND) LTD DUBLIN MADE IN ENGLAND C.I.L. 1958"; this has a (split) leather cover over the tube, and a working eyepiece flap.

The other is signed: "DIXON & HEMPENSTALL DUBLIN C.I.L. 1964" and has a black-painted woven string cover over the tube, and a working eyepiece flap.

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CLONGOWES WOOD COLLEGE - CWC

Naas
Co. Kildare
Telephone 045-868202

**Note: An overview of the collection, with some photographs, is given in
The Clongownian - see Mollan 1987.**

0341 CWC003 AIR PUMP - SYRINGE

GRIFFIN LONDON

B 238x237; H 297; TD 181. c1900. G.

Tate's exhausting and condensing air pump; iron and brass; base has four arched feet; pump housing plate; stop-cock and table.

Pump (D 35) extends both sides of housing; wooden handle for piston at one end.

Description given in Griffin 1910,316.

0348 CWC080 AIR PUMP - SYRINGE

Unsigned

L 373; D 39. 1855. AQ.

Brass; cylindrical with wooden handle; outlet has screw thread; assumed to be that acquired in 1855.

Clongowes 1854,5 lists "Condensing and exhausting Syr-inge", in 1855.

0353 CWC037 ARTIFICIAL HORIZON

Unsigned

H 23; D 81; C 132x113x46. Late 19 C. G.

Black glass disc in oxidised brass housing; three level screws; spirit level (L66,D112); mahogany case.

Spirit level has ground glass bottom; fitted case.

0337 CWC001 ATWOOD MACHINE

Unsigned

L 2670; 25x25. Late 19 C. G.

Scale only 0-240; brass; square section.

Clongowes 1854,4 refers to an Atwood's Machine "Pres-ented by Charles Kennedy Esq. (This instrument was originally the property of the celebrated Dalton of Man-chester.)" but this scale seems to be of a later date.

0339 CWC072 BAROGRAPH - ANEROID

DIXON HEMPENSTALL OPTICIANS DUBLIN

Hs 288x180x158; B 355x225. Early 20 C. G.

Mahogany glazed case; brass fittings; eight evacuated capsules; ink bottle; still working; on school staircase.

Date from Morrison-Low 1989,123.

0340 CWC071 BAROMETER - FORTIN

Griffin & Sons Ld London No 822

L 1080; C 1320x234x198. Late 19 early 20 C. F.

Standard precision barometer; black sheath; silvered scale and vernier; thermometer no 16907; 1000MB 32.8°F.

Standard temperature for 1000MB 32.8°F.

The firm became a Limited Company in 1894, Crawforth 1988,8.

0284 CWC067 BELL - ELECTRIC

YEATES & SON DUBLIN

B 150x88x15; HsH 68, D 64. Mid to late 19 C. G.

Mahogany base; six connectors; switch; two coils; make/ break circuit; brass cylinder housing; no bell.

The bell was on a screw thread on top of the brass hous-ing, through which the clapper on the make and break circuit protrudes.

0285 CWC024 BIOT APPARATUS

Griffin London

H 482; D 120 & 136. Late 19 early 20 C. G.

Black tripod foot; brass bracket; glass pillar; copper sph-ere; separate copper hemispheres on ebonite handles.

0309 CWC033 COIL - INDUCTION, MEDICAL

JAMES ROBINSON OPTICIAN & PHILOSOPHICAL ARTIST 65 Grafton Street, Dublin.

B 184x149x40; H 197; DoD 85; CoD 54. 1845. S.

Mahogany base and four legs; four brass terminals and seven-point switch; red-covered upright coil with top interruptor.

Brass ring around glass dome has the legend: "PRESENTED TO THE Revd John McDonald S.J. PROFESSOR OF NATURAL PHILOSOPHY 1845".

Similar instruments 0151 UGP014 and 1061 MAY037 are incomplete and unsigned.

Clongowes 1854,3 lists "Robinsons improved Do [i.e. Callan's coil] (Presented by Scholars)", 1846.

0307 CWC020 COIL - INDUCTION, RUHMKORFF

YEATES & SON, DUBLIN

B 635x302x64; HsH 260; H 310. Mid to late 19 C. G.

Mahogany base; copper connectors; glass and brass commutator; wood and glass housing for coil (cracked).

Coil covered in patterned blue material; two brass contacts rise above housing; legend on coil reads "The current for this coil not to exceed 10 Amperes 12 Volts".

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0308 CWC021 COIL - INDUCTION, RUHMKORFF

Unsigned

B 420x215x52; HsD 117. 1855. AQ.

Mahogany base; copper strip connectors; coil between two transparent ebonite discs; ivory/copper commutator.

Brass terminals; two brass pillar connectors (not original); may be "Ruhmkorff's Coil" listed in Clongowes 1854,3 as acquired in 1855.

0286 CWC055 CONDUCTORS - CYLINDRICAL & SPHERICAL

Unsigned

H 320; CyD 53. H 366; SrD 107. Late 19 C. G.

Two; black iron tripod foot; ebonite pillar in brass sleeves; brass - one cylindrical, one hollow spherical.

Cylindrical conductor has hemispherical ends; sphere has cutaway top.

0289 CWC050 DIP NEEDLE

GRIFFIN LONDON. T.MASON 5, DAME ST. DUBLIN

BD 155; H 170. 1900-1916. A.

Mahogany base; central brass disc; double black metal support for needle (missing); arc brass scale.

The scale rises from the base of the support; two brass knurled knobs on top of the support hold the needle.

Mason dates from Morrison-Low 1989,131.

0290 CWC048 DISCHARGE FLASK

Unsigned

BD 85; H 236; ToD 39. Mid 19 C. G.

Tapering cylindrical flask; open ground glass base; cylindrical brass cap, pointed wire electrode below.

0295 CWC059 DISCHARGE TUBE

WM LADD Optician 31 Chancery Lane London

H 210; W 294; SrsD 59,49,47. 1858-1860. A.

Omega shaped glass tube with five spheres; elliptical shaped electrode housings at each end.

Dates from Crawford 1988,11; a Ladd discharge tube was supplied to St Andrews in 1864-5, Wray 1984,6.

0296 CWC060 DISCHARGE TUBE

Unsigned - attributed to Wm Ladd

D 340; SrD 42&28. 1858-1860. SI.

Glass; circular tube with sphere in middle with one electrode; eight large and seven small spheres to electrode two.

With a somewhat similar omega-shaped discharge tube 0296 CWC060 which retains a WM LADD signature, and the address, 31 Chancery Lane, London.

W. Ladd at 31 Chancery Lane from 1858-60, Downing 1988,73.

0283 CWC025 DISCHARGE TUBE

YEATES & SON DUBLIN

L 1110; D 39. Mid to late 19 C. G.

Green cylinder glass tube; brass fittings; stop-cock and screw thread at one end; sphere and point electrodes.

0294 CWC061 DISCHARGE TUBE

Unsigned

FrH 255; L 250; D 5&18. Mid to late 19 C. G.

Wooden stand, seven wire frames; six elongated dumb-bell tubes labelled Br, Cl, CO₂, H, N, I; pointed electrodes. Seventh tube missing.

0293 CWC066 DISCHARGE TUBE

Unsigned

L 560; D 25. Late 19 early 20 C. G.

Two; one has end bulbs with wire electrodes and long inner tubes; one has disc electrodes and white fibre filling.

0291 CWC064 DISCHARGE TUBE - GEISSLER

Unsigned

L 288; D 22 & 35. Late 19 C. G.

Glass cylinder tube; two bulbs at ends for wire electrodes; small bulbs; two green spirals; coil.

Arm in middle for evacuation.

0297 CWC038 ELECTRIC EGG

YEATES & SON 2 Grafton Street, DUBLIN

BD 203; H 560; D 220. 1840-1864. G.

Mahogany base; brass stop-cock and sleeve; elliptical glass egg; glass housed coil into egg from brass top.

Coil is made up of pink-covered wire and extends deep into the egg through a brass sleeve on top; two electrical contacts above.

Yeates & Son instruments signed with the address are attributed to George Yeates & Son 1840-1864, but instrument not clearly recognised in Clongowes 1854,2 - possibly "Illuminated Jar" 1854, or "Exhausted flask for E. Lights" 1854.

Dates from Morrison-Low 1989,139.

0301 CWC054 ELECTROMETER - GOLD LEAF

Unsigned

H 200; D 106. Mid to late 19 C. G.

Squashed sphere glass housing; leaves inside; brass sleeve and cylindrical conductor (L 150, D 54) on top.

Conductor has one end flat and other hemispherical; it is mounted on an ebonite disc which screws into the neck of the flask; flask has CLONGOWES WOOD COLLEGE on paper label; there is a spare conductor.

0298 CWC030 ELECTROMETER - QUADRANT

Unsigned

B 164x162; H 258. Late 19 C. G.

Brass base; three level screws; brass quadrants on glass pillars; arched brass support for aluminium vane.

Cylindrical glass basin in centre of base, silver foil inside and out; cracked glass rectangular cover (not original?).

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0299 CWC027 ELECTROMETER - TORSION, COULOMB

G. KNIGHT & CO 2 Foster Lane LONDON
BD 285; H 560; HsD 180&43. 1857-1861. A.
Wood base; three level screws; cylinder glass housings, engraved scale 2-36 around lower one; brass fittings.
Brass dumb-bell through hole at side of larger housing; torsion fibre present but detector missing.
Dates from Crawforth 1988,10.

0300 CWC031 ELECTROMETER - TORSION, COULOMB

Watkins & Hill, Charing Cross London
BD 118; H 382. 1854. AQ.
Brass base; three level screws; arched glass with brass fittings; ivory scale 10-360° on top of fibre housing.
Paper scale around housing; pith ball and brass cylinder detector detached but present; side arm with brass fittings.
Presumably "Coulombs Torsion Electrometer" acquired in 1854 - Clongowes 1854,2.
Firm at this address from 1822-1856 - Clifton 1995,291.

0313 CWC022 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned (plate missing)
B 530x305; H 555; PD 382. Late 19 C. G.
Open wood base; handle turns wooden discs and, via belt drives, the plates; one conductor set broken.

0344 CWC043 FOUNTAIN

Unsigned
BD 65; D 79; H 128. 1855. AQ.
Spherical glass vessel; glass base; brass collar on top into which screws brass fitting with small hole. Missing tube from the fitting into the vessel.
Described in Curtis 1861,51: "Artificial Fountain produced by the elasticity of air. It consists of a vessel to be partly filled with a tube reaching nearly to the bottom. When under the receiver, and the air exhausted, the spring of the confined air on the water forces it up in a pleasing jet."
Artificial fountains acquired in 1855, Clongowes 1854,5.

0343 CWC047 FOUNTAIN

Unsigned
H 272; D 74. 1855. AQ.
Tapering glass; circular section; small hole near top; brass cap at large end; (broken) tube through this.
Artificial fountains acquired in 1855, Clongowes 1854,5.

0302 CWC032 GALVANOMETER - ASTATIC, NOBILI

YEATES & SON. DUBLIN.
BD 180; HsH 330; HsD 115. Mid to late 19 C. G.
Mahogany base; three level screws; brass pillars and arch for fibre; paper scale 90-0-90° on copper disc; dome.
Scale detached; two brass contacts on base; double needle - one part in coil, other above; glass dome.

0304 CWC053 GALVANOMETER - ASTATIC, NOBILI

Unsigned
B 163x129; 198. Mid to late 19 C. G.
Painted wood base; four level screws; raised silvered scale 90-0-90°; brass suspension for fibre; dome gone.
Green-covered wire coil; double needle; two brass contacts on base; scale on three turned brass pillars; fibre gone.

0303 CWC034 GALVANOMETER - ASTATIC, NOBILI

Unsigned
BD 175; HsH 130; HsD 142. Late 19 C. G.
Red painted base; squat dome; green wire coil; double needle from black bracket; paper arc scale 30-0-30.

0305 CWC028 GALVANOMETER - ASTATIC MIRROR

GRIFFIN GRAM STANDARD LONDON
BD 215; H 375. c1910. CT.
"Steward's simple mirror galvanometer"; wood base, support and coil housing; curved magnet on pillar above.
Three level screws; three contacts on front of base.
Possibly later than 1910 - but design identical to Griffin 1910,730 except for signature plate on base.

0306 CWC029 GALVANOMETER SCALE

JOSEPH M. MAIBEN & CO. 11 WESTLAND ROW DUBLIN
B 304x150; H 335; S 406x69. 1912-1922. F.
Mahogany base and supports; telescope in wooden frame; hinged scale board above this with paper scale.
The telescope frame can move up and down in the grooves of the support; two contacts at one side; signature on ivory disc on base; paper scale also has a hand-written signature JOSEPH M. MAIBEN. & CO. DUBLIN.; scale 300-0-300.
Dates from Morrison-Low 1989,130.

0342 CWC058 GLASS BELL JAR

Unsigned
BD 85; H 494; D 82. Mid 19 C. G.
Tall thin jar with knob on top; open ground-glass bottom.
Clongowes 1854,5 lists "Bell for air pump" acquired in 1836.

0347 CWC005 GLASS GLOBE

Unsigned
BD 150; D 200; H 425. Mid 19 C. G.
Thick walled spherical glass vessel; brass sleeve on top with stop-cock and tapering to a point.

0332 CWC007 GONIOMETER - REFRACTION

Yeates & Son Dublin
H 430; HsD 212 & 262; SL 400. 1877. AQ.
Brass and oxidised brass; tripod foot; pillar to axis of closed glass cylinder; radial arms to note light path. Cylinder holds liquid for analysis; scale on housing 0-180-0°; linear brass scale below 9-0-9; three level screws on foot.

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Illustrated in Yeates 1880,4: "...to illustrate Snell's law of sines, best make, very complete..".
Might be: "Apparatus for demonstrating the laws of refl-ection polarisation &c - with glass case of lenses &c £18/18" acquired in 1877, listed in Clongowes 1854,6.

2002 CWC019 HOUSING

JOSEPH M. MAIBEN & CO. 11 WESTLAND ROW DUBLIN
153x153x122; (DiD 235). 1912-1922. A.
Wood; nearly cubic; perhaps originally for a resistance; now holding modern revolving aluminium disc.
Signature on small ivory disc (D16.5).
Dates from Morrison-Low 1989,130.

0338 CWC002 INCLINED PLANE

Unsigned
L 3180; Se 117(mx)x85. Late 19 early 20 C. G.
Large wooden plane; one half inclines, the other remains horizontal; both with grooves for carriage.

0315 CWC063 LAMP - ELECTRIC

EDISWAN SUNLIGHT
H 225; D 111. Late 19 C. G.
Elongated glass bulb; two electric contacts at base attach-ed to arched filament, secured to top with hook.
Hook on top fused into glass.

0325 CWC074 LENS ON STAND

Unsigned
PrH 258; HsD 111. 1855. AQ.
Brass expanding stand; oxidised brass semicircular mount for biconvex lens in oxidised brass housing.
"Six lenses of different curves on Stand" acquired in 1855, Clongowes 1854,5 - this could be one of them - the others do not seem to have survived, but prisms on similar stands do survive and are listed for the same date; '11.5"' chalked on base.

0310 CWC023 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned
H 223; D 62-80. Late 19 C. G.
Pair; tapering tin cup, blackened outside, holds glass cup; covered tin vessel with curved conductor fits into this.
Inside tin vessel hollow; brass wire conductor from this, shepherd's crook shape, ending in sphere; second jar is missing the glass cup which fits between the inner and outer tin coatings.
Looks too modern to be "Electrical jar with moveable coating" acquired in 1854, although the description fits, see Clongowes 1854,2.

0346 CWC004 MAGDEBURG HEMISPHERES

Unsigned
L 270&250; DLi 90&79. 1829. AQ.
Brass; two pairs; stop cock and handle which unscrews on one side; fixed handle and no stop-cock on other.
Clongowes 1854,5 lists acquisition of hemispheres in 1829 - the larger set looks older than the smaller.

2011 CWC083 MAGNET

Unsigned
From L 150-262, W 70-120. Mid to late 19 C. G.
Six horse-shoe magnets; five with red paint and one with blue paint; three with parallel arms, three with tapering arms.
Various other bar and horseshoe magnets, which don't look so old.

0316 CWC017 MICROSCOPE - COMPOUND

R & J BECK, LONDON, No 7276
Fo 117x74; H 266; HsD 30. c1875. N.
U-shaped brass foot; small pillar to pivot; stage on this; bracket to tube; mirror, condenser and objective missing.
Serial no. 5381 is given date 1870 by Turner 1981,74.

0317 CWC016 MICROSCOPE - COMPOUND

LEITZ WETZLAR No 131099
H 280; HsD 30. 1910. N.
Y-shaped black foot to pivot; brass; stage and support pillar above; bracket to tube; triple objective.
Fine focus on top of support pillar; coarse by rack and pinion on tube bracket; substage condenser and mirror.
Dates for serial numbers provided by J. Bennett.

0318 CWC015 MICROSCOPE - COMPOUND

Ross LONDON
PvH 197; C 532x247x216. Second ½ 19 C. G.
Brass; tripod foot; pillar to pivot; swan-neck; stage at one end, tube on other; no optics; seven drawer case.
Incomplete; case made of mahogany.

0319 CWC045 MICROSCOPE - COMPOUND

Wands PATENT APPLIED FOR RD NO 729601
H 253; HsD 29. 1927. P.
Black curved frame, three legs; stage at bottom and tube bracket on top; white metal tube; rack and pinion focus.
Single objective and eyepiece; no substage mirror nor condenser.
Date assumes RD is registered design, when the number would give a 1927 date, Crawforth 1984,108.

0320 CWC018 MICROSCOPE - COMPOUND

Unsigned
BD 71; H 196; HsD 25&23. Late 19 C. PC.
Iron base; universal ball joint; pillar holds brass stage and bracket for tube; late 19 Century French toy.
Identification by Gerard Turner.

0321 CWC006 MIRROR - CONCAVE

Unsigned
D 294; HsD 362. 1836. AQ.

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Wooden frame and back; semicircular brass mount with two securing knobs; bracket for stand (missing).
Assumed to be that listed in Clongowes 1854,5, acquired in 1836.

0350 CWC039 MIRROR - ROTATING CUBIC

YEATES & SON OPTICIANS DUBLIN

BD 155; H 380; M 167x152x150. Mid to late 19 C. G.

Iron base and pillar; handle turns brass disc which revolves rubber washer to turn brass pillar and mirrors.
One of the four mirror sides is missing; instrument also called a "cycloscope".

0311 CWC068 MORSE KEY

Unsigned

B 108x57; H 62; CoD 18. Mid to late 19 C. G.

Mahogany base, four connectors, brass key; other end attaches to coil with make and break attachment.
"S" and "B" on ivory discs on sides.

0322 CWC009 OPTICAL BENCH

J. Duboscq à Paris

C 980x273x134. 1849-1883. F.

Actual bench missing from mahogany drawer case; with fittings, some with micrometers; 26 lenses, slits, &c.

Fittings in brass and oxidised brass.

Dates from Brenni 1988,3-4.

0323 CWC070 OPTICAL ELEMENT

SOLEIL RUE DE L'ODEON A PARIS

D 44-60. c1855. AQ.

Cork discs for different elements: nicol prism, "verre trompe", "beril", "mica 1/4 onde axe", "mica axe".

Not all the elements have the signature - but they are similar in construction.

Some, at least, were acquired from "Rd Fr Maas professor at Namur College S.J." in 1855, including "Mica 1/4 of a wave for circular polarisation" and "Mica an entire wave (axes crossed) for elliptical polarisation" - Clongowes 1854,6.

2008 CWC073 ORGAN PIPE - BLOCK

RUDOLPH KOENIG A PARIS FA3

Hs 429x65x55; L 471. 1858-1901. F.

Boxwood; mahogany lip and input pipe.

Very similar to Yeates & Son pipe 2007 CWC079, but with no flame capsule.

Dates from Payen 1986,160.

2007 CWC079 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN

Hs 470x61x53; L 515. Mid to late 19 C. G.

Boxwood; mahogany lip and input pipe; evidence of now-missing manometric flame capsule; like 2008 CWC073.

2009 CWC065 ORGAN PIPE WITH MANOMETRIC CAPSULES

RUDOLPH KOENIG A PARIS

Hs 719x78x78; L 763. 1858-1901. F.

Boxwood; mahogany lip and input tube; glass back; two left of three mahogany manometric flame capsules.

Mahogany bar screwed to side, with three holes on top and one on side (at centre), not connected internally to pipe - presumably for holding manometric apparatus.

Dates from Payen 1986,160.

0349 CWC056 ORRERY

Unsigned

BD 150; H 365; GD 67. Late 19 early 20 C. G.

Black base and short pillar; armillary sphere above: brass cogwheel device and black tube to Earth and Moon.

0331 CWC010 POLARISCOPE

WATKINS & HILL, 5 CHARING CROSS, LONDON

BD 180; H 400. 1855. AQ.

Mahogany base; brass arch for revolving rectangular glass below and black glass above, glass disc between.

Clear and black glass rectangles framed in oxidised brass.

Clongowes 1854,5 notes the acquisition of Wood's, Nohremberg's [*sic*], and Lecount's polariscopes in 1855; this model is rather like the Norremberg, but is less sophisticated than the more developed form of the instrument.

Firm dates 1822-1856 - Clifton 1995,291.

324 CWC008 POLARISCOPE - DUBOSCQ

J. Duboscq à Paris

PvH 278; BnL 308. 1856. AQ.

Brass; expanding stand to pivot; condenser, sample holder and eyepiece systems move independently on bench.

Condenser system L162,D24-65; eyepiece system L180 D65-92; sample clamped between two discs; disc of apertures at front of eyepiece system.

Might be the "Polariscope to be used with Electric light" noted as acquired in 1856 in Clongowes 1854,6; this adds that the condenser is common to a microscope and polariscope, the latter having a crystal holder, analyser, objects and slides.

Brenni 1988,3-4 gives Duboscq dates 1849-1883.

0326 CWC075 PRISM ON STAND

J. DUBOSCQ à PARIS

PvH 268; PmL 64, Si44; PmHsL 90. 1855. AQ.

Brass; expanding stand ending in pivot and right-angled mount for prism housing; prism chipped.

Could be "Glass Prism on Stand" noted as acquired in 1855 in Clongowes 1854,5, and is likely to be one of a collection of prisms acquired in this year since they have similar stands.

Brenni 1988,3-4 gives Duboscq dates 1849-1883.

0329 CWC078 PRISM ON STAND

J. DUBOSCQ à PARIS Yeates & Son. Dublin

PvH 270; PmL(incHs) 77; Si 46. 1855. AQ.

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Brass; expanding stand to pivot and right-angle bracket; four prisms joined at triangular faces.

Brass rod, parallel to one edge, from prism housing.

Likely to be one of a set of prisms acquired in 1855.

Recorded in Clongowes 1854,5; Brenni 1988,3-4 gives Duboscq dates for 1849-1883.

0328 CWC077 PRISM ON STAND

J. DUBOSCQ à PARIS Yeates & Son Dublin

PvH 265; PmW (inc Hs) 50. 1855. AQ.

Brass; expanding stand to pivot and right-angle bracket; two thin prisms hinged together.

Likely to be one of a set of prisms acquired in 1855.

Listed in Clongowes 1854,5; Brenni 1988,3-4 gives Duboscq dates 1849-1883.

0327 CWC076 PRISM ON STAND

Yeates & Son. Dublin

PvH 290; PmSi 38, L(+Hs) 66. Mid to late 19 C. G.

Brass; expanding stand ending in pivot; prism housing with prism attached to this.

Could be one of a set of prisms acquired in 1855, Clongowes 1854,5 - but its mount is different from the others, and it does not have the Duboscq signature.

2003 CWC042 RESISTANCE BOX

JOSEPH M. MAIBEN & CO. 11 WESTLAND ROW DUBLIN

Hs 281x136x106; H 145. 1912-1922. A.

Mahogany housing; brass U-shaped bar with 12 holes for ebonite/brass keys; 1-500 ohms; 2 brass contacts.

Keys for 1, 2, 2, 5, 10, 20, 20, 50, 100, 200, 200, 500 ohms; signature on small ivory disk.

Dates from Morrison-Low 1989,130.

2004 CWC046 RESISTANCE BOX

YEATES & SON Dublin t/t/-

Hs 244x72x66; H 84. Mid to late 19 C. G.

Mahogany housing; black wood or ebonite top; brass zig-zag with 10 arms and six screw contacts;

0, 1, 2, 2, 5, 10 "OHMS".

0354 CWC036 SEXTANT

Troughton London 1486 Silver

R 215; FrH 42&60; SL 310. 1784-1826. R.

Oxidised brass double frame with T-shape in centre held with brass bolts; two telescopes; four filters.

Horizontal wooden handle below; silver metal scale 5-145 with vernier; tangent and clamping screws on index arm; index and horizon mirrors.

If platinum was used for the scale, it would be marked "Platina", and the date would be post 1806 (J. Chaldecott PC); however, this is marked "Silver" which indicates an earlier date.

Pillar frame sextant patented by Edward Troughton c1784, partnership with Simms 1826, Porter 1985,35.

2001 CWC035 SPECTROSCOPE

Unsigned

TusL 60&70, W 70&74; TusD 37&43.

Mid to late 19 C. G.

Brass; two right-angled tubes screw together, a prism at one corner, a 45° glass at other; sliding sun filter.

Each tube consists of a narrower part at right angles to a wider part; when screwed together they make a light path in two right-angles; a "sun" prism on an oxidised brass mount (now detached) screws into a hood over the end of one tube, and the light bent by this could be viewed through or reflected by the 45° glass; another hood (which does not fit the screw threads) has a variable sliding dark filter; mahogany case.

0279 CWC011 SPECTROSCOPE - DIRECT VISION

John Browning, 63 Strand, London

L 458; HsD 38; Te&CID 22; C 190x134x69.

1873-1900. A.

Brass; unscrews into three pieces; tripod legs of stand stored in stand pillar; fitted mahogany case.

Dates from Crawforth 1988,4.

0281 CWC052 SPECTROSCOPE - DIRECT VISION

Yeates & Son, Dublin

H 329; PvH 265; HsD 24. Mid to late 19 C. G.

Brass on iron tripod foot; pillar to pivot which holds prism housing; telescope and collimator missing.

0278 CWC013 SPECTROSCOPE - TABLE

GRIFFIN SARDINIA S LONDON

HT 278; SD 155. 1899-1905. A.

Brass with black iron tripod foot; collimator fixed; telescope fine adjusted with vernier and clamped.

Dates from Anderson 1990,34.

0288 CWC044 STAND - INSULATING

Unsigned

H 248; D 11. Mid to late 19 C. G.

Two; black iron tripod foot; glass pillar - brass sleeves; side arm ending in brass sphere (D7) on top.

One of the two has a brass cylinder which fits on top of the tapered apex of the brass fitting on top; the other is missing this.

Illustrated in Leybold 1933,252.

0312 CWC069 SWITCH

Unsigned

B 92x83; H 105. Mid to late 19 C. G.

Mahogany base, two terminals; pillar of ivory and brass discs; hand pushed spring connector on second pillar.

Vertical pillars attached to terminals; a sleeve with an ivory

button top connects, with a central spring, to one; when this is pushed, a brass connector moves down the other pillar, making electrical contact when it hits a brass disc, and breaking it when it hits an ivory disc.

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0335 CWC051 TELESCOPE - READING

Elliott Bros. London

BD 91; H 220; PvH 173; D 32&42. c1895. CT.

Brass; turned pillar; pivot with bracket for telescope; no optics at one end; lens hood missing.

Very similar to "condensing lens on brass stand", part of set of apparatus for "Speaking Galvanometers, including brass lamp (paraffin oil), copper chimney for ditto, condensing lens on brass stand, and brass scale-stand" illustrated in Elliott 1895,25.

0336 CWC012 TELESCOPE - READING

Unsigned

L180; H78; TuD26; SD75; C198x158x94. Late 19 C. G.

Brass; prism at objective over half lens; tube joins circular scale and vernier; bubble level; backing plate.

Knob moves telescope in horizontal arc; backing plate has four screw holes; sophisticated instrument, probably part of some larger apparatus, perhaps astronomical; in mahogany case; two eyepieces; not identified yet by anyone who has seen photograph.

Instrument made of brass and oxidised brass. A mounting plate has holes for four fixing screws; three bolts rise from the mounting plate which, using two knurled nuts on each, secure and level the base plate; a bridge on this base plate has a bubble level on top containing pink liquid, and the whole instrument can be revolved horizontally with respect to the base plate, using an endless screw and rack; at the side of the plate, near the pinion around which the instrument revolves, is a raised panel having a silvered vernier at right-angles, with a scale 60-0-60; this measures the vertical rotation of a telescope using a full circle silvered scale 0-90-0-90-0°; a telescope is mounted on a diagonal of the circle, which uses a push tube to focus an image upside down; it has a biconvex eyepiece lens, and two plano-convex objective lenses; it also has two eyepiece hoods, one with a hole and the other with opaque black glass; at the objective end, an oxidised brass sleeve holds a prism covering half the lens with its long side bisecting the lens, but this cannot be seen when viewing an object through the telescope.

0334 CWC014 TELESCOPE - REFRACTING

(Eyepieces) John Browning 63, Strand London Nos 2&4

L 1005; D 62&32; C 841x204x138. 1873-1900. A.

Brass; support beam; no tripod; telescope unsigned; signed eyepieces appear not to belong; mahogany case.

Dates from Crawforth 1988,4.

0333 CWC057 TELESCOPE MOUNT

Made by Yeates & Son, Dublin

H 817; SsD 111 & 98. c1880. CT.

Equatorial; blue iron stand; declination and hour circles; adjustment by tangent screw and hooks joint; three level screws.

Illustrated in Yeates 1880,37.

1143 CWC081 TRADE LABEL

JAMES ROBINSON OPTICIAN, AND PHILOSOPHICAL ARTIST, 65, Grafton Street, Dublin. 1845. S.

On electro-medical coil 0309 CWC033.

2006 CWC049 TUNING FORK ON RESONANCE BOX

RUDOLPH KOENIG A PARIS LA3

Not measured. 1858-1901. F.

Resonance box only; boxwood with mahogany veneer; identical to larger Yeates & Son boxes 2005 CWC062.

Four cork discs for feet.

Dates from Payen 1986,160.

2005 CWC062 TUNING FORK ON RESONANCE BOX

YEATES & SON OPTICIANS DUBLIN UT3 (R. Koenig)

Not measured. Mid to late 19 C. G.

Two; resonance boxes only; boxwood with mahogany veneer; identical to smaller Koenig box 2006 CWC049.

0351 CWC041 WAVE DEMONSTRATION APPARATUS

Elliott Bros, Charing Cross, London. Wheatstone Invt.

B 638x205; Hs 322x105x76; SrsD3. 1856-1858. A.

Mahogany base; oxidised brass housing; white glass spheres; mahogany wave forms; in glazed case.

Brass slides with scales (1 to 8 repeated) go under housing; the wave forms rearrange glass spheres (top and sides) into different wave patterns; boxwood case has glass on three sides.

Dates from Chaldecott 1989,161.

0352 CWC040 WAVE DEMONSTRATION APPARATUS

Unsigned

B 712x180; H 910; SrsD 19; DisD81. 1855. AQ.

Powell; mahogany base and two turned pillars; brass rod for 24 brass rings; rods from these to ivory spheres.

The brass rod is attached to the rings at different points on their circumferences; handle (broken) turns the rings to give a wave pattern with the spheres; to demonstrate progressive transverse waves.

"Powells [sic] wave apparatus" acquired in 1855, Clongowes 1854,5.

2010 CWC082 WIND CHEST

Unsigned

Bx 340x148x18; H 173. Mid to late 19 C. G.

Mostly mahogany; brass input pipe to chamber with five spring stops to let air into five holes for pipes on top.

Bridge on top of chamber with holes to support pipes, one with frame for a slide below the hole; base is boxwood with mahogany frame and may be a replacement; instrument has a paper label "Relay Chamber".

0282 CWC026 WOULFE BOTTLE

Unsigned

H 122; D 77. Mid to late 19 C. G.

Glass; cylindrical flask; covered top with pimpled mound in centre; two necks with collars on top.

Located in Chemistry laboratory.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

DUBLIN CIVIC MUSEUM - DCM

58 South William Street

Dublin 2

Telephone 679-4260

4191 DCM003 CIRCUMFERENTOR

Spear Dublin

No measurements available. 1791-1837. F.

Incomplete - recorded in c1984 (Holbrook 1992,226), but could not be found in March 1995.

Dates from Morrison-Low 1989, 135.

4190 DCM002 DIAL - HORIZONTAL MOON

Co[nst]rud..Oct.14 1844. by. ML. Lyons N.L. 53'10"

403x324. 1844. S.

Slate; elliptical (cracked); Roman hours IIII-XII-VIII; various number scales for time adjustment.

Central divisions for hours, half and quarter hours, and five minute intervals; outside these the Roman hours; next series of numbers 0.0 1.2 2.2 3.1 4.0 4.3 5.9 6.9 7.1 8.1 4.3 5.2 6.9 7.1 8.0 8.3 9.9 10.2 11.1 (some numbers are unclear); next integers from 6-25; next months JAN-DEC; next three dates for each month e.g. 10 21 27 4 19 28; outer line series of numbers (0-19) and letters 45S6 5L2W0 1F70 11A1916 1514S11 104T0 4S1014 15L1413 19S03 43W0 ?4A3 2S1T0; the bronze gnomon has a solid insert and has angle 53°.

R. Anderson (Holbrook 1992,226) records that this is a moon dial, for use at 53°10' (Powerscourt House, Enniskerry) which came to the Museum from Professor Bayly Butler's roof garden at Glenlion, Baily; "the outer scale shows the equation of time, the inner scale an adjustment for 'lunar time'".

1432 DCM001 DIAL - HORIZONTAL PEDESTAL

William King Dublin Fecit

D 127. 1767-1784. FL.

Brass; originally circular but cut down to octagonal; recorded in c1984, but could not be found in March 1995.

Recorded in Holbrook 1992,226; dates from Morrison-Low 1989,128.

4193 DCM004 LEVEL - TELESCOPIC

Buckley Sackville St.. Dublin

B 167x31; H 108; MnL 314; CpD 90; C 410x163x123.

1832-1859. R.

Brass; rectangular base; glazed compass below telescope;

crossed spirit levels on top; mahogany fitted case

The small rectangular base has two lateral feet, and a central screw thread for a stand; above this is the glazed compass which has a floating silver ring divided 10-360°, read by a small magnifier (the lens is gone but the frame remains) on a pin (now stuck upside down); rack and pinion eyepiece focus; on top of the tube is a long parallel spirit level (now broken) and a short one at right angles at the objective end.

Dates of Joseph Buckley from Morrison-Low 1989,121

4209 DCM005 LEVEL - TELESCOPIC

ED. SPRENGER BERLIN 7957

Sp 170; MnL 342; H 182; ScD 130. Late 19 C. R.

Brass; tribach base; divided circle 0-350° with vernier 0-30; telescope above with suspended spirit level.

Parts in oxidised brass; central screw thread on base for stand; incomplete clamping and tangent screw mechanism on arm opposite the vernier; rack and pinion eyepiece focus.

Eduard Sprenger exhibited in 1876, 1879 and 1896, Brachner 1985,150.

4217 DCM006 LEVEL - TELESCOPIC

CARL ZEISS JENA Nr 30224 N1.IIa DIXON & HEMPENSTALL DUBLIN

(On case) Berlin Optical Institute, Dublin

Sp 115; H 162; TuL 212; C 245x215x141.

Early to mid 20 C. G.

Brass and grey enamel; tribach base; short telescope;

spirit level observed through small telescope.

Some oxidised brass parts; clamping and tangent screws and circular bubble level; broken rack and pinion eyepiece focus; the small tube beside the eyepiece is used to view the spirit level at the side of the main tube, and the level has a rotating mirror and (cracked) ivory background below it; cylindrical objective shade; fitted oak case with adjust-ment label (1978?) from the Berlin Optical Institute, 157 CAPEL STREET, DUBLIN 1. Phone 775910.

Brown 1982a, Nos 164 & 165 are Zeiss levels Nr 697 c1930 and Nr 2255 c1935.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

DUNSINK OBSERVATORY - DUN (Dublin Institute for Advanced Studies) Castleknock Dublin 15 Telephone (01) 838-7911/7959

1832 DUN014 AIR PUMP

Unsigned 16907 5996

B 318x162x51; H 523; WhD 350. Late 19 early 20 C. G.

"Geryk pump"; iron base, support, wheel and crank to drive cross bar with piston into brass cylinder pump.

Other end of cross bar attached to support by a pivot; brass screw cap at side of pump cylinder and right-angled brass pipe below; wheel has three bifurcated spokes.

Illustrated in Baird & Tatlock 1924,210.

1849 DUN031 BAROMETER - MARINE

ADIE LONDON 1184

L 940; TuD 25; B 1020x95. Third ¼ 19 C. G.

Oxidised brass, brass, iron and silver metal; gimbal mount on mahogany base board; ivory thermometer scale.

Latter 0-110° with mercury and glass thermometer on front of tube housing; main scale 27-32" with vernier adjusted by rack and pinion - glass shield cracked; iron cistern cover detached from back board.

"Kew Pattern" marine barometer developed by John Welsh of Kew Observatory and Patrick Adie, son of Alexander Adie of Edinburgh, around 1855 - Banfield 1985b,170-1.

Patrick Adie traded from 1848, Clifton 1995,4.

1823 DUN005 CHRONOGRAPH

Unsigned but by Howard Grubb.

B 1150x356x102; L 1300; H 410. c1890. R.

Green iron base and frame; brass and white metal; pendulum escapement; balls governor; cylinders and half frame gone.

Restored; pendulum not displayed with instrument.

Grubb 1903,18 notes: "The largest Chronographs, similar to those made for Dunsink, Capetown, and Oxford Observatory, with best controlled clock, register on two barrels 32 inches long and 9¼ inches diameter, the seconds being represented by spaces of 0.4 inch constructed for 5 hours' continuous work." Illustrated in Grubb 1903,18, but not in Grubb 1885.

1839 DUN021 CHRONOMETER - MARINE

DENT, LONDON. Chronometer Maker, to the QUEEN. No.2140.

C 170x159x156; DiSD 95&35. 1826-1851. WR.

Mahogany double hinge case; brass gimbal mount; silver metal face; hours I-XII; small seconds dial 10-16.

Wind adjust scale (D26) 0-56; "WITH AIRY'S COM-PENSATION" on seconds dial; winding key and gimbal clamp; "DENT 2140. TWO DAYS" on ivory disc on front of case.

Working dates from Clifton 1995,82.

1821 DUN003 CLOCK - REGULATOR

John Arnold & Son London.

H 1906; MxW 450; SsD 293 & 130. 1787. R.

Mahogany case; silver metal dial; large minute and small second scales 5-60; arc for hours; brass pendulum bob.

Five bar zinc and steel compensation pendulum; brass cylinder weight; set to solar time.

The "& Son" added to the signature after the "John Arnold London" indicates it was being made when the firm became John Arnold & Son in 1787.

This regulator is believed to be, with 1822 DUN004, only pair of 18th Century astronomical clocks still existing as a pair in their original institution.

Wayman 1987,129-130 notes the technical description by Charles Allix: "A fine Astronomical Regulator Clock, probably made in the years just before 1800, going a month, with deadbeat escapement, beautiful 5-bar zinc and steel compensation pendulum and mahogany case 6'3" tall of fairly severe classical proportions relieved with restrained decorative mouldings.

The case is in beautiful condition but has had a little careful restoration done on it in the recent past. The 12" square dial, which is signed, has a bottom aperture showing 24 hour ring, concentric minutes, and large offset seconds circle at Chapter XII. The move-ment plates have canted upper corners and are screwed together, separated by 6 turned pillars. The deadbeat A-shaped pallets are jewelled in sapphire, the inserts so shaped as to give almost a line contact with the wheel. The train pivots above the centre-wheel-and-pinion are jewelled in sapphire and except for the seconds pivot have end pieces of the same stone. The great wheel pivots are run in plain holes. The intermediate wheel-and-pinion pivots are also run in brass but with sapphire end pieces and oil sinks of a peculiar form. The maintaining work is in the manner of Harrison and there is no stop work. The back board of the case is 1½ ins. thick. The pendulum cock is screwed to the back board and has adjustable 'cycloidal cheeks' embracing the suspension spring. To the best of my knowledge, this is the only surviving Arnold Clock having these cycloidal cheeks...The going weight is 9½ lbs."

Date and details from Wayman 1987a,128-132.

1822 DUN004 CLOCK - REGULATOR

John Arnold & Son London.

H 1915; MxW 455; SsD 293&130. Late 18 C. R.

Mahogany case; silver metal dial; large minute and small second scales 5-60; arc for hours; brass pendulum bob.

Five bar zinc and steel compensation pendulum; brass cylinder weight; set to sidereal time.

Extensively renovated in 1967-9 by Charles Allix of Sevenoaks, Kent.

Second of pair with 1821 DUN003; this has the "& Son" correctly spaced in the signature;.

Date and details from Wayman 1987a,128-132.

1826 DUN008 CLOCK - REGULATOR

E. DENT & CO. 61 STRAND & 34 ROYAL EXCHANGE LONDON 2032

H 1450; W 407; SsD 250&110. 1875. AQ.

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Mahogany case; silver metal dial; large minute 0-55 and small second 0-50/hour 0-23 scales; mercury pendulum.
Oxidised brass cylinders for mercury of pendulum and for weight; sidereal clock.
Acquired 1875, Wayman 1987a,131.

1824 DUN006 COELOSTAT

[Howard] "GRUBB" Dublin. 4852

Sp 405&510; H 520; MiHsD 225. c1898. PC.

Green iron base and frame; brass and white metal; worm screw drives sector to rotate mirror; balls governor.

Famous instrument - used by Joly in the solar eclipse expedition in May 1900 to Plasencia, Spain, and also in the experiment planned by Sir Arthur Eddington in 1919 to Sobra, Brazil, which verified the theory of relativity (Jon Darius - PC 1990 - notes that Eddington himself did not go to Sobra); restored; mirror available; there are parts of another similar coelostat in storage. Glass 1990,11 notes that it had an 8" mirror, and gives additional references: Royal Dublin Society Bi-Centenary Celebrations 1931 Official Handbook (p82) and F.W. Dyson et. al. Philosophical Transactions of the Royal Society 220, 291, 1920; Glass also records (p15) a 4" Grubb lens of focal length 19ft used with this 8" coelostat in the 1919 eclipse expedition.

For the Report of Joint RDS/RIA Solar Eclipse Expedition, see Scientific Transactions RDS, 8(V),65-68,1903.

1830 DUN012 COELOSTAT

W. OTTWAY & CO. EALING W.

B 610x464x55; H 780; MiHsD 440. Turn 19/20 C. G.

Iron base and frame; brass and white metal; disc with handle turns worm screw, sector and mirror; clock drive.

Latter in oxidised brass housing, now detached; being restored 11/88 - frame painted blue.

John Ottway worked from 1826-1870, Clifton 1995,205; are W. Ottway & Co a successors?

1845 DUN027 COMPASS - BEAM

Unsigned

Bm 917x16x9; H 102. Mid 19 C. G.

Mahogany beam; two brass slides with knurled clamps; white metal points; one slide has sleeve for pencil.

1836 DUN018 DYNAMETER

Dollond London

P 59x30x6; L 71; W 55; TuD 20. Early 19 C. G.

To measure magnifying power of telescope; brass; plate for tube and two semi-lenses adjusted by drum micro-meter.

Micrometer scale 10-100 with vernier on side of plate; device does not need knowledge of thickness and focal lengths of any of the lenses in a telescope, and can be used for refracting or reflecting telescopes; a cap is put over the objective with a hole of known diameter; the instrument is adjusted until the two discs are in touch; it is then adjusted the other way until this happens again, when the power may be calculated.

Details from Pearson 1824,48-53 & Plate XI.

1842 DUN024 EYEPIECE - MICROMETER

Unsigned but by Howard Grubb

L 344; SD 196; C 406x268x148. c1876. D.

For South telescope 1820 DUN002; brass; silver scales; two drum micrometers; large circular scale; fitted case.

Rectangular frame has drum micrometers at sides 0-90 and linear scales 0-40 under (broken) glass on frame; a circular rack and knurled knob pinion drive the frame around the large scale 0-350°; three lens systems fit into the frame and there is a screw thread at the other side for the telescope; the back has four cylindrical holes for electric lamps (L43D10), two of which survive; fitted mahogany case.

Date derived from that of South telescope.

1384 DUN016 GLOBE - TERRESTRIAL

NEWTON'S New & Improved TERRESTRIAL GLOBE. Published by Newton Son & Berry 66 Chancery Lane, LONDON

D 75 (3"). c1831-c1841. R.

Plaster; yellow land, pale green sea; mounting gone.

Dates from J.R. Millburn, BullSIS 20,1989,3-5.

1835 DUN017 GRATING - DIFFRACTION

Ruled on Prof Henry A Rowland's Engine...Plate prepared...by J A Brashear Allegheny Pa USA

B 161x135x17; Gt 146x49. Late 19 C. R.

Speculum metal; rulings on rectangle on circular back.

Circle D157 incomplete; full hand-engraved inscription reads: "Ruled on Prof Henry A Rowland's Engine Johns Hopkins University Baltimore MD USA Radius 21 ft 6" F 14438 lines to 1 inch Plate prepared at the Astronomical and Physical Instrument works by J A Brashear Allegheny Pa USA This grating specially selected by Prof Rowland Jr for Prof Schuster"

There are two other more-modern gratings in collection.

Bennett 1984a,100-2 records Rowland gratings dated between 1888-1891.

1840 DUN022 LENS MEASURER

Unsigned

Sp 61; H 116; TuD 18. Mid to late 19 C. G.

Oxidised brass tribach base; vertical brass telescope; crosswires; mahogany case; to correct tilt of lens.

Push focus; objective lens loose and chipped; case dimensions 167x91x67.

Use from P.A. Wayman, PC.

1852 DUN034 LENS SYSTEM

Unsigned

L 202; TuD 139. Mid 19 C. G.

Brass; two-element lantern lens; rack and detached pinion adjust; also sleeve with three holes for securing nuts.

One lens element has two air pockets between glass components.

1440 DUN001 MERIDIAN CIRCLE

(Jesse Ramsden)

D 2438 (8'). 1783-1808. R.

Brass; parallel outer rings; 16 spokes; ordered from Ramsden, finished by Matthew Berge; stolen Nov. 1981.

Circle divisions 1.8mm apart; microscopes magnified 9 times; micrometer wire recorded to accuracy of .005 or 1/100 of a revolution of a 0.5mm screw; difficult to understand how it could be set so accurately without a vertical eyepiece micrometer screw; circle reversed on alternate nights; four reading microscopes; plumb line viewed under microscopes mounted on

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rotating frame; some fragments remain.

Details given in Wayman 1987a,34-5; engraving as in 1845 in Bennett 1987,128 (from Taylor's TCD History).

1841 DUN023 MICROMETER - PIVOT

Unsigned

L 627; W 90; Bm 585x22; C 660x123x71. 1876. PC.

Brass beam with two white metal arcs at its end; when separated, a pointer moves across a scale 0-30.

The end of the beam with the arcs sits on a brass bracket with two knurled knobs holding it to a strut in the mahogany case to match a similar socket on the instrument; the arcs and beam are pivoted to one side of the frame; on top of the arcs is a tapering brass rod ending at a pivot for the long white-metal needle; silvered scale 0-30 and 30-0 at the far end from arcs; for testing uniformity of pivots of transit circle.

Use from P.A. Wayman, PC..

1831 DUN013 MIRROR

Unsigned

L 493; W 308. Mid to late 19 C. G.

Elliptical with sides parallel but displaced; central angled hole with one side serrated; not silvered now.

Also collection of circular mirrors in glass and speculum metal, from 28" Commons/Hargreaves, (see reflecting telescope 1829 DUN011), down.

1844 DUN026 ORRERY

W. & S. JONES, Fecerunt, No 30, Lower Holborn, LONDON.

Sp 325; TH 277, D 226. 1800-1860. A.

Brass; folding tripod legs; pillar to table - scales 10-30 (x12) and 10-31; planetarium, tellurian, lunarium.

Table on top of drum with winding handle at side which turns the centre sprocket; planetarium as far as Uranus, with moons for Earth, Jupiter, Saturn and Uranus; lunarium has terrestrial globe: "A Correct GLOBE with the new Discoveries"; tellurium has concentric scales 1-5-1 (x2), 1/2-29, 10-30 (x12); restored.

Dates from Clifton 1995,155; "Fecerunt" suggests early part of 1800-1860 period.

1850 DUN032 PLATE MEASURER

TROUGHTON & SIMMS LONDON

H 362; W 397; SD 170. Mid 19 C. G.

Brass, white metal, ebonite, mahogany and glass; two microscopes; plate holder in circular scale mount.

Latter 10-360° with two verniers "A" and "B"; plate position adjusted by two clamp and tangent screws; frame tensioned by brass cylinder weight over pulley wheel; one microscope has an eyepiece micrometer; ebonite plate on top under microscopes eyepieces broken; instrument restored.

1851 DUN033 PLATE MEASURER

TROUGHTON & SIMMS LONDON

H 480; W 660; Fr 254x254. c1870. R.

Iron base and frame; brass, silver and white metal; one microscope; tensioned by two brass cylinder weights.

Left/right adjustment read by silvered micrometer with scale 0-9 turned by ebonite knob; up/down by brass knurled knob without micrometer; silvered linear scales for both directions 1-26; mirror on pivots on expanding stand from base under plate; "CARL ZEISS JENA NO. 6687" eyepiece on microscope has double micrometer; instrument restored.

Eyepiece serial number would give a date of c1870 Nuttall 1973,38, but not clear if this is original.

1837 DUN019 PROTRACTOR

STANLEY LONDON (H T T (?) 11902)

D 205; L 315; C 316x154x35. Late 19 early 20 C. G.

Brass; incomplete circle (c215°); revolving arm with vernier window; scales 0-180 and 180-360°; wood case.

Transparent disc with cross at centre point and silver metal frame above.

1838 DUN020 SEXTANT

G. Whitbread, London 1739 (2 Grenada Terrace)

R 207; L 254; W 278; C 341x278x126. 1842-1874. A.

Brass; crosswork frame; silver scale 0-150, window vernier; index and horizon mirrors; four and three filters; case.

Reinforced index arm has magnifier for vernier on pivot, tangent and clamping screws; eyepiece tube screws into ring; filters in brass and oxidised brass frames; wood handle underneath; three feet; mahogany sector case with trade card: "G. WHITBREAD, Manufacturer of Surveying Instruments & ALL SORTS OF Sextants, Quadrants & Telescopes, Compafses &c. 2, Grenada Terrace, Commercial Road, East, London."

Dates from Downing 1988,141.

1829 DUN011 TELESCOPE - REFLECTING

15" mirror by G.H. With; 28" by Common/Hargreaves

TuL 3330, D 450. 1888. AQ.

Fragmented; presented by Isaac Roberts; used in roof dome; tube, two finders, drive and 28" mirror survive.

Telescope remounted by Grubb in 1895; after 10 years he built a new dome and mounting; dismounted by Brück; remounted with 28" mirror made by A.A. Common, refigured by F.J. Hargreaves, tube made in UCD (survives); drive entered separately 1825 DUN007.

Andrew Ainslie Common (1841-1903) received a gold medal of the Royal Astronomical Society in 1884 for his photographs of nebulae (Sky & Telescope 1979,308).

Origin of mirror given in Wayman 1987a,162.

1847 DUN029 TELESCOPE - REFRACTING

BROADHURST. CLARKSON & CO. 63. FARRINGTON RD. LONDON. E.C.

L 1127; MxD 87. c1900. R.

Brass; long lens shield on objective; rack and pinion eyepiece focus; pivot to turned pillar; stand gone.

Anderson 1990,13 lists a Broadhurst, Clarkson & Co. catalogue at 63 Farringdon Road, dated c1900.

1846 DUN028 TELESCOPE - REFRACTING

Utzschneider u. Fraunhofer in München

L 1183; MxD 100. 1819-1840. R.

Brass; replacement mahogany casing; rack and pinion eyepiece focus; pivot to mahogany/brass tripod stand.

Firm dates from 1814, in Munich from 1819, managed by Mertz & Mahler 1826, owned 1839/40; Brachner 1985, 139.

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1820 DUN002 TELESCOPE - REFRACTING

[Thomas] GRUBB DUBLIN 1868

L 5795 (19'); LeD 298 (11.75"). 1868. S.

"South Telescope"; iron equatorial mount; iron, brass, silver, and mahogany; brass finder; restored 1988.

Lens, dating from 1829, made by Cauchoix of Paris and donated by Sir James South to the University of Dublin to mark the installation of Lord Rosse as Chancellor; earlier South had destroyed the telescope in which the lens was fitted (made by Troughton & Simms); Grubb mounting, built c1853, installed 1868, has a brass driving clock controlled by a two-weight governor and driven by a weight inside the pier.

Wayman 1987a,98 gives details: "The telescope tube is tapered for rigidity and is provided with internal strength-ening...The eye-end is provided with rack-and-pinion focusing and there are five eye-pieces giving magnifications from 120 to around 600. The driving clock has a large centrifugal governor with a horizontal friction-plate against which the throw-out of the two brass balls abuts. There is no pendulum control, but the mechanism is built on Grubb's principle that to obtain a smooth drive there have to be large frictional losses in the centrifugal and worm-drive mechanism, which will then have sufficient over-provision to overcome occasional minor obstructions. The motion in right ascension is by worm and a sector of limited travel (two hours approximately). Consequently wear has taken place on the first half of the track, and the work can 'bind' now after over one hundred years' use, when it reaches the second half..."

See Wayman 1968,274-6 and 1987a,96ff; restoration by Jeremiah Daly.

1848 DUN030 TELESCOPE - REFRACTING

Troughton & Simms London. Telford Premium 1874 "Awarded by The Institution of Civil Engineers to Joseph McCarthy Meadows (no closing inverted commas)

Sp 306; L 974; MxD 87; C 1008x202x127. 1874. S.

Brass; folding tripod foot; pillar; eyepiece focus; astronomical and terrestrial eyepieces; rack and pinion focus; mahogany case.

1827 DUN009 TELESCOPE - REFRACTING

Tulley Islington London

MnL c290. 1799-1824. R.

Brass; four draw; black snakeskin coating; brass cap; originally property of Sir William Rowan Hamilton.

In display case outside Meridian Room.

Working dates of Charles Tulley from Clifton 1995,283.

1825 DUN007 TELESCOPE DRIVE

Unsigned but by Howard Grubb.

1 Sp 760&412; H 385; 2 L 615; H 155. c1888. R.

From Roberts reflector 1829 DUN011; iron, white metal and brass; clockwork and governor; pendulum.

Main drive has serrated drum for weight cable and quick-moving brass governor using a brass ring loaded with lead cut into eight segments with springs applied; friction in bearings reduced by two steel discs and ball-bearings at upper end of spindle; control has a three disc detector with metallic wipers to serve a triple electromagnetic switch (gone but see 1446 UCP126) to drive differential accelerator or retarder.

See Grubb 1888,352-356.

1833 DUN015 TELESCOPE MOUNT

Unsigned - attributed to Plössl.

Sp 850; H 1640. Mid 19 C. R.

Mahogany veneer tripod; brass mount; horizontal and vertical circular racks; tube support and counterweight.

Brass refractor by Plössl now gone; tripod damaged in 1977 fire.

Turner 1989,212 gives life dates for Simon Plössl 1794-1868; Anderson 1990,64-5 lists catalogues, 1831-56.

1843 DUN025 THEODOLITE - TRANSIT

Unsigned

L 266; H 240; CrD 143. Late 19 C. G.

Oxidised brass; frame to pivots for vertical circle and telescope with top spirit level; no horizontal circle.

Circular disc base with no obvious connections to usual horizontal circle; vertical circle has silver scale 0-90-0-90-0° with two magnifiers, clamp and tangent screw; objective focus using knurled knob at eyepiece end; telescope and circle detach from frame and fit in mahogany case which contains a right-angle eyepiece.

P.A. Wayman associates use with Ottway coelostat 1830 DUN012.

1828 DUN010 TRANSIT CIRCLE

(Pistor & Martins)

TuL 954, MxD 255; CrsD 992; CIL 974, D 88. 1874. AQ.

Now fragmented; pillars; part tube; 10-spoke circles 0-350, brass collimator and lens remain; used 1874-1936.

With the South Telescope 1820 DUN002, one of the two principal instruments of Dunsink from the late 1860s to the end of the 19 Century; divisions on circles of two arcminutes (10,800 on each circle); provided only with fixed wires, plus one horizontal micrometer wire, but apparently no travelling wire micrometer; silvered circles illuminated by lamps and four telescopes, the lamps also illuminating the cross wires.

See Wayman 1987a,103-105, which has a photograph of the instrument; the firm went bankrupt in 1873, Weil 1988,11.

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IRISH DISTILLERS' GROUP LIMITED - IDG

Bow Street Distillery
Dublin 1
Telephone (01) 872-5566

0509 IDG066 AMMETER & VOLTMETER

NALDER BROS & THOMPSON LTD. LONDON No 197014

390x237x187. 1900-1909. R.

Heavy instrument in mahogany hinged case; two arc scales; resistance shunts 1.5, 15, 150 and 600 amps.

Direct current meter; hand-written legend on scales "John Power & Sons Dublin".

Firm listed in 1900, Crawforth 1988, 18; and in 1909, Anderson 1990, 58.

0560 IDG003 BAROMETER - FORTIN

J. ROBINSON & SONS 65 GRAFTON ST. DUBLIN No 527

H 1035; Bk 1100x113. Kew Certificate Dec 1890.

Standard barometer in glass-sided mahogany case; black body; brass fittings; framed Certificate.

Silver metal scale 27-32 and vernier; thermometer in centre of casing, 10-130°.

Firm dates 1885-1903, Morrison-Low 1989, 133.

0561 IDG001 BAROMETER - MARINE

S. MASON ESSEX BRIDGE DUBLIN

H 924; W 45; CyD 38 & 56. 1838-1877. A.

Wood back (veneered?); brass cylindrical reservoir housing; ivory scale; central thermometer.

Thermometer marked "freezing, temperate, summer heat, blood heat, fever heat".

Dates from Morrison-Low 1989, 130.

0572 IDG078 BUNG ROD

Unsigned IMPEL GALLONS

L c1250; Se c10x10. Late 19 early 20 C. G.

Boxwood; square section; tapers to point at bottom; sliding brass fitting at bung; various scales:

front 1-47; side Imperial Gallons 0-230; other side 0-6G.

0574 IDG063 CALLIPER - CROSS

DRING & FAGE LONDON MAKERS TO THE CUSTOMS

780x19x18; As 530x12x21-0. Late 19 early 20 C. G.

Boxwood; brass fittings; side pieces bound in brass taper to point; sliding front pieces; scales 0-28 and 30-59; for measuring kegs.

0573 IDG074 CALLIPER - CROSS

J. LONG MAKER 20 LITTLE TOWER ST LONDON

780x21x14; As 536x14x22-0. 1821-1884. A.

Boxwood; brass fittings; side pieces bound in brass taper to point; sliding front pieces, scales 0-28 and 30-59; for measuring kegs.

Dates from Crawforth 1988, 11.

0575 IDG052 CALLIPER - LONG

DRING & FAGE LONDON MAKERS TO THE CUSTOMS

L 1040xc20xc10; As c210&c100. Late 19 early 20 C. G.

Boxwood; two sliding front pieces with side arms on ends at right-angles and arms at right-angles to those.

Brass fittings; scales 0-29 and 29-70.

0512 IDG060 CALORIMETER - THOMPSON FUEL

Unsigned

CyH 350, D 117; H 333; D 117. Late 19 C. G.

Copper conical crucible H83 for fuel, metal housing with foil wings; glass 2000 Gramm cylinder.

The powdered fuel is mixed with nitrate and chlorate of potassium; this is set on fire through a tube with a stop-cock, and the whole placed in the cylinder filled to the 2000 Gram mark; the increase in temperature of the water gives the fuel efficiency.

0496 IDG067 COLORIMETER

A. Jobin Paris

B 173x159; H 410; TusL 117, D 14½. Post 1892. R.

Duboscq pattern; knurled wheels with verniers raise hollow glass sighting tubes; sample vessels missing.

Payen 1986, 159 records that Jobin took over the workshop of Laurent (successor to Henri Soleil) in 1892.

0502 IDG072 COLORIMETER

THE LOVIBOND TINTOMETER THE BRITISH DRUGHOUSES PATTERN Pat No 299194

Res 975637 No 612

H 252; Hs 230x126x92. 1934-1940. D.

Ebonite box; nine grooves for slides; 90° slim viewer.

Lovibond literature shows this model as 1934, with different model in 1940.

0500 IDG035 COLORIMETER

J.W. LOVIBOND'S PATENT TINTOMETER THE TINTOMETER LTD. SALISBURY "Tintometer" PATENT J.W. Lovibond, No240

C 494x163x133; Ty 454x102x34. c1900. D.

Mahogany case; paper-covered telescopic iron viewer; wooden tray has room for four sets of 34 slides; case has double hinged lid.

Lovibond literature shows earliest type of tintometer similar to this - "Telescope-type" 1900.

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0501 IDG071 COLORIMETER

J.W. LOVIBOND'S PATENT TINTOMETER THE TINTOMETER LTD. SALISBURY "Tintometer" PATENT J.W. Lovibond, NO.1823A

C 494x163x133; Ty 454x102x34. 1900-1934. D.

Mahogany case; telescopic wooden viewer; 20 slides.

Room for four sets of slides; case has double hinged lid; hinge below viewer holds wooden support to which white ground can be attached as background to cell compartments; also several other later Lovibond tintometers, including the 1934 model.

Lovibond literature shows this type of model between 1900 and 1934.

0497 IDG007 COLORIMETER

PH. & F. PELLIN PARIS. FRANCE

B 152x130; H 404; TusD 26, L 53. Post 1900. R.

Improved Duboscq pattern; sample tubes move up around octagonal glass pillars; back verniers; mirror below.

Felix joined his father Philibert in 1900, Brenni 1988,4; instrument illustrated in Turner 1983,223.

0503 IDG068 COUNTER

Unsigned

234x62x42. Late 19 C. G.

Brass front and frame; steel sides; iron back; heavy iron knob to advance counts; plus other counters; hand-written note "Counter from beam engine".

Other counters by: W & T AVERY LTD BIRMINGHAM; Budenberg Gauge Co. Ltd. Broadheath, nr Manchester No 27963; Schaffer & Budenberg Ltd Manchester No 132059; and Schaffer & Budenberg Ltd. Manchester No 132060

0504 IDG022 DIVIDERS

Unsigned

AsL 362. Mid to late 19 C. G.

Black painted iron (rusted); arc attached to one arm around which the other revolves.

0498 IDG045 FARINATION APPARATUS

Braumstr. C. Pohl's Kornprüfer PATENT RICHARD SIMON NOTTINGHAM G.M. Sch. 28325 No.281

L 184; W 57. 1895-1905. W.

Grobecker's; brass; grill; hinged plate; steel blade.

U-shaped with handle; ebonite plates with holes (five of them) slide into brass housing below the blade.

Similar circular instrument illustrated in Maiben 1914,243 with name: "Grobecker's Farination Apparatus".

Second identical instrument, numbered 573, is missing the ebonite plates.

Dates from Crawforth 1988,18.

0513 IDG054 FIRE EXTINGUISHER

The Brigade Fire Extinguisher DUBLIN JAPAN WORKS JERVIS STREET DUBLIN MADE IN ENGLAND "To operate work like a pump"

H c660; D c110. Late 19 C. G.

Copper and brass; cylindrical; pump handle to operate; foot plates.

0576 IDG075 GRAIN SIZER(?)

R ROBY LTD Makers Bury St Edmunds England Patent

C 342x74x68; Ps 50x50; Grs 80x49.

Late 19 early 20 C. G.

Aluminium plates (24), with hemispherical indents; five grids, brass sides with iron wires; wood case; purpose uncertain.

Marks on plates e.g. 086, 092, 6½M/M, 7½M/M; grids have cylindrical brass sides; wires have different diameters (1.2-1.9) and are numbered 108, 120, 123, 129, 135.

0527 IDG031 HYDROMETER

BUCKLEY & CO., HUDDERSFIELD. Patent No.3594, No7867

H 283; D 40. Early 20 C. G.

Glass; tapering fluted bulb; paper scale 10-60; mercury weight; Patent "will not roll when laid down".

0528 IDG049 HYDROMETER

J. HICKS LONDON

H 128; D 16; CL 157, D 28. Late 19 C. G.

Glass; cylinder bulb; spherical mercury weight; ivory scale in stem 10-90; cardboard cylinder case.

0529 IDG040 HYDROMETER

J. LONG 20 LITTLE TOWER ST LONDON

H 231; D 33. 1821-1884. A.

Glass; pear shaped bulb; mercury weight; ivory scale 5-50.

Two other Long hydrometers with paper scales - miniature H107,D14 - scale 20.10.P.10.20, JOSh. LONG LONDON; and H246,D35 - scale 0-120, Josh. Long 43 Eastcheap, London SP. GR. SACCHR.

Dates from Crawforth 1988,11.

0531 IDG056 HYDROMETER

Unsigned

H 143-176; D 22-34. Late 19 early 20 C. G.

Varied collection of glass hydrometers with mercury weights; four with ivory scales; eight with paper; tin cases.

Ivory scales 10-90, 5-55, 0-50; eight identical with paper scales 1-9; cylindrical tin cases for all but one; date on case of one of identical eight is 1916.

0526 IDG057 HYDROMETER

Unsigned Alcoometre

H 291; D 40. Late 19 early 20 C. G.

Glass; cylinder bulb; pear shaped weight, lead shot; hand-written scale on paper 1-3 (red), 90-100 (black).

0542 IDG028 HYDROMETER - RECORDING

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD CAMBRIDGE ENGLAND No 05638.

372x351x291 1907. N.

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Mahogany case; windows top and front; brass clockwork mechanism drives silvered drum; "proof scale" 10OP. Proof. 10UP. 20UP to 90UP.
Date from Jim Bennett PC.

0543 IDG033 HYDROMETER - RECORDING

THE CAMBRIDGE AND PAUL INSTRUMENT CO. LTD. LONDON & CAMBRIDGE NO C 13591
372x345x296. 1921. N.

Mahogany case; windows top and front; brass clockwork; "proof scale", nearly identical to 0542 IDG028.

Cambridge & Paul Instrument Company Ltd operated between 1919-1924, Cattermole 1987,xiv; serial no - Jim Bennett PC.

0532 IDG012 HYDROMETER - SIKES

B & T LONDON No 111

H 177; D 39; C 204x102x61. Late 19 C. N.

Brass; scale 1-10; only one weight; thermometer signed "DRING & FAGE LONDON" scale 20-100°; wooden case.

Baird moved to London in 1890, Brian Gee, Bulletin 27,1990,33.

0533 IDG021 HYDROMETER - SIKES

[On case] SIKES'S HYDROMETER BUSS 33 Hatton Garden LONDON Maker to the REVENUE of the UNITED KINGDOM

[On instrument] No B.G.B. 1642

H 178; D 40; C 202x97x55. 1866-1895. A.

Brass; scale 0-10; eight weights; in mahogany case.

All weights stamped 1642; thermometer missing.

Dates from Crawforth 1988,5; serial no 16853 at this address 0993 PRI144 points nearer 1866 than 1895.

0535 IDG015 HYDROMETER - SIKES

[On case] SIKES'S HYDROMETER BY DRING & FAGE 145 STRAND LONDON MAKERS TO THE REVENUE OF THE UNITED KINGDOM & COLONIES No 13354

H 172; D 38; C 212x97x66. 1883-1902. A.

Brass; scale 0-10; six weights plus cap; mahogany case.

Rectangular cap for top of hydrometer; thermometer missing; hinge of case broken.

Dates from Crawforth 1988,6.

0534 IDG010 HYDROMETER - SIKES

[On case] SIKES'S HYDROMETER DRING & FAGE LTD. MAKERS TO H.M. CUSTOMS AND EXCISE OF THE UNITED KINGDOM AND COLONIES &c 150-152 TOOLEY STREET LONDON.

H 174; D 39; C 208x101x57. Late 19 C. G.

Brass; No1958; scale 0-10; nine weights; mahogany case.

Thermometer in case, scale 30-90, signed "T.O.Blake (Sikes' Hydrometers) Ltd."

Second similar instrument, same signature on box, signature on instrument "DRING & FAGE LONDON No 5181", 11 weights stamped 5181 plus one extra stamped 23159.

0536 IDG013 HYDROMETER - SIKES

[On case] SIKES' POCKET HYDROMETER JOSEPH LONG 43 EASTCHEAP LONDON No 25455

H 100; D 26; C 131x102x53. Late 19 early 20 C. G.

Brass; nine weights; case; no thermometer nor vessel.

Mahogany case with space for missing thermometer and vessel; horn-rimmed magnifying glass D23.

Second identical instrument missing its signature plate on case and with none also on instrument, missing vessel, thermometer and magnifying glass; the above signature, less the number, is on the case; the signature on the instrument is: "J LONG LONDON No 25455".

Firm at this address from 1885-1936, Crawforth 1988,11.

0530 IDG050 HYDROMETER - SIKES

[On case] STANDARD HYDROMETERS W. REEVES 146 MINORIES LONDON

H 270; D 32; C 325x200x56. Early 20 C. G.

Glass; cylinder bulb; mercury pear weight; flattened shaft; scales 0-20, 20-40, 60-80; three of five in mahogany case.

Above signature on case; signature on instruments "Stan-dard Sikes W Reeves 146 Minories London"; hand-written paper scale with signature in red; case has room for five hydrometers and a thermometer.

0539 IDG070 HYDROMETER - SIKES

Unsigned No V.C. 5067 SIKES

H 111; D 31; VH 128, D 40. Late 19 early 20 C. G.

Brass; cylindrical glass vessel with lip

Another has No K G 6365; thermometers missing; mahog-any cases.

Only hydrometer retaining its glass vessel.

0538 IDG044 HYDROMETER - SIKES

Unsigned SIKES PROOF SCALE

H 123l; D 14. Late 19 C. G.

Glass; cylinder shaped bulb; mercury pear weight; hand written paper scale in shaft 30-70.

0540 IDG043 HYDROMETER - TWADDELL

James White, Glasgow

H 226; D 26. 1850-1900. R.

Glass; elongated pear bulb; spherical mercury weight; hand-written paper scale 138-146 (No6) and signature.

Dates from Bryden 1972,59.

0541 IDG036 HYDROMETER - TWADDELL

Unsigned Twaddells No 6 ANTIUN SERIES BRITISH MADE No 72629

H 215; D 36. Late 19 C. G.

Glass; pear bulb and weight; scale 138-170 (No6).

Three other glass Twaddell hydrometers Nos 1, 2 and 3.

One is inscribed "Twaddells No 1 Antiun Series No 85167 BRITISH MADE", scale 0-24, H228,D36; another "TWADDLES [sic] No 2 British Made", scale 24-48, H146, D16; and another "Twassle's [sic] Hydrometer Nr. 3", scale 48-74, H203,D25.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0562 IDG039 HYGROMETER - HAIR

CASELLA LONDON "EDNEY" HAIR HYGROMETER No 9680

H 411; SHsD 146. Early 20 C. G.

Cylindrical stainless steel scale housing; scale 20 -100 (log); stainless steel cylinder housing for hair.

0563 IDG038 HYGROMETER - HAIR

NEGRETTE & ZAMBRA PERCENTAGE HUMIDITY made in ENGLAND DEW POINT F BELOW AIR TEMP R 121146

H 381; SHsD 103. Design 1889. R.

Cylinder glass-covered stainless steel scale housing; metal housing for hair with gauze-covered sleeve; scales 10-100 (% humidity), 0-50 (dew point adjust).

British design registration no 121146 corresponds with 1889, Crawforth 1984,108.

0559 IDG069 INHALER

MANUFACTURED BY S. MAW SON & THOMPSON LONDON ENGLAND

H 230; D 55-150. 1870-1894. F.

Pear-shaped pottery vessel; curved side arm; legend and instructions in front - uses one pint boiling water.

Legend: "MAW'S IMPROVED INHALER FOR HOT WATER, INFUSIONS &c. The water should be boiling, and the Inhaler not more than half filled. A pint is sufficient."

Dates from Crawforth 1988,12 and Pearsall 1974,266.

0556 IDG046 LAMP

OLDHAM LAMP TYPE - "USM" APPROVED UNDER SCHEDULE B

H 240; D 88. Early 20 C. G.

Iron cylinder holds battery; screw bottom missing; four pillars and iron top protect glass light surround; iron handle attached to top.

0569 IDG005 LEVEL - TELESCOPIC

TROUGHTON & SIMMS LONDON

Tel 327, D 20 & 48; C 381x217x186.

Late 18 early 19 C. G.

Oxidised brass; spirit level on top; three adjustable feet; bracket for tripod; mahogany case.

Stamped on instrument (also on case) JOHN POWER & SON DISTILLERS DUBLIN.

0557 IDG004 MICROSCOPE - COMPOUND

J. SWIFT & SON LONDON

H 285; Sa 94x87. Late 19 C. G.

"Swift's Discovery Microscope"; black metal tripod to U-shaped frame; pivot supports tube and stage; double objective; iris diaphragm.

Substage condenser; rack and pinion focus; one objective signed "REICHERT WEIN Nr. 177778".

Firm became J. Swift & Son in 1877, Turner 1989, 184-201.

0505 IDG073 PANTOGRAPH

DIXON & HEMPENSTALL OPTICIANS 12 SUFFOLK

STREET, DUBLIN.

AsL 510&230; C 540x132x99. Early 20 C. G.

Brass arms and fittings with ivory wheels; lead weight covered with red leather; brass hemisphere on pencil for (missing) weight; signature on trade card on lid of box.

Date from Morrison-Low 1989,123.

0499 IDG008 POLARIMETER & SACCHARIMETER

LAURENT SUCCR de SOLEIL A. JOBIN SUCCR 31. rue Humboldt. PARIS POLARIMETRE-LAURENT No. 5033

H 420; L 547. Post 1892. R.

Black metal tripod and pillar; brass sample tube.

Scales 100-0-100 and 200-0-200; double vernier; pillar holds tube support which is attached to scale and optics; eyepiece turned by knurled knob to cogs around silvered scale, read with magnifying glass with mirror; only half of sample tube contains sample, poured through screw cap; objective and nicol prism can be revolved and removed.

Payen 1986,159 records that Jobin took over the workshop of Laurent (successor to Henri Soleil) in 1892.

0510 IDG065 POLE INDICATOR

Unsigned POLE INDICATOR FOR 220 VOLT CIRCUITS

116X116X65. Late 19 early 20 C. G.

Mahogany case; leather carrying handle; arc scale reading + 0 -; earth and line contacts above.

0570 IDG002 POSITION FINDER

McCombie's patent

CrD 138; AL 376; C 518x168x70. Turn 19/20 C. R.

Three; nos 58,60,64; brass circle; iron (No58) or brass arms; mahogany drawer case; only No64 assembled.

The arms of No58 are rusted, the large mirror is detached but complete; the main mirror and housing are detached from their bracket in No 60; each case has brass handles top and front; Turner 1983,265 illustrates one of these, signed "McCombie's Patent", which he attributes to Henry Hughes & Son, and Bennett 1987, 207 notes that Hughes & Son were sole makers; but Historical Technology 104,1972,181 offer one signed: "McCombie's Patent M. LAMBERT DUBLIN 71," which may suggest that these instruments, with such similar serial numbers, are by Lambert rather than by Hughes & Son; in any event, Moscowitz notes: "OF IRISH INVENTION - McCombie's Angle And Position Finder, Dublin, 1898..This combined sextant-station pointer ...is designed to replace the two instruments and the necessity of reading out the angles on the sextant and setting them into the station pointer. A clever linkage converts the double angle motion of the index mirror into the true angle needed for the station pointer aspect of the instrument....The inventor T.G. FitzGibbon McCombie, commander of the Irish Lights Steamer 'Tearaght', writes, 'THE ANGLE AND POSITION FINDER Is an instrument of the Station Pointer type, but superior to it, inasmuch as it does the work of two angle Sextants and a Station Pointer combined. It is specially adapted for coast navigation....' - illustrated.

Morrison-Low 1989,128 lists Michael Lambert, 47 Rath-mines Road, Dublin, in 1881.

0564 IDG048 PRESSURE GAUGES

Budenberg; Mather & Platt; Schaffer & Budenberg.

Most D 148-155, W 42-54. Late 19 early 20 C. G.

Eleven; cylinder brass housings with glass fronts, some with stop-cocks; one double gauge; various scales.

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Signatures: "Budenberg Gauge Co Ltd Broadheath nr Manchester No 5833784" D103,W47; same No 5878067 D148, W51; "MATHER & PLATT LTD MANCHESTER No 5956263" D148, W42; "MATHER & PLATT LTD PARK WORKS MANCHESTER" D155, W53; same (lower case) D155,W53; "MATHER & PLATT PARK WORKS, MANCHESTER MADE IN ENGLAND COMP-OUND GAUGE" D155,W53; "Schaffer & Budenberg Ltd. Manchester London & Glasgow No 2584210" D150,W45; same; two unsigned.

0565 IDG011 PRESSURE GAUGE TESTER

VULCAN TEST GAUGE Schaffer & Budenberg Ltd No2804969 THE VULCAN PORTABLE GAUGE TESTER BULLOCK'S PATENT 250.

SHsD 88; W 32; C 203x178x117. Late 19 early 20 C. G.

Stainless steel housing; piston; stop-cock; case.

Cylinder with glass front for scale 0-300; piston at right-angles; stop-cock below to female screw thread and adaptors; mahogany case.

Crawforth 1988,18 lists firm (without Ltd) in 1875; this looks later.

0545 IDG018 SACCHAROMETER

[On case] BATE'S PATENT SACCHAROMETER BATE Poultry LONDON Maker to the Honble Board of Excise

H 186; D 36; C 197x78x48. 1808-1847 & 1855-1899. R.

Brass; scale 0-30; five weights; case; J. Long Trade card.

Weights inscribed 970, 1000, 1030, 1060, 1090; thermo-meter and second instrument(?) missing from case; signature on instrument: "Bate's Patent LOFTUS London No 2267"; trade label on bottom of case: "JOSEPH LONG BY APPOINTMENT TO THE INLAND REVENUE INDIAN AND COLONIAL GOVERNMENTS 43 EAST-CHEAP LONDON MANUFACTURERS OF SIKE'S HYDROMETERS SACCHAROMETERS THERMO-METERS"...etc.

Bate 1808-1847; Loftus 1855-1899; Long after 1885; dates and addresses from Crawforth 1988,3&11.

0547 IDG017 SACCHAROMETER

BATE'S PATENT SACCHAROMETER BATE No 21 Poultry LONDON Maker to the honble Board of Excise L OERTLING

H 183; D 36; C 200X80X43. 1846-1847. R.

Brass; scale 0-30; five weights 970-1090; wooden case.

Thermometer and smaller instrument(?) missing; signature on instrument "L OERTLING LONDON Late Bate's Patent No 270 4"; signature without the "L OERTLING" is on the case.

Bate died in 1847 and Oertling worked from 1846, Crawforth 1988,3&13.

0548 IDG006 SACCHAROMETER

STANDARD SACCHAROMETERS T.O. BLAKE 57 HATTON GARDEN LONDON Nos 69111, 69101, 69102.

H 325; D 41; C 387x121x60 1914-1926. A.

Three; copper and brass; 995-1005, 1050-1060, 1060-1070.

In mahogany case; label on case reads "Adjusted by Reeves Oct 1962".

Dates from Crawforth 1988,4.

0549 IDG047 SACCHAROMETER

BUCKLEY & CO HUDDERSFIELD PATENT NO 3594

H 210; D 31. Early 20 C. G.

Glass; fluted tapering bulb (patent 3549 - will not roll); spherical mercury weight; paper scale 990-1030.

0550 IDG037 SACCHAROMETER

Josh Long 43 Eastcheap LONDON

H 206; D 37. Late 19 early 20 C. G.

Pair; glass; pear bulb; circular mercury weight; hand-written paper scale 1030-1060.

Firm at this address from 1885-1936, Crawforth 1988,11.

0551 IDG041 SACCHAROMETER

W. Reeves 146 Minories London

H 195; D 36. Early 20 C. G.

Glass; pear bulb; spherical mercury weight; hand-written scale 1070-1100.

Two more by Reeves & Co 26 Minories.

The Reeves & Co instruments have pear-shaped mercury weights as well as bulbs; their scales are 1030-1070, one being broken

There are two more glass saccharometers, H300D33 and H266D22; former has a mercury weight and the legend: "MADE IN ENGLAND SP. GR.", scale 990-1020; the latter has a lead shot weight and the legend: "Specific Gravity Temp. 60°F ENGLISH MADE No. J.K. 1745"; both are in cylinder tin cases.

0544 IDG058 SACCHAROMETER

Unsigned Aräometer n. spez. Tp. 15°C

H 299; D 26. Early 20 C. G.

Eight; glass; cylinder bulbs; pear-shaped lead shot weights; scales 4 x 0990-1020; 4 x 1020-1070.

Each plugged with pink cotton wool; printed paper scale; the 4 x 0990-1020 are in tin cylinder cases H303,D32 - these also contain the letters "Gew." after "spez" in the legend.

0508 IDG019 SLIDE RULE

DRING & FAGE MAKERS 56 STAMFORD ST LONDON

L 611; W 47. 1903-1928. A.

Boxwood with standard scales - probably for use with hydrometer.

Dates from Crawforth 1988,7.

0506 IDG020 SLIDE RULE - BREWER'S

Unsigned

L 226; W 35. Late 19 early 20 C. G.

Boxwood; "PROOF, UNDER PROOF, OVER PROOF, THERMOMETER SCALE"; scales 50-30; 55-70; 70-5; 10-40; 35-55; 30-80°.

0507 IDG076 SLIDE RULE - HEAD ROD & ULLAGE

Unsigned (so far as can be seen - in display case)

L 1200; W 50. Late 19 early 20 C. G.

Boxwood with brass fittings; scales 20-300, 43-2, 46-76, 15-66.

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0566 IDG016 STEAM ENGINE INDICATOR

CROSBY STEAM GAGE & VALVE CO 147 Queen Victoria Street, London EC

H 165; DrH 93, D 38; C 212x176x122.

Late 19 early 20 C. G.

Stainless steel; drum turned by pulley and string.

Pen marks chart; seven springs supplied; two boxwood rules with scales 5-0-5 and 15-0-10; in hardwood case; CROSBY signature on rules and address on chart paper.

Firm at 75 Queen Victoria Street in 1890 and 1895, Crawforth 1988,17.

0568 IDG014 STEAM ENGINE INDICATOR

RICHARD'S IMPROVED PATENT STEAM-ENGINE INDICATOR MANUFACTURED BY ELLIOTT BROTHERS, OPTICIANS, 449, STRAND LONDON

H 200; DrH 150, D 52; C 250x248x94. 1864-1886. A.

Brass; piston and springs; revolving chart cylinder.

In mahogany case; unlike 0567 IDG009, the springs are located in the piston, not on top; six springs supplied.

Dates from Crawforth 1988,8.

0567 IDG009 STEAM ENGINE INDICATOR

M'Kinnell & Buchanan's PATENT STEAM ENGINE INDICATOR

H 227; DrH 135, D 52; C 264X264X107.

Late 19 early 20 C. G.

Brass; piston screws to test outlet; forces spring up, acts via pointer to drum, revolved with string.

Mahogany case; four springs supplied - located on top of piston; stop-cock to reduce diameter of inlet.

0515 IDG026 THERMOGRAPH

NEGRETTI & ZAMBRA TRADE MARK LONDON Temperature Recorder Patent No.167,000 Range 70/230°F NoT14696 10.Ft.

Hs 365x214x180. Patent 1921.

Iron base; hinged housing; brass drum; copper probe.

Metal housing hinged; copper probe broken; scale 70-230° and hours; recording paper still on drum.

Patent dates from Crawforth 1984,104.

0514 IDG023 THERMOGRAPH

SUPPLIED BY NEGRETTI & ZAMBRA LONDON

275x210x124. Early 20 C. G.

Steel base and support for japanned metal cover; brass workings; copper probe; recording paper still on drum.

Scale 9-29; recording paper dated 22:8:1975.

0554 IDG053 THERMO-HYDROMETER

ALCOHOL BY VOLUME. W. REEVES & CO LTD LONDON NO 3842 T: 15°C. BRITISH MAKE

H 252; D 21. Early to mid 20 C. G.

Glass; lead shot weight; scales 40-60 & 0-50°.

0553 IDG055 THERMO-HYDROMETER

REAUMUR LIHOMER pro objemová procenta alkoholu

H 150; D 16. Early 20 C. G.

Glass; cylinder bulb weighted with lead shot and red tar; scale 70-100; mercury thermometer below, 0-30°.

0516 IDG025 THERMOMETER - BREWER'S

W. REEVES & CO 26 MINORIES LONDON

H(-Ha) c350; W c70. Early 20 C. G.

Copper frame, handle and bucket; brass scale 100-220°.

One of three such thermometers - others unsigned.

Name from Baird & Tatlock 1914,791.

0517 IDG034 THERMOMETER - BRINE PIPE

W. REEVES & CO 26 MINORIES LONDON

H 300; D 34. Early 20 C. G.

Brass cylinder housing, sliding panel; one of group of 13; others by J. Long, G.H. Zeal, and Goodbrand.

Dimensions vary from H 244-465, D 25-45. Signatures: GOODBRAND STALYBRIDGE (1); J. LONG. 43 EAST-CHEAP London (1); REEVES (as above) (3); G.H. ZEAL. London (4); unsigned (4).

Name from Baird & Tatlock, 1914,788.

0518 IDG077 THERMOMETER - ELBOW RIGHT ANGLE

J. CASARTELLI & SON LTD., MANCHESTER

H 227; W 50. 1923-1933. F.

Two; rectangular iron housing; glass front; 160-340°.

Also two in brass by Reeves, and one unsigned.

Glass broken in one; "W. REEVES & CO LTD LONDON" scale 70-170°; unsigned "MADE IN ENGLAND" scale 4-45°.

Dates from Crawforth 1988,17.

0522 IDG059 THERMOMETER - GLASS MERCURY

J. LONG 43 EASTCHEAP LONDON

H 492; D 34. Late 19 early 20 C. G.

Oak cylinder housing; metal scale 40-260°; brass tube and cage (three discs joined by wires) over probe.

Firm at this address from 1885-1936, Crawforth 1988,11.

0521 IDG061 THERMOMETER - GLASS MERCURY

J. LONG 43 EASTCHEAP LONDON

H(+Ha) 770; W 50. Late 19 early 20 C. G.

Very fine brass thermometer; heavy brass disc on top of conical cylinder bulb cover with circular holes. Scale c -80 - +110°.

Firm at this address from 1885-1936, Crawforth 1988,11.

0537 IDG051 THERMOMETER - GLASS MERCURY

T.H. MASON DUBLIN CUSTUIM AGUS MAC

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c170x20. Early to mid 20 C. G.

Ivory back; brass mounts; scale 30-110°; with Sikes hydrometer No 21686 JL, brass in mahogany case.

"JL" on the hydrometer probably stands for Joseph Long; the hydrometer scale is 0-10, and there are eight weights.

Thomas Holmes Mason took over the firm in 1913, Mason 1980,12.

0523 IDG030 THERMOMETER - GLASS MERCURY

T.H. MASON & SONS LTD DUBLIN MADE IN ENGLAND

H 189; W 31. Mid 20 C. R.

White delph housing; Mason signature on top; Made in England on bottom; bulb missing; scale 40-90°.

The firm assumed this name in 1935, Mason 1980,18.

0524 IDG024 THERMOMETER - GLASS MERCURY

W. REEVES 146 MINORIES LONDON

H 336; D 23. Late 19 early 20 C. G.

Wood cylinder housing; brass screw thread on top and cage on bottom, scale 90-220°.

Two other similar Reeves thermometers; signatures W. REEVES 26 MINORIES LONDON 70-230°; and W. REEVES & CO 26 MINORIES LONDON - latter has copper screw thread at top.

Fourth unsigned thermometer has brass screw thread on top, wooden bulb surround and brass pointed bomb weight below, 50-220°.

Hand-written on shaft of first instrument is "M.B. Lane... (can't read)....1919", so still in use in 1919.

0525 IDG029 THERMOMETER - GLASS MERCURY

YEATES & SON LTD, DUBLIN

H 360; W 48. Early 20 C. G.

White delph back with scale 100-220° on one side and with the signature on the other.

0519 IDG027 THERMOMETER - MALT KILN

Unsigned BRITISH MAKE

H 443; W 45. Late 19 early 20 C. G.

Oak handle; brass housing; white scale 50-260°; bulb in brass cage.

Second similar thermometer with metal scale.

Bulb broken in second instrument - unsigned "MADE IN ENGLAND".

Name from Baird & Tatlock 1914,787.

0520 IDG062 THERMOMETER - MAXIMUM & MINIMUM

J. LONG, 43 EASTCHEAP, LONDON

H 447; D 51; CaD 57-151. Late 19 early 20 C. G.

Brass cylinder scale housing; bulb in copper tube; conical wire basket; scale 10(20)-260.

Second similar instrument is not a maximum and minimum thermometer and is unsigned: "MADE IN ENGLAND REGD NO.238854"; scale 70-260; rectangular iron scale housing; similar wire cage protects (blue) bulb.

Firm at this address from 1885-1936, Crawforth 1988,11.

0555 IDG032 THERMO-SACCHAROMETER

Saccharometer Balling Temp: 17½°. Salm Amsterdam.

Early 20 C. R.

Three; glass, mercury weight; scale 0-10; thermometer 0-40°, red mark at 17½°; "Alcohol g.b." in signature.

Mark at 17½° corresponds to 0 on scale reading 1-11 up and 1-8 down.

Anderson 1990,75 lists a catalogue of G.B. Salm dated c1910.

0558 IDG042 TYPEWRITER

The Globe Typewriter H.E. NORMAN TYPEWRITER ENGINEER 5 UPPER ORMOND QUAY DUBLIN

TELEPHONE NO 2773 No 1760

B 302x207; Hs 282x183x95. 1895-1900. D.

Singing sector mechanism; American manufacture; a finger selector lever moves over an index; letters are in a moulded rubber stamp.

Details from J.E. Smart, Research Assistant at the printing and papermaking collection at the Kensington Science Museum, to Ted Bonner, dated 15:7:1974; the machine was introduced in 1893 by the American Typewriter Company of New York, and placed on the British market in 1895; they have an identical machine No 3754.

0511 IDG064 VOLTMETER

AYRTON & PERRY'S Voltmeter PATERSON & COOPER LONDON

B 236x188x4; Hs 200x155x67. 1885-1900. W.

Mahogany baseboard and housing; ebonite top; fan scale; jewelled needle bearing; brass handle; lid missing.

Dates from Crawforth 1988,18.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

ST PATRICK'S COLLEGE, MAYNOOTH - MAY

Maynooth
Co. Kildare
Telephone
(01) 628-5222

Note: A comprehensive catalogue of the Maynooth instruments was published in 1994, and this gives fuller descriptions of the instruments, with photographs; it also includes more 20th Century items - see bibliography under Mollan 1994.

1059 MAY035 AIR PUMP - DOUBLE BARREL

NEWMAN LONDON

T695x444, H575; PT356x407, H575+444. 1812-1856. F.

Mahogany table holds turned supports for plate table and bridge above pistons, which are housed in brass cylinders.

The plate table is above the base table; a handle raises and lowers two racks attached to a pinion which drives leathers in two pistons; two mercury troughs below for manometers; brass cylinder under table with stop-cock at bottom with settings "OPEN", "CLOSE" and "VALVE".

Dates for John Frederick Newman from Clifton 1995,199.

1814 MAY297 AIR PUMP - FLEUSS

FLEUSS PATENT NO 5810

B 430x310x48; MxH 720. Late 19 early 20 C. R.

Cast iron base and support to pivot for handle, other end to brass cylinder; air pump plate; glass bell jar.

End of lever away from handle moves piston in pump; lead from this through elongated egg-shaped vessel to central pipe in plate; glass bell jar (MxD173,H430) has brass sleeved sealed top; the handle has a hinge beyond the pivot, so it can be folded for storage.

Turner 1983,103 dates Fleuss pumps c1900.

1645 MAY132 AIR PUMP - SYRINGE

Unsigned

B 222x167x39; H 280; PD 135; TuD 33. Mid 19 C. G.

Mahogany base on four feet; brass; tube angled at side; pipe and hollow pillar with stop-cock to circular table.

1734 MAY217 AIR PUMP PLATE

YEATES & SON Dublin

BD 198; TD 195; TH 153. Mid to late 19 C. G.

Turned wood base; turned brass pillar with stop-cock to brass table; in centre, another brass stop-cock.

Fitted with glass globe on brass sleeve and stop-cock, containing a bell 1735 MAY218.

4058 MAY321 AMMETER

AMPERE JOHNSON & PHILLIPS. LTD. LONDON. No 10538.

B 214x214x15; H 77; HsD 186. Early 20 C. G.

Mahogany base; glazed cylinder brass housing; white scale 0-1.0 (log); inscribed "THERMAL INSTRUMENT".

The scale covers less than half the cylinder face, and reveals the red magnet and wire mechanism; there are two ebonite-covered contacts at the side of the housing.

A card calls this a hot wire ammeter and attributes it to Hauptman & Braun; it was presented by Mr J.F. Crowe of Essex.

1756 MAY239 AMPERE APPARATUS

Yeates & Son Dublin

B 360x193x34; H 462. Mid to late 19 C. G.

Mahogany base; two parallel right-angled brass pillars to two mercury cups for a variety of suspended copper coils.

The coils comprise one circle, one figure-of-eight double rectangle, and one solenoid; also present are a solenoid and a single rectangle with brass contacts on the ends of the wire rather than the double points for the mercury cups; the base, which has been sanded, has two copper strips to two brass contacts.

1729 MAY212 ARAGO DISC APPARATUS

Yeates & Son Dublin.

Sp 608 & 263; WhD 271; H 138. Mid to late 19 C. G.

Mahogany; pulley wheel and handle drive brass disc and pillar to turn copper disc; glass and copper discs above.

The mahogany base (625x200) has a shaped foot at one end and a cross piece at the other; the lower copper disc has two grooves making up most of its diameter; three turned mahogany pillars hold the glass disc on top of the copper disc; and another (complete) copper disc sits on top of the glass.

4052 MAY315 ASTRONOMICAL MODELS

Unsigned

Fr 175x102x15; DiHsD 88. Mid to late 19 C. G.

Four; mahogany frame holds a fixed glass disc; a handle attached to a cog turns the brass frame of another disc.

Each frame is numbered; No.9 has a fixed map of the world, showing "AFRICA", "ASIA", "INDIAN OCEAN", and the "EQUATOR", with a lighthouse at around Scotland; the moving disc shows a sailing ship traversing the globe, moving into and out of the lighthouse beam.

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The fixed disc of No.10 has part of the Sun, a black ring, and a central clear disc labelled with hours, with the moon and stars on the other side; the moving disc has a map of the earth with a pointer to the hours.

No.22 has a fixed disc with an illustration of the sun and its corona; the moving disc has black circles to fully or partially eclipse the sun; it also has a pivoting plate with a hole the size of the sun.

No.34 has a fixed disc with hours on the outside; this is black inside with a smaller off-centre clear disc with a diagonal; the moving disc has months and dates on the outside, and stars in the centre, and the combination shows the changing night sky.

There is a further novelty model, slightly larger, which shows rats climbing up to a bed and entering the opening mouth of a sleeping man!

All of these would be shown using a magic lantern to give a moving pattern.

4053 MAY316 ASTRONOMICAL MODELS

Unsigned

Fr 178x102x9; Sd 73x73. Mid to late 19 C. G.

Twenty-eight frames for glass slides, showing planets, eclipses, orbits, phases of the moon, clouds, etc.

1785 MAY268 ATWOOD MACHINE

Unsigned

Fo 730x730; H 1910; PrMxD 94. Mid 19 C. G.

Mahogany; brass fittings; cross foot; turned pillar; two scales 0-67"; frame on top for missing pulley system.

Foot adjusted by four wood screw pegs; incomplete.

1651 MAY138 AURISCOPE (OTOSCOPE)

Unsigned

L 115; TuD 22; AMxD 56. 1862-late 19 C. R.

Silver metal; tube with eyepiece and conical ear probe; side cone arm at 90°; angled piece with hole at join.

A similar instrument in Tesseract 39,1992-3,60 is described as "Brunton's Otoscope", incorporating a light gathering funnel, magnifying lens, perforated 45° mirror, and three interchangeable tubular ear specula, to provide illuminated views of the auditory canal; however, Bennion (1979,99) describes it as an Auriscope, invented by John Brunton (1836-1899) in 1862.

1695 MAY182 BALANCE - FOLDING COIN

AVERY

Hs 150x26x22. Mid 19 C. G.

Mahogany housing; brass; slide on scale 0 3 6 9 "PENCE"; turn at other end.

Firm founded in 1817 and now largest scale manufacturing group in Britain; Crawforth 1979,137.

1694 MAY181 BALANCE - FOLDING COIN

WILKINSON, Ormskirk. (Late of KIRKBY,) Near LIVERPOOL.

Hs 137x24x15. 1786-1801. A.

Mahogany housing; brass; slide on scale 0 3 6 9 12; turn at other end; pan gone.

Pins for pivot missing; instructions under balance and on housing lid.

Anthony Wilkinson assessed for Land Tax in Kirkby 1781 -1785 and in Ormskirk 1786-1801, Crawforth 1979,167.

1705 MAY192 BALANCE - MAGNETIC

Robt. W. Paul. London, N. T. MASON 5, DAME ST.,

DUBLIN.

B 207x178x18; H 420. 1900-1916. A.

"MAGNETIC BALANCE (MC.EWEN PATTERN) Pat-ented"; parts missing; mahogany base and frame; white metal fittings.

Frame at right-angles to base, with support behind; V-shaped groove rises vertically from base for missing part; on top is a bracket holding a bolt and knurled screw to device with two side arms having divisions for 10-200mg weights, and a plate clamped by two screws for suspending missing part; between these, in line with top and bottom, is a brass-bound mirror; horizontal to the mirror is another V-shaped groove, scale 4-13 cms.

Mason dates from Morrison-Low 1989,131.

1057 MAY033 BALANCE - PRECISION

J. SPENCER & SON, Opticians to the Queen, 19 GRAFTON-STREET, DUBLIN. LADD & OERTLING LONDON

B 405x203x67; H 327. 1866-1883. A.

Mahogany drawer base with pans; brass pillar and beam.

Open triangular beam raised by lever at base of pillar; small ivory balance scale; drawer contains a trade label for Ladd & Oertling at 27, Moorgate Street, EC London; supplied by Spencer & Son.

Spencer & Son dates from Morrison-Low 1989,136

1592 MAY081 BAROMETER - ANEROID, PORTABLE

CURRY & PAXTON OPTICIANS 195 GT PORTLAND ST LONDON

D 50; C 160x100x25. c1894. R.

With compass and thermometer; watch case gilt housing for compass and barometer; ivory scale for thermometer.

In green lined case; barometer has silvered face and watch hand pointer to black pressure scale 23-31" and altimeter scale 0-8000' signed "Compensated Curry and Paxton, LONDON", correction screw at back; compass has mother-of-pearl face, half painted black, with clamping knob in place of watch winder; both have glass covers; mercury and glass thermometer, scales 20 -120°F 0-50°C on rectangular scale with arched top.

Firm listed in 1894, Pearsall 1974,262 "late Pickard & Curry".

1795 MAY278 BAROMETER - BANJO

Unsigned

L 953; MxW 255; DID 203 (8"). Mid to late 19 C. G.

Mahogany veneer; pointed top and bottom; hygrometer; thermometer gone; convex mirror; dial 28-31"; level.

White metal dial with blue metal pointer and brass marker moved at ivory surrounded key hole below; red liquid in spirit level "WARRANTED CORRECT"; all dials brass and glass mounted; space for thermometer between mirror and hygrometer has rounded top; mercury column intact, but mercury displaced.

1786 MAY269 BAROMETER - FORTIN

YEATES & SON, DUBLIN. No. 474

L 1017; MxD 54. Late 19 C. G.

Black metal, brass fittings; white metal scale 27-32"; front thermometer 20-120° "FAHRENHEIT"; damaged.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Glass around mercury reservoir gone and mercury lost; one of three securing screws to hold discs around reservoir missing; glass around scale broken and incomplete.

1051 MAY027 BAROMETER - STICK

R. WALLACE LIMERICK

H 912; MxW 80. 1856-1881. FL.

Oak; rounded top; ivory plate 27-31" with thermometer 30-110°; circular cistern cover.

Maynooth 1955, No. 863.1 records: "The actual maker of this barometer was a craftsman named Moore, 'a great clockmaker' who left Wallace's in 1846/7, according to the tradition of the house."

Dates from Burnett & Morrison-Low 1989, 156.

1773 MAY256 BATTERY

Unsigned

Various sizes. Mid 19 C. G.

Large and varied collection of batteries, many used and/or made by Nicolas Callan; some detailed below.

1794 MAY277 BATTERY - BICHROMATE

Yeates & Son, Dublin

BD 119; MxD 149; H 313. Mid to late 19 C. G.

Bulbous glass flask; brass sleeve on top; on this is an ebonite disc holding zinc and carbon plates.

Second carbon plate missing; two brass contacts on top of disc, also brass rod to raise or lower central zinc plate.

A card with the instrument notes it is a "POGGENDORF BICHROMATE CELL 1836" - the date presumably referring to its invention.

Variations of the "bi-chromate bottle batteries" were offered in Yeates 1877, 17-18.

1774 MAY257 BATTERY - BUNSEN

Unsigned

H 630; D 265. Mid 19 C. G.

Seven; glass cylinder, then open zinc cylinder, then porous vessel, with carbon cylinder in centre.

Yeates 1877, 17 notes: "This very intense Battery is charged with concentrated nitric acid in the porous cell with the carbon plate, and one part of sulphuric acid to 10 parts of water for the outer cell with the zinc plate."; one glass cylinder is missing. There is also a smaller version (H180, D150), consisting of an outer earthenware pot, a hollow cylinder of zinc, a porous pot and a central rod of carbon.

1772 MAY255 BATTERY - DANIELL

Unsigned - attributed to Nicholas Callan (1799-1864)

MxD 169; H 298. c1836. D.

Forty-one outer cells; outside, porcelain flower pot, then open copper cylinder, porous pot, zinc cylinder.

First form of "constant battery" invented by Daniell in 1836; the constant or two fluid element was developed to replace the single fluid element as in Wollaston's battery; solutions - saturated copper sulphate and dilute sulphuric acid.

1587 MAY076 BATTERY - DRY PILE, ZAMBONI

YEATES & SON, DUBLIN. PHYS. LAB. R. COLL. OF SC.

BD 62; H 255; CyHsD 33. Mid to late 19 C. G.

Brass base and sleeves for glass cylinder around discs; spherical brass conductor on rod on top (D 19½); "+" engraved on upper sleeve and "-" on lower.

Yeates 1877, 20 notes "Zamboni's Battery or Dry Pile, composed of alternate discs of tin foil and paper coated with black oxide of manganese [sic]" and is available as 1000 discs mounted in a glass tube (as here) £1:15:0, or 2000 mounted in two columns, with pendulum, on stand, with glass shade £3:13:6.

1793 MAY276 BATTERY - GROVE

WEDGWOOD (on white outer housing)

Hs 143x130x50. Mid 19 C. G.

White ceramic housing; two zinc plates at sides of red porous pot vessel; platinum plate for this is gone.

Zinc plates connected by copper U with a brass contact; the solutions were dilute sulphuric acid in the outer vessel and strong nitric acid in the porous pot.

1775 MAY258 BATTERY - LECLANCHÉ

LECLANCHÉ BARBIER PATENT R A L & CO LONDON

Se 112x112; H 240. Post 1866. R.

Twenty seven; glass square section vessel; graphite cylinder fits into this; in centre, zinc rod.

Yeates 1877, 17 notes that the cell is excited with a saturated solution of sal-ammoniac and water.

Chaldecott 1989, 165 records the patenting of a new galvanic cell by George-Lionel Leclanché, France 1866.

4056 MAY319 BATTERY - MAYNOOTH

Unsigned - attributed to Nicholas Callan

OHs 141x106x33. c1855. R.

Identical to 1663 MAY150 without the porous pot; zinc plate separated from cast-iron cell by pieces of wood.

The cell was charged with sulphuric acid, common salt and water and, without any porous pot, has the advantage of being a "single fluid cell".

For details, see Callan 1855, 260-272.

1663 MAY150 BATTERY - MAYNOOTH

Unsigned but by or after Nicholas Callan (1799-1864)

Hs 143x106x35; H(+E) 220. c1848. R.

Ten; cast iron housing positive element; zinc negative element, in porous pot; nitro-sulphuric acid solution.

Maynooth 1955, 11 notes: "It has a very low internal resistance, and gives intense currents. Using these cells, Callan constructed probably the largest primary battery ever made, consisting of 577 cells, totalling 95 sq. ft of zinc, 200 sq. ft of cast iron and containing 14 gallons of nitric and 16 gallons of sulphuric acid...The heat developed by this prodigious battery set fire to the solder connecting the copper strips to the zinc plates. The battery was twice the size of that constructed at Napoleon's orders for the Ecole Polytechnique, Paris. The coil was much used by Poggendorf, Roberts (who used it for blasting purposes), Sturgeon, Lord Kelvin, and others." The cell is a modification of Grove's cell (see 1793 MAY276).

See Callan 1855, 260-272.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1664 MAY151 BATTERY - MAYNOOTH

MAYNOOTH BATTERY E.M. CLARKE MAKER 428 STRAND LONDON

HsB 116x68, H 123; H(+E1) 270. 1840-1851. A.

Two; treated cast iron housing positive electrode; porous pot; zinc plate negative electrode with copper strip.

Mahogany shaped piece fits groove at top right side.

Maynooth 1955, 12 notes: "Callan found that sheet iron coated with an alloy of lead and tin resisted the action of acids and weather more effectively than iron treated in any other fashion. In the Maynooth Battery, the cast iron element is replaced by iron treated in this way." - see Callan 1854, 83.

Dates from Clifton 1995, 57.

1725 MAY208 BATTERY - VOLTAIC PILE

Unsigned

BD 133, H 54; H 522; DisD 78. Mid 19 C. G.

Red oak base; three glass pillars to wood top; about 100 copper and zinc discs with velvet pads between.

Capillary glass pillars and blockboard top are modern replacements.

1770 MAY253 BATTERY - WOLLASTON

Unsigned

Hs 360x143x140. Mid 19 C. G.

Ceramic housing with ten compartments; zinc and copper plates (nine sets left) on mahogany cross bar.

Callan's first large battery had 280 Wollaston cells, which he used in 1836 with his giant electromagnet (see induction coil 1660 MAY147) to lift up to two tons; the solution was water with sulphuric and nitric acids.

There are three other ceramic housings, two of them cracked.

1771 MAY254 BATTERY - ZINC/CARBON

YEATES & SON Opticians TO THE UNIVERSITY DUBLIN

B 274x142x15; H 375. Mid to late 19 C. G.

Mahogany housing and bridge; iron bar with handle to raise or lower four zinc/carbon cells in ebonite vessels.

Each cell has two graphite plates with a zinc plate in between (one is broken); one of the two mahogany strip feet is missing from the housing.

1735 MAY218 BELL

Unsigned - but on Yeates & Son air pump plate

D 228; H 325. Mid to late 19 C. G.

Glass globe on brass sleeve with stop-cock below contains a small brass bell - cannot be heard in vacuo.

Screws on to turned brass pillar with stop-cock in centre of Yeates & Son air pump plate 1734 MAY217.

1684 MAY171 BELL - ELECTRIC

YEATES & SON DUBLIN

B 219x161x20; CuD 83. Third ¼ 19 C. G.

Mahogany shaped base and double coil housing; silver metal bell cup; two brass contacts; blue velvet back.

Base weathered; two hanging rings at back.

1804 MAY287 BELL - ELECTRIC

Unsigned

B 147x110; H 58. Mid 19 C. G.

Mahogany base; horizontal iron U with two green coils on wood bobbins; interruptor at poles; actual bell gone.

Brass sphere clanger (D11) on wire from metal cross piece on poles of electromagnet which makes and breaks contact with a brass spring.

A card with the instrument notes that this arrangement is the "McGaulay trembler interruptor", referring to James William McGaulay (c1806-1867), who was an "independent inventor" of the "automatic hammer contact breaker" - see Mollan 1994, 135.

1581 MAY070 BELL - ELECTRIC, "THE GAMUT"

Unsigned - attributed to Yeates & Son, Dublin.

BD 132; H 388; TD 240. Mid to late 19 C. G.

Eight brass bells on mahogany table; glass central pillar; on top, brass whirl for suspended clapper.

Mahogany base and turned pillar to table; brass sleeves on each end of glass pillar; clapper on brass rod with accompanying pith ball on string.

This was located in a cupboard labelled "PRECISION INSTRUMENTS BY YEATES DUBLIN".

A similar, though not identical, instrument is illustrated in Yeates 1877, 10.

Elliott 1856a, 9 notes that the clapper is suspended from a "movable fly or whirl", electricity causing it to revolve, striking the bells.

4134 MAY338 BRIDGE - KOHLRAUSCH

KOHLRAUSCH BRIDGE W.G. PYE & Co. CAMBRIDGE ENGLAND

Hs 340x172x75. Early 20 C. CT.

Mahogany housing; ebonite top; wire with tapper on bar; switch to multiply scale reading; six terminals.

There are three sets of two brass screw terminals, labelled "Batt or Sec. Coil", "X", and "Tele or Galv"; the scale reading can be multiplied from 0.1 to 10000; the wire runs along a bone log scale 0-9.

Pye 1914, 52 illustrates a similar bridge, with the description: "Kohlrausch Universal Bridge arranged for the measurement of electrolytic or solid resistance through a range of from 0.01 to 50,000 ohms. The design of this instrument is especially adapted for rapid measurement of resistance, having switches on the dial principle. The rubbing contacts of the switches are of ample cross-section and enclosed in the case of the instrument. The slide wire is carefully selected for uniformity of cross-section and contact is made to it by an improved form of 'jockey' which enables either continuous or tapping contact to be made".

4129 MAY333 BURNER - BUNSEN

Unsigned

Sp 139; H 230; TuD 11. Early 20 C. G.

Cast-iron tripod foot; brass pillar for height adjust; burner pipe clamped in this; fluted air adjust sleeve.

4128 MAY332 BURNER - GAS

WARRINGTON FLETCHER RUSSELL & CO LTD

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

BD 96; H 179; TuD 26. Early 20 C. G.

Brass; base with central mound and leaf design; hemi-spherical gauze inlet at bottom; gauze-covered top.

1808 MAY291 BURNER - SPIRIT

Unsigned

BD 68; MxD 90; H(-Li) 118. Mid 19 C. G.

Glass; spirit reservoir almost hemispherical; side arm with stopper; middle stem with ceramic wick holder.

Stem has ground glass surround for lid; present lid does not fit this.

1688 MAY175 CAMERA LUCIDA

L. Ingr Chevallier Opticien du Roi Visàvis le Marché aux Fleures à Paris Tour de l'Horloge du Palais No.1.

MnL 275; C 282x67x47. Early 19 C. R.

Brass; G clamp; extending arm; two pivots; prism; case.

Mahogany and boxwood case; label on case reads, in full: "LINGR. CHEVALLIER, Opticien du Roi et des Princes, Tour de l'Horloge du Palais No.1. vis-à-vis le Marché aux Fleurs A Paris."

Turner 1983,207 records that Jean Gabriel Augustine Chevallier had a shop from 1796 at the corner of Pont Neuf and Quai de l'Horloge.

The camera lucida was patented by Hyde Wollaston in 1806, Turner 1983,299.

1689 MAY176 CAMERA LUCIDA

Unsigned

MnL 214. Mid to late 19 C. G.

Brass; G clamp; pivot to expanding arm with two support rods on sliding ring; pivot and revolving arm for prism.

Latter in oxidised brass housing with hinged glass disc and aperture; flap with triangular aperture on other side of prism.

4049 MAY312 CATHETOMETER

Yeates & Son Dublin

Sp 293; H 1064; TeL 173, D 27. Mid to late 19 C. G.

Red-painted iron tribach foot; silver metal pillar on which slides the brass telescope, with a spirit level on top.

The base has three brass level screws; the pillar (D35) is held between a turned brass boss below and a cap above; an oxidised brass sleeve slides on the pillar, with clamping and adjusting screws for the horizontal brass telescope; the eyepiece optics are gone as is the knob for its rack and pinion focus.

1810 MAY293 CATHETOMETER

Yeates & Son Dublin.

Sp 426; H 1267; PrD 46. Mid to late 19 C. G.

Iron tribach foot; silver metal pillar, brass scale 0-100cm; moving brass telescope with top spirit level.

Broken rack and pinion focus of level objective; push focus of eyepiece; clamping knob for level and vernier with adjusting knobs for height reading.

Yeates 1883,12&14 illustrated.

0727 MAY002 CIRCUMFERENTOR

Johannes Lewis Dublini Fecit Anno Domini 1688

D 129; L 196. 1688. S.

Brass; raised edge divided 10-360°; and side lugs with semicircular ends; decorated compass; lid.

No scale on face; needle and pin missing; no needle clamp; no bracket below for stand; face decorated with rose and fleur-de-lis.

On loan to Maynooth from Col Lawlor of Curragh Camp.

This is the oldest known instrument with an Irish signature in Ireland.

0729 MAY004 CIRCUMFERENTOR

Seacome Mafon No 8 Arran Quay Dublin

D 159. 1780-1804. A.

Brass; scale on face 0-90-0-90-0°; raised edge scale 10-360°; no sighting arms; metal needle bearing; no needle clamp; lid; remains of glass lining inside lid.

Dates from Morrison-Low 1989,130.

0730 MAY005 CIRCUMFERENTOR

Spear & Clarke DUBLIN

D 159; L 482. 1815-1817. F.

Brass; cracked glass cover; silvered face, scale 10-80°(x4); raised edge scale 10-360°; line and window sights.

Agate needle bearing; clamp attached to face by curled ends; stand bracket below; double sights.

Presented to Maynooth by Mr Donal O'Carroll, Glasnevin, whose grandfather, Michael O'Carroll, walked to Dublin from North Tipperary and home (about 180 miles) in pre-railway days to buy the instrument.

Dates from Morrison-Low 1989,135.

0728 MAY003 CIRCUMFERENTOR

Spicer Dublin

D 134 L 406. 1767-1771. FL.

Brass dial and glass-lined lid; scale on face 0-90-0-90-0°;

raised edge scale 10-360°; line and window sights.

Unscrews into seven parts, using two knurled and four butterfly bolts; needle missing; clamp attached to face by curled ends; double sights; bracket below for stand, tightened with another butterfly bolt.

Dates from Morrison-Low 1989,136.

0731 MAY006 CIRCUMFERENTOR

Walker & Son, No. 17. Temple Barr DUBLIN

D 154; L 464. 1802-1819. F.

Brass; two spirit levels at right-angles on face; two lugs hold arms which support sights; glass cover.

Silvered face, scale 10-80°(x4); raised edge 10-360°; double line and window sights; needle clamp attached to face by curled ends; needle missing; bracket below for stand; attachments secured by butterfly bolts.

Dates from Morrison-Low 1989,138.

1615 MAY104 CLINOMETER

T. COOKE & SONS LTD LONDON & YORK. 1903 No.1548 J.H. Coles 1904 (On case - A. ROSS & CO LTD 1903)

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

D 85; W 27. 1903. S.

Oxidised brass housing; fan window; ivory scale.

Latter 0-45 red and black, driven by weight, released by catch at side; in circular leather case. "J.H. Coles 1904" is handwritten.

1614 MAY103 CLINOMETER

WATKIN'S CLINOMETER PATENT 217 J. HICKS MAKER 8 HATTON GARDEN LONDON NO.2254 & NO. 3993 (520)
D 71; W 16. 1864-1884. A.

Two; oxidised brass frame; glass window; ivory scale.

Glass cracked on both; signature on brass strip on lid; scale 0-45 black and red, weighted, with release catch outside; one fits in leather case with Hicks prismatic compass 1612 MAY101.

Dates from Downing 1988,59.

1629 MAY116 COIL

YEATES & SON DUBLIN

Hs 200x153x19. Mid to late 19 C. G.

Mahogany rectangular frame for green-covered coil; two brass contacts.

Illustrated as accessory for Ampere's Table in leaflet by Ducretet.

1574 MAY063 COIL

Yeates & Son Dublin

BD 105; H 343 c1877. R.

Expanding brass stand; on top, two ebonite squares with green-covered coil between; central glass cell gone.

Yeates 1877,333 described this apparatus as "Glass cell [here missing], with parallel ends, and surrounded by a coil of insulated wire, for Grove's experiment....The cell is filled with a solution of magnetic Iron Ore, which is opaque to light, but the moment a voltaic current is sent through the coil the solution in the cell becomes clear".

1660 MAY147 COIL - INDUCTION

Unsigned but by Nicholas Callan (1799-1864)

L(-Ha) 1705; W 775; BrD 60. 1836. R.

Iron bar bent into horseshoe shape with long parallel ends; copper wire primary; secondary now gone.

Maynooth 1955,8 notes: "The iron core weighs 15 stone; the primary originally consisted of seven coils of copper wire, each coil containing 70ft of wire 1/6" in diameter. The secondary coil (now missing) contained 10,000ft of copper wire 1/40" in diameter....used as an electromagnet....(it) had a lifting power of several tons."

Maynooth 1955,8 records: "A small model of it was exhibited in London in 1837, where it achieved great notoriety."

This important instrument is the earliest preserved induction coil; the World's first induction coil, which was wound on a straight bar, was presented to Downside Abbey in May 1837 (McLaughlin 1965,72).

1796 MAY279 COIL - INDUCTION

Unsigned made by Nicholas Callan (1799-1864)

Various. Mid 19 C. G.

Selection of coils made by Callan for his research; in addition to those listed separately below.

1658 MAY145 COIL - INDUCTION

Unsigned but by Nicholas Callan (1799-1864)

B 864x415x34; H 590; CosD 465 (W 100) & 125.

c1857. G.

Iron wires core; primary coil, large secondary; modern wood base, frame, interruptor, and point electrodes.

1659 MAY146 COIL - INDUCTION

Unsigned but by Nicholas Callan (1799-1864)

TH 754; T 855x519; CosD 530(W108), 125. c1857. R.

Iron wires core; primary in ebonite tube; secondary; on mahogany table and frame; commutator; interruptor.

Callan 1857,327-8 describes his newly-made coil with a secondary of iron wire of 21,000 feet (later increased to 50,000 feet), which he demonstrated to the Dublin Meeting of the British Association for the Advancement of Science in 1857.

McLaughlin 1965,73 records that Callan built "huge coils as well as medium-sized ones, and with great liberality he presented them to men of science and institutions in different parts of the world".

1070 MAY046 COIL - INDUCTION

Unsigned but by Nicholas Callan (1799-1864)

1xL 1020, D 180; 3xL 100, D 530. c1859-63. R.

Callan's giant induction coil; primary with iron rods in centre has three separate secondaries around it.

The secondary coils are said to contain about 45.7 Km of fine iron wire, all hand-insulated with beeswax/gutta-percha mixture. In an address to the British Association meeting in Dublin in 1857, Callan stated (Casey 1985,494): "It is now more than twenty years since I discovered the method of making the induction coil, or a coil by which an electric current of enormous intensity may be produced with the aid of a single galvanic cell; a coil which is now to be used for the working of the Atlantic Telegraph. Mr. Faraday was the first to develop the laws of electrical induction, but he did not discover the method of making a coil by which a current of very great intensity may be obtained by means of a very small battery. This was first discovered in Maynooth College in 1836. In the summer of 1837, I sent to the late Mr. Sturgeon a small coil which he exhibited at a meeting of the Electrical Society in London and from which he gave shocks to several of the members. This was the first induction coil of great power seen outside the College of Maynooth. The first notice of the discovery of the coil is to be found in a paper of mine published in the London Philosophical Magazine for December 1836." - Callan 1836,272-278.

McLaughlin 1965,35 notes that: "Students took part in his [Callan's] electrical researches, serving as human electrometers or voltmeters when it came to trying out the power of his great batteries and induction coils. Now and again there were accidents.

Tradition has it that some of Callan's outstanding students, (among them Charles Russel and William Walsh, the one to be president of Maynooth and the other to become a famous archbishop of Dublin), had to spend time 'on the infirmary' after doses of Callan's high-tension electricity."

Callan 1863,413 reports that he made an induction coil "of considerable power" in 1859-60, with the secondary in three parts. In early 1863 he improved it with a new primary coil and core, and with better insulation between primary and secondary. With these modifications he produced sparks 15 inches in length.

1589 MAY078 COIL - INDUCTION

Horatio Yeates Dublin (engraved on glass)

BD 231; H 558; CoHsD 308. 1859-1864. F.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Two; turned mahogany base and pillar; oxidised brass bracket for glass disc with flat concentric red coil. Bracket on top of pillar makes right-angle with it and also with mahogany circle frame for glass disc, meeting latter at its lowest point; ends of coil exposed at centre and edge.
Dates from Morrison-Low 1989,139.

1803 MAY286 COIL - INDUCTION

Made by Yeates & Son Dublin.
B 228x111; H 123. Mid to late 19 C. G.
Mahogany base; two ebonite supports for coil; brass and iron circuit breaker; no commutator; two base contacts.
Modern frame added below base.

1590 MAY079 COIL - INDUCTION

YEATES & SON, DUBLIN.
D 115 & 116. Mid to late 19 C. G.
Two; each has two flat coils, green and red, wound concentrically, joined in centre; brass contacts on ends.

1061 MAY037 COIL - INDUCTION, MEDICAL

Unsigned, attributed to James Robinson, Dublin
B 183x150x41; H 198. c1845. SI.
Mahogany base and four feet; four brass contacts and seven-point switch; red-covered upright coil with top interruptor. Latter in form of knurled screw on brass galleys with spring from short pillar on other side which contacts either the screw or a disc on top of the coil; identical to signed and dated coil 0309 CWC033, also to unsigned 0151 UGP014.

1686 MAY173 COIL - INDUCTION, MEDICAL

Unsigned
B 189x131x29; H 134; C 215x155x152. Early 20 C. G.
Boxwood base/frame; red velvet-covered coil; brass tube central insert, turned wood handle; interruptor; case.
Four silver metal contacts on frame; interruptor in form of spring on two small coils at side; case has brass handle and two closing hooks.

1811 MAY294 COIL - INDUCTION, RUHMKORFF

Yeates & Son Dublin
B 573x302x97; H 405; CoD 170. Mid to late 19 C. G.
Mahogany base, ebonite top and housing for coil; brass and ebonite commutator; point electrodes on bar on top. Latter horizontal, with ebonite handles; brass and iron interruptor mechanism.

1593 MAY082 COIL - INDUCTION, RUHMKORFF

Yeates & Son Dublin
B 444x205x58; H 280; CoHsD 127. Fourth ¼ 19 C. G.
Mahogany base; ebonite supports for coil in ebonite housing; ebonite, copper and brass commutator.
Brass and iron interruptor; two brass contacts on ebonite bosses on ebonite bar at top of coil.
A card with the instrument notes: "An induction coil made by S.M. Yeates and used by Marconi in his pioneer experiment at Dun Laoghaire 1898"; this is when Marconi transmitted messages from a boat out in the harbour back to land; as a result the Dublin Daily Express became the first newspaper in the world to publish news received by wireless.

1685 MAY172 COIL WINDING APPARATUS

A.W. KNIGHT LTD LONDON S.E.15 KAYNITE RADIO CO WINDING MACHINE 7/70 PATENT NO 189376
B 155x101x15; TH 65; H 116. Patent 1922.
Base table; axle and cog wheel mechanism; wood spool.
Adjusted with brass off-centre disc; circular white scale 10-100 to give windings; spring on mechanism to direct windings onto spool (D41); metal legs on base table.

1598 MAY087 COMMUTATOR

Unsigned
B 288x104x24; H 120; CyD 90. Late 19 C. G.
Heavy duty; mahogany base; brass supports for wood and brass cylinder - divided surface; four sprung contacts.
Brass contacts with copper strips to connect together different parts of the cylinder surface; ebonite handle to turn cylinder.

1680 MAY167 COMMUTATOR - BERTIN

GRIFFIN LONDON
B 114x100x16; H 36. Turn 19/20 C. G.
Mahogany base; brass horse shoe and central tongue on ebonite disc moved by brass arm to reverse current.
Four brass screw contacts on base, one connected to horse shoe, one to tongue, and two to spring strip contacts.
Name from Ganot 1890,855.

1681 MAY168 COMMUTATOR - RUHMKORFF

Unsigned
B 139x70x18; H 56. Mid to late 19 C. G.
Mahogany base; brass and copper fittings; ivory drum and knob; two metal contact bars; one spring missing.
Two of four feet now missing; four contact screws on base; copper connector from one of these to one end of axle support is detached..

1616 MAY105 COMPASS

BLUNT. LONDON
D 48; W 28; CD 65 W 54. 1822-1824. W.
Silver metal cylinder housing; black and white card rose 0-90-0-90-0°; glass cover gone; turned boxwood case.
The compass card sits on a pin on top of a copper conical pyramid on the bottom of the case; two spikes on the bottom of the housing rise to clamp card when set on a flat surface; the case has a central brass spike on which sits the outside of the silvered conical base of the housing; case has a screw-on lid; card has part of a copy book underneath, with portions of the word "Praise" repeated three times.
Assumed to be Thomas Blunt II; dates from Clifton 1995,33.

1620 MAY068 COMPASS

G & R BRINSLEY. 1918. (E.G.H. Burke. hand-written on case)
HsD 52, W 18. 1918. S.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass encased; hinged lid with disc window; black and white silvered disc indicator 20-360°; leather case.

Clamp on side to release indicator disc.

Also smaller brass encased compass, with moving magnet needle indicator 0-90-0-90-0, in red case, D34 W7, CD44, W15.

1621 MAY109 COMPASS

THE REFLECTOR COMPASS PATENT APPLIED FOR G.F.R.

MxD 50; W 25; Mi 14½x13. Mid to late 19 C. G.

Brass and oxidised brass; moving disc with mirror image scale 20-340°; hinged lid with window; hinged mirror.

Latter located on divided ring (3-34) around glass cover to compass, under the circular window of the lid; scale around side of housing 2-34.

1619 MAY108 COMPASS

J. WARDALE & CO LONDON NO 7772 1918

Hs 78x78x27; SsD 46&62. 1918. S.

Hinged wood housing; fixed black and white scale 10-350° around brass and glass encased compass disc 20-360°.

Brass clamp allows compass to turn so that a line on top can be secured anywhere around fixed scale.

1037 MAY011 COMPASS - MARINE

MASON, Essex Bridge, DUBLIN. Estd. 1780.

250x245x152. 1809-1883. A.

Red wood case, sliding lid; brass circle for compass gimbals; card rose in brass cylinder with glass top.

Dates from Morrison-Low 1989,130.

1639 MAY126 COMPASS - MARINE

Unsigned

C 198x196x120; HsD 136. Late 19 early 20 C. G.

Boxwood case (slide lid gone); brass; gimbal mount; round-bottom housing, glass top; black and white card.

Scale 0-90-0-90-0°.

1617 MAY106 COMPASS - MARINE

Unsigned

MxD 57; W 35. Mid to late 19 C. G.

Miniature; brass case with lid; gimbal mount; black and white card 0-90-0-90-0°.

1613 MAY102 COMPASS - PRISMATIC

ELLIOTT BROS. STRAND LONDON. Francis L.G. Little.

D 76; W 21. 1856-1886. A.

Brass housing; broken glass top; folding line and window sight, hinged mirror; green card 10-360°; two filters.

Mirror can slide up and down sight; oxidised brass prism mount with flap and green and red filters; top of cylinder housing found later with owner's name inscribed.

Dates from Crawforth 1988,8.

1612 MAY101 COMPASS - PRISMATIC

J. HICKS 8. HATTON GARDEN. LONDON

D 71; W 16. 1864-1884. A.

Three; oxidised brass housing; line and window folding sight; fold back prism with clamp; green card 10-360°.

Cut out fan shaped window on top of housing (one has glass missing and prism mounted upside down); two have pear-shaped leather cases, one of which has a second compartment for Hicks clinometer 1614 MAY103.

Dates from Downing 1988,59.

1622 MAY110 COMPASS - PRISMATIC

SAVAGE & SON SANDHURST 131

HsD 71; W 17. Early 20 C. G.

Oxidised brass housing; fan shaped window; green card 10-360°; line and window sight; hinged prism with clamp.

Pear-shaped leather case numbered WD 8449.

Also smaller unsigned prism compass (HsD55,W20), with hinged lid and mother-of-pearl disc indicator 0-340 and 10-360°, wire sight across circular window in lid a replacement.

Both presented by Mrs Margaret McCabe, 50 Old Finglas Road, Dublin, in 1983.

1053 MAY029 COMPASS - VARIATION

YEATES & SON DUBLIN.

Hs 290x177x59. Mid to late 19 C. G.

Mahogany frame; glass cover; copper face; silvered metal scales 30-0-30° at both north and south ends.

Knob at south side raises needle; two knobs at north side secure top; 538 30 engraved on side.

1644 MAY131 CONDENSER

APPS 433 STRAND LONDON

Hs 463x145x137. Late 19 C. G.

Mahogany housing; three brass contacts on ebonite plates at each end; glass plates with foil inserts inside.

Firm was at 433 Strand from 1866 until at least 1900, Downing 1988,4.

1792 MAY275 CONDENSER

Unsigned - attributed to Nicholas Callan (1799-1864)

Hs 646x440x236. Mid 19 C. G.

Boxwood case with glass top contains layers of foil separated by black resin (paraffin wax, resin and india rubber in oil).

Two brass contacts at side.

Another box with no glass top contains a second con-denser, this time with four brass contacts.

Described in Callan 1857,337-9.

4076 MAY325 CONDENSER - VARIABLE

Unsigned

B 178x176x19; H 155. c1930. G.

Mahogany base; four metal pillars to ebonite top; between base and top, glass cylinder over condenser plates; scale 0-180°.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

There are 14 semi-circular stationary plates, and 13 arc moving plates; an ebonite and brass knob on top has a pointer to the scale; there are two white-metal contacts on the top.

A card with the instrument records that it is a standard variable condenser, air spaced, maximum capacity 0.001 MFD; Presented by Mr J. F. Crowe, Essex.

1582 MAY071 CONDENSER - VARIABLE, AEPINUS

Made By Yeates & Son. Dublin

B 595x235x30; H 600; PsD 260. Mid to late 19 C. G.

Mahogany base and slides for glass pillars and brackets to brass plates; central disc gone.

Pillars end in brass spheres; from these, at right-angles, are rods to the centres of the plates; on top of the sphere on each pillar is a crook for a suspended pith ball (missing); on base between the glass pillars is a turned boxwood support with a black wood curved groove to hold the missing central disc.

Name from Yeates 1877,7; illustration (p6) similar though not identical.

1702 MAY189 CONDUCTOR - CYLINDRICAL

Unsigned

BD 294; H 653; CyL 1018, D 137. Mid 19 C. G.

Mahogany base; turned glass pillar, wider below, to horizontal large brass cylinder with rounded ends.

1701 MAY188 CONDUCTOR - SPHERICAL

Unsigned

BD 230; H 660; MxD 69; SrsD 63 & 14. Mid 19 C. G.

Mahogany base; turned hollow glass pillar; on top, brass sphere with bent wire to small brass sphere.

Glass pillar bulbous at bottom becoming thinner at top and fitting into base of larger sphere.

1703 MAY190 DETONATING BOTTLE

Unsigned

L 395; MxD 104. Mid 19 C. G.

Heavy green glass pear-shaped vessel; broken rim below for missing base; glass tube from top into vessel.

There is probably a fitting missing from the top, which is chipped. The instrument is similar to a Cavendish Eudiometer, but without a stop-cock below, and with no stopper nor electric contacts above.

It is also similar to an instrument illustrated in Griffin 1910,834: "Detonating Bottle of stout glass for exploding a mixture of hydrogen and oxygen".

1626 MAY114 DIAL

Unsigned

BD 61; H 107; SkH 4. Early to mid 19 C. R.

Ivory; hexagonal pillar on base with thermometer scale 20-120°"FAHT" and 0-30°"REAUR"; centre spike in front top.

Actual thermometer gone; "269" hand-written on base.

This instrument is very similar to a more-decorated one offered in Christie 24:9:92, which has a "floating compass card" with a gnomon, described as a "Porter's" [sic] magnetic sundial", signed "Saml. Porter fecit Feb.y 16th 1824 Enter'd at Stationers Hall"; the pillar is described as "moulded composition six sided column".

0726 MAY001 DIAL - HORIZONTAL PEDESTAL

Saunders Dublin Fecit AD 1796

610x610 1796. S.

Brass (? corroded); decorated with church, harp and crown, globe and sunrise, bishop, and round tower.

White painted gnomon at c53.8°; hours IIII-XII-VIII; place names around from California to Pekin[sic], through e.g. Madeira, London, and Rome.

The dial is located on stand on lawn in front of main entrance from Maynooth town.

4337 MAY350 DIP CIRCLE

"NIVOC" W. & J. GEORGE LTD

Sp 180; BD 165; H 247; Hs 155x164x71. Early 20 C. R.

Mahogany base on three level screws; horizontal divided ring; vertical divided circle in glazed housing.

The horizontal ring on the mahogany base is divided 0-90-0-90-0°; within this, a disc with a vernier rotates, turning a short brass pillar and the mahogany glazed housing containing the silver ring of the dip circle, which is divided 0-90-0-90-0°; a knob on front of the housing raises two V-supports for the rectangular (48x6) needle; when these are lowered, the needle rests on agate knife edges; the glazed front of the dip circle housing opens; on top of the housing are holes which held a (missing) circular bubble level.

The firm of W. & J. George succeeded Becker & Co., and were active in 1905 (Hackmann 1985,87).

1747 MAY230 DIP NEEDLE

GRIFFIN LONDON

BD 40; H 121; NL 284, W 9. Turn 19/20 C. G.

Brass base and pillar hold pin; on this brass cone; gimbal mount around this for rectangular needle.

There is another unsigned dip needle with two brass vertical supports on a mahogany base to hold the narrow diamond shaped needle; BD106,H150.

1670 MAY157 DISC SPINNER

YEATES & SON, Dublin

Sp 194; H 340; WhD 109. Mid to late 19 C. G.

Cast iron tripod stand holds five-spoke brass pulley wheel; at top, ebonite pulley wheel with brass clamp.

Wood handle to turn brass wheel; missing colour discs for Newton's disc experiment would be clamped on top.

1740 MAY223 DISCHARGER - JOINTED

Unsigned

L 410; SrsD 27 & 24. Mid 19 C. G.

Glass cylinder handle to brass sleeve and pivot for two bent brass rods ending in brass spheres.

Handle had been painted red, but much of the paint has chipped off.

1791 MAY274 DIVIDERS

4 PS ABS (?)

L 216. Mid 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

White metal; arc attached to one arm goes through hole in other with clamping screw; reputed to be Callan's.
With other tools "from Callan's workshop".

1065 MAY041 DIVIDING ENGINE

Yeates & Son DUBLIN 5000=1.INCH OR 196.853=1.M.M.

Hs 737x241x335; H 360. Mid to late 19 C. G.

Linear engine; mahogany base; engraver moves between parallel metal bars; drive wheel and handle at side.

Wheels at both sides divided 0-240; one metal bar divided 0-27; engraver on rocker device with springs and incorporating a brass cylinder; in glazed mahogany case (one pane cracked), with drawer; label in latter "ROYAL COLLEGE OF SCIENCE FOR IRELAND...in stock 1910".

1736 MAY219 EAR TRUMPET

Weiss & Son Strand London *

L 1220; MxD 54. 1831-1851. R.

Ivory funnel and sleeve to fibre and string-covered tube with ivory ear insert at far end; a missing piece would have screwed on to the turned end which fits into the ear.

John Weiss & Son, 62 Strand & King William Street, Strand 1843, Oxford Street 1894 Pearsall 1974,257&267.

Dates from Clifton 1995,293.

1789 MAY272 EIDOGRAPH

Unsigned

AsL 784,784&754; Se 14x14&12x8; C 888x145x105.

Late 19 C. G.

Incomplete; three brass arms, scales 90-0-90, one of greater cross section than other two ("A" & "B"); mahogany case.

Arms A and B have sleeve for pen at one end; fitted case has circular groove (D119) for base disc; arms A and B clip into inside lid.

1700 MAY187 ELECTRIC EGG

Made by YEATES & SON, 2, Grafton Street, DUBLIN.

BD 162; H 480; MxD 178. 1840-1846. G.

Mahogany base; brass sleeves; stop-cock below; glass egg, red coil in glass cylinder inside; top contacts.

Coil cylinder extends from above egg, through a brass sleeve into the coil; on top is an ivory disc with a wood cross piece above having two brass contacts at the sides.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

1699 MAY186 ELECTRIC EGG

Unsigned

BD 170; H 733; MxD 170. Mid 19 C. G.

Mahogany base; brass stop-cock, sleeves and conductors; elliptical glass egg; ring on top of upper conductor.

Electrical contacts on stop-cock below egg and on brass ring on top; these are connected to brass spheres inside the egg; the upper conductor is now stuck, but was able to be adjusted to vary the distance between the spheres.

1654 MAY141 ELECTRIC MOTOR

(Original by) Frederick McClintock

630x452. (1833). R.

Diagram of instrument of "Phi.Mu."; iron ring on fixed disc, connections of electromagnets around it.

Four V-shaped magnets on the rotating disc, whose poles pass the poles of the iron ring (from which an arc has been cut).

This is an illustration of what is reputed to be the first known electric motor, invented in 1833 by an Irish scholar who published under the name Phi Mu (different from P.M.) - identified as Frederick William McClintock, a graduate Trinity College, who published the design in the Mechanics Magazine in 1833, and who died tragically in a yachting accident in Strangford Lough in Co. Down in 1834 - McLaughlin 1964,20, 1965,120.

1652 MAY139 ELECTRIC MOTOR

(Original by) Frederick McClintock (NEWTON & CO 3 FLEET ST)

B 315x163x16; H 322; WhD 191. (1832). R.

Facsimile of second machine of "Phi Mu"; on Newton base and trunnions; double coil electromagnet/rotating wheel.

Mahogany base and iron triangle trunnions (both from other instrument with Newton signature) to axis of plywood wheel with black spots to represent metal, which pass over the pole of one of the coils; a π -shaped iron piece joins the pole of the other coil to the other side of the wheel.

This is a model of Phi Mu's second important contribution to electromagnets, described in the Mechanic's Magazine in 1834.

1653 MAY140 ELECTRIC MOTOR

(Original by) Patrick Murphy

B 380x255x19; H 322; WhD 224. (1832). R.

Facsimile of first armatured dynamo; six magnets on a rotating disc over three fixed two-coil electromagnets.

Chipboard base and supports; the electromagnets are connected in series; a metal handle turns the disc, with six π -shaped magnets embedded in it, whose poles pass those of the electromagnets.

In July 1832, Faraday received a letter from Dublin, describing the world's first rotating magneto-electric machine: the letter was signed P.M. - McLaughlin 1965,117 identifies P.M. as Dr Patrick Murphy, for seven years consulting physician to St Patrick's College, Maynooth.

1805 MAY288 ELECTRIC MOTOR

YEATES & SON DUBLIN

B 208x101; H 105. Late 19 C. G.

Two; models; wood bases and supports; armatures wound in different ways; brass springs to divided contact.

One armature is wound with a single (string) coil and the cylinder contact is split in two; the other has three (string) coils wound around a metal coil and the contact is split in seven.

1673 MAY160 ELECTRIC MOTOR

YEATES & SON Dublin

B 209x156x20; H 184. Mid to late 19 C. G.

Mahogany base; cast iron frame; elongated double coil electromagnet; coil armature; springs/drum rectifier.

Brass fittings and contacts.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1657 MAY144 ELECTRIC MOTOR

YEATES & SON DUBLIN

Sp 630&260; FrH 312; H 600. Mid to late 19 C. G.

Cast iron double frame and trunnions hold four double coil electromagnets and axis of seven-spoke wheel and cross pieces. The latter pass over the poles of the electromagnets; interruptor spring (now broken) on ebonite arch around axis at one side; cogwheels to another revolving axis on the other side.

This motor is illustrated in The Irish Press of 27:7:42, in Trinity College, when the Taoiseach, Mr de Valera "visited the Physics Laboratory, where the ingenious inventions of Dublin Scientists were on display."

1656 MAY143 ELECTRIC MOTOR

Unsigned

B 210x135x31; H 190; WhD 101. Second ½ 19 C. G.

Mahogany and brass; single coil electromagnet; trunnions to axis of wheel which moves interruptor and works pump.

Mahogany base has four feet; axis of six spoke wheel has connectors which enable a metal piece to pass over the pole of the electromagnet; on the other side of the wheel is a cog-wheel-driven piston attachment in a glass tube which feeds liquid from a connecting white-coloured reservoir in the base and returns it via a cap with a spout on top of the glass tube (cap now detached).

1655 MAY142 ELECTRIC MOTOR

Unsigned

B 221x136x23; H 189; WhD 103. Second ½ 19 C. G.

Mahogany base holds double coil electromagnet; metal frame to wheel axis, eight brass cross pieces over poles.

Base has four mahogany turned feet; double coil wound on boxwood spools; frame and six spokes of wheel painted green; eight cog brass wheel at side of axis with spring interruptor; four brass contacts on base.

1704 MAY191 ELECTRIC PISTOL

Unsigned

L 124; MxD 50. Mid 19 C. G.

Hollow brass vessel in the shape of a bulbous cannon; screw thread at one end for missing support.

Label with instrument calls it "Part of Voltaic cannon".

1584 MAY073 ELECTRIC PISTOL

Unsigned

H 170; L 460; WhsD 148. Mid 19 C. G.

Mahogany frame; two eight-spoked brass wheels; heavy glass canon with cork bung, brass conductors top and bottom.

Note with instrument describes it as "apparatus for prod-ucing water".

1669 MAY156 ELECTRICAL MACHINE - CLARKE

Unsigned, Attributed to Spear, 29 Capel Street, Dublin

B 290x177x20; H 380. 1835-1837. R.

Mahogany base and support for missing horse-shoe magnet; axle with pulley spindle and double red-covered coil.

The coils rotate across the poles of the magnet; the base of a missing commutator remains below the axle of the coils.

McLaughlin 1955,806-7 records that this "Clarke's magneto electric machine" was introduced by Edward S. Clarke, Member of the Royal Irish Academy, around 1835, and was made by the firm of Spear, of 29 Capel Street, Dublin before 1837.

Gee 1993,101-133 records that the machine was dev-eloped by Edward Marmaduke Clarke, a Dublin-based instrument maker, who went to work with Watkins & Hill in London in 1833, and set up on his own soon after; he announced his invention in the Morning Post of 14 October 1835.

1674 MAY161 ELECTRICAL MACHINE - CLARKE

Unsigned

B 280x177x29; H 130. Mid to late 19 C. G.

Mahogany base; green horse-shoe double magnet; brass cog system, with ivory handle end turns two coils.

Base on four turned feet; coils on wood spools

Machines like this, with hand-held electrodes, became common for medical use, to treat symptoms like tooth-ache, neuralgia, and tic-doloruex; Yeates 1877,34 supplied a small-sized "Clarke's Magneto-Electric Machine" and this could be by Yeates.

1069 MAY045 ELECTRO DYNAMOMETER

SIEMENS BROS & CO LONDON No 3776

B 205x181x57; CyH 284, D 150. Late 19 early 20 C. G.

Mahogany base and support for fixed coil; on top, brass knob and white scale to adjust tension on moving coil.

Both coils black-covered; moving coil of four turns around many-turned stationary; three contacts on base; top scale 0-390; paper cylinder cover with brass handle.

1660 MAY147 ELECTROMAGNET

See 1660 MAY147 - COIL - INDUCTION

4142 MAY340 ELECTROMAGNET

Unsigned - attributed to Nicholas Callan (1799-1864)

H 225; BrD 36; WiD 2. Mid 19 C. G.

Rough cast-iron bar in U-shape has red-covered copper wires around each pole; keeper in shape of T with cylindrical handle.

1797 MAY280 ELECTROMAGNET

Unsigned - attributed to Nicholas Callan (1799-1864)

L 225; D 37. Mid 19 C. G.

U-shaped iron bar; red-covered copper wire wound around ends; iron keeper with hook on top.

Latter not included in length measurement; hole drilled at bottom of U.

1722 MAY205 ELECTROMAGNET

YEATES & SON DUBLIN

B 215x141x22; H 190; CoHsD57. Mid to late 19 C. G.

Mahogany base and support for metal U (D25); housing of brass for thick copper wire coils around limbs of U.

1072 MAY048 ELECTROMAGNETIC BALANCE

YEATES & SON DUBLIN

BD 125; PvH 382; BmL 430. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Red-painted iron base; brass pillar; electromagnetic coil; central magnet to beam on pivot; weight on other arm.
Coil has two contacts; presumably the position of the brass cylinder hanging weight on the balance arm is a measure of the strength of the current applied to the coil.

2558 MAY305 ELECTROMAGNETIC ROTATION APPARATUS

YEATES & SON DUBLIN

Sp 193; H 333; ORiD 225. Mid to late 19 C. G.

Green- painted tripod base; wood mercury reservoir with two brass contacts; on top, fixed and rotating copper wire rings.

1630 MAY117 ELECTROMAGNETIC ROTATION APPARATUS

YEATES & SON, DUBLIN

BD 75; H 162; PrD 28; MxD 77. Mid to late 19 C. G.

Boxwood base and mercury reservoir; iron pillar; hanging copper ring reservoir and zinc disc; also rotating cage.

Yeates 1877,29 lists "Amperes buckets, extra large size [this one is not particularly large], set of five pieces - viz., iron core, with mercury cup, two buckets, cage, and spiral (a very effective set)..

£1:10:0" - and the description seems to match this, with the spiral missing.

4077 MAY326 ELECTROMETER - GOLD LEAF

Unsigned

Hs 122x102x92; DiD 34. Second ¼ 20 C. F.

Mahogany box with two glazed sides; a wax plug on top holds a metal rod with a disc a plate at its ends.

Attached to the plate is a thin metal film; the plate can be raised or lowered by changing the position of the rod in its sleeve in the wax plug.

Griffin & Tatlock merged in 1929, Clarke 1989,290.

1818 MAY301 ELECTROMETER - HENLEY

YEATES DUBLIN

BD 85; H 188; SD 62. 1826-1858. G.

Turned mahogany base; brass sleeve; wood pillar, sphere on top, semicircular scale 0-90°; suspended pith ball.

The pillar is now warped.

Attributed to George Yeates - dates Morrison-Low 1989, 139.

1716 MAY203 ELECTROMETER - QUADRANT

GRIFFIN, SARDINIA STREET., LONDON.

Sp 330; BD 305; H 505. 1899-1905. A.

"Squirrel cage"; mahogany base; three level screws; brass quadrants on glass pillars; fibre crook; wire cage.

One quadrant can be moved in or out; missing fibre from brass crook suspension for fluted aluminium vane in hollow quadrants; glass beaker with foil lining outside and inside (leyden jar) at centre of base; brass conductors below base connect with two of the quadrants; brass and ebonite handle below base allows rotation of right-angled brass wire under the quadrants; glass dome missing.

Dates from Anderson 1990,34.

1717 MAY204 ELECTROMETER - QUADRANT

Unsigned

Sp 345; Hs 182x182x398; H 588. Mid to late 19 C. G

Brass tripod foot; mahogany and glass housing; brass quadrants on glass pillars; mirror on broken fibre.

Three level screws on feet; knob at one corner to adjust one quadrant; wood, brass and glass sleeve at side for wire below quadrants; glass back of housing covered in foil, except for T-shape; brass adjustment for fibre on top; also brass and copper spring contact on top whose purpose is unclear; circular hole below quadrants for missing vessel.

1733 MAY216 ELECTROMETER - TORSION, COULOMB

ELLIOTT BROS LONDON

Sp 384; H 662; CyD 240; DiD 304. Second ½ 19 C. G.

Mahogany base; three brass level screws; glass cylinder; glass disc and tube to brass torsion fibre suspension.

Base made up of three laminated discs; mirror on bottom of cracked glass cylinder, which had two brass-bound circular windows; disc has scale 10-360°, and it and the tube lift off the cylinder; fibre suspension has brass disc vernier 10-360°; fibre holds white metal wire cradle for white metal dumb-bell holding a card labelled "N" and "B"; revolving plane mirror on sleeve from base.

1742 MAY225 ELECTROSTATIC GENERATOR

Unsigned

L 354; CyD 30; DiD 117. Early 20 C. G.

Ebony cylinder; central cut-out for glass disc turned by handle; white metal sphere conductor at one end.

Glass disc broken; conductor connected to U-shaped metal strip for missing friction pads.

1633 MAY120 ELECTROSTATIC GENERATOR - CARRÉ

Unsigned - attributed to Yeates & Son

B 500x432x35; H 796; DiSD 452&318. c1877. CT.

Open mahogany base; two wood and glass pillars; two ebonite discs, large placed above small; brass cylinder gone.

Leather friction pads for lower disc in mahogany frame on base; brass comb and conductor to large disc; wooden pulley wheel and handle on axis of lower disc connected by thong (missing) to the axis of the larger disc.

This appears to be an identical instrument to 0701 UDP029, and to the illustration in Yeates 1877,2, though the very large brass cylinder conductor on top is missing.

1074 MAY050 ELECTROSTATIC GENERATOR - DE WINTER

Signature plate missing

B 1222x1000x126; H 1311; PD 915. 1794-1834. PC.

Mahogany shaped base and supports for glass plate axis; brass sphere conductor on glass pillar.

Wood rings on conductor at sides of plate; hole on top of conductor for large wood ring containing a "stout wire" (ring now detached and does not appear to fit, although illustrations of this type of machine have such a ring on top of the conductor); wood handle to turn plate; triangular support for plate at side opposite the conductor.

A card notes that such machines were made by Samuel Healy, Dublin from 1794-1834 - Healy specialised in manufacturing "electrifying machines for medical pur-poses".

Winter's [sic] improved Plate Machine illustrated in Yeates 1877,2.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1632 MAY119 ELECTROSTATIC GENERATOR - NAIRNE

Unsigned

B 790x417; H 720; CyD 310. Mid 19 C. G.

Brown painted base and supports for two glass pillars to axis of glass cylinder; glass turning bar.

Latter has wood handle detached; cylinder has brown coating inside and red ends; contacts to cylinder broken and incomplete.

1073 MAY049 ELECTROSTATIC GENERATOR - WIMSHURST

K. SCHALL LONDON, W.

B 932x560x64; PsD 548; H 783. Late 19 C. G.

Mahogany base; two pairs ebonite plates (188mm apart) with foil strips; insulated conductors; two leyden jars.

Latter on turned black wood bases; brass pulley wheels on black metal mounts turned by brass and ebonite handle; only one leather thong remaining.

Karl Schall at 55 Wigmore St, London W, 1894, Pearsall 1974,258; machine invented 1883, Van Camp 1988,63.

1583 MAY072 ELECTROSTATIC GENERATOR - WIMSHURST

YEATES & SON Dublin

B 445x262x36; H 520; DisD 370. Third ¼ 19 C. G.

Open mahogany base and brackets to axle for glass discs; brass sleeves for glass pillars to combs and conductors.

Brass and wood handle for mahogany pulley wheels; one thong present, one gone; two small leyden jars, with shepherd's crook conductors on top, wired to glass pillars.

Not in Yeates 1877, so presumed post 1877; confirmed in that machine invented in 1883, Van Camp 1988,63.

1783 MAY266 ELIHU THOMSON APPARATUS

Unsigned

B 223x227x241; H 273. Late 19 early 20 C. G.

Apparatus to show electromagnetic repulsion between an alternating electro-magnet and a conducting ring.

Wood base; vertical coil wound around core of metal wires, wider on the bottom than on top; mahogany ring on three ebonite pillars at about half height; copper ring with water reservoir inside (with curved spout) fits on mahogany ring; water in copper ring will turn to steam blowing cork out of spout when repulsion experienced; brass ring around coil, held by three strings, will levitate; see 0937 UDP202.

See Griffin 1910,794; Van Camp 1988,82&84 illustrates and describes an earlier version of the apparatus.

1671 MAY158 ERECTOR

YEATES & SON Dublin

Sp 168; Hs 129x127x114; PvH 363. Third ¼ 19 C. G.

S.M. Yeates' improved form; iron and brass stand; angled mirror housed in mahogany; lens, aperture, mirror.

Latter on pivot on top of brass aperture housing which, in turn, is on a bracket from the brass pillar above the mirror housing; the plano convex lens on top of the mahogany housing is in an oxidised brass frame.

The apparatus is called an "episcope" on a card with the instrument.

Debbie Griggs, Rittenhouse 7, 1992, 10-11, shows a similar optical arrangement, a "vertical lantern", exhibited by Henry Morton in New York in 1871, used as a means to project objects (like a galvanometer needle) onto the screen.

Illustrated in Yeates 1880,7.

1698 MAY185 EUDIOMETER - CAVENDISH

Unsigned

BD 125; H 371; MxD 78. Mid to late 19 C. G.

Mahogany base; brass fittings; heavy glass vessel with stop-cock at base; clamped stopper with two wires.

Another (brass) stop-cock above base, below sleeve for pear shaped vessel; stopper secured by brass ring around neck with two side pillars to cross bar above; wires sealed into stopper.

This apparatus, named after Henry Cavendish (1731-1810), was used to measure the purity, that is the oxygen content, of air, by converting it to water with hydrogen and an electric spark.

1815 MAY298 EXPANSION APPARATUS - BAR BREAKER

JOSEPH M. MAIBEN & CO. 11 WESTLAND ROW DUBLIN

B 626x94x58; L 650; H 158. 1912-1922. A.

Cast iron base and supports; gas pipe heater under rod; tightening knob at one end, hole for cross bar at other.

Signature on ivory disc set into base.

Dates from Morrison-Low 1989,130.

4054 MAY317 EXPANSION APPARATUS - BAR BREAKER

YEATES & SON DUBLIN

B 447x81x30; L 475; H 104. Mid to late 19 C. G.

Cast iron base and supports; gas pipe heater; rod and bar missing; tightening bolt on axis of rod.

1077 MAY053 EXPANSION APPARATUS - BAR BREAKER

YEATES & SON DUBLIN (cast into base)

B 453x85x40; L 475; H 131. Mid to late 19 C. G.

Cast iron base and supports; gas pipe heater under rod; tightening knob at one end, hole for cross bar at other.

1746 MAY229 EXPANSION APPARATUS - O'TOOLE

PHILIP HARRIS & CO LTD BIRMINGHAM & DUBLIN INSTRUMENT SPECIALISTS

Sp 275 & 265; H 743. 1902-1911. F.

O'Toole Extensimeter; mahogany base and frame; steam jacket; spirit level and micrometer screw for expansion.

Spirit level gone; cylinder has input and output pipes and thermometer pipe in the centre; it is housed in a mahogany surround from which one side can be removed; a glass capillary tube on top rises on expansion of the cylinder pushing up one side of the missing level.

The instrument was invented by Fr Hugh O'Toole of Blackrock College, see prototype 2062 BLA044.

Dates from Morrison-Low 1989,126.

1078 MAY054 EXPANSION APPARATUS - TWO METALS

Made by YEATES & SON Dublin

Sp 196; H 510. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Iron tripod foot; brass pillar for silvered arc scale 20-0-20; U-shaped bimetal bar with pointer to scale.
To demonstrate differential expansion of two metals.

1696 MAY183 EYE MODEL

W & S, JONES, 30 Holborn London

BD 91; H 201; GL 61, MxD 52. 1791-1859. A.

Brass; egg-shaped globe on stand; lever under this to change two lenses; Y-bracket for two correcting lenses.

Remains of white disc on front of eye, presumably was illustration of iris and cornea; the lever under the front of the eye globe allows one of two lenses to be inserted in the eye cornea; the Y-bracket is attached to a pivot on the stand, with a clamping knob behind to allow a correcting lens to be placed in the light path - one of the two lenses is now missing.

Dates from Clifton 1995,155.

1691 MAY178 EYE MODEL

Unsigned

BD 47; H 80; CyD 44. Second ½ 19 C. G.

Black metal; turned conical base; cylinder with small lens at one side; blood vessel sketch inserted in other.

Two grooves in front of lens to fit correcting lenses; ivory semicircular scale around lens 0-180°; the sketch is in the closed end of another cylinder which fits into that held on the base, scale at side 5-0-2.

4334 MAY347 EYEPIECE - MICROMETER

Unsigned

L 112; W 55. Late 19 C. G.

Brass; on one side a drum micrometer varies the position of an eyepiece; serrated edge in field of view.

The micrometer is divided 0-90 and 10-100; a knurled knob (bent) at the other end of the frame moves the serrated edge, which has groups of five points; opposite the eyepiece is a larger screw thread (D34), with a divided inner ring marked 1-9 (x5); the micrometer does not seem to fit any of the optical instruments in the collection.

4131 MAY335 FARADAY NEEDLE

YEATES & SON, DUBLIN.

Sp 193; H 310. Mid to late 19 C. R.

Green- painted cast-iron tripod foot holds vertical magnet with boxwood reservoir; brass crook on foot for needle.

The needle is now missing; one end would have been held by the crook, and the other would have dipped into the mercury reservoir on the cylindrical magnet; there are brass screw electric contacts at the base of the crook and on the reservoir. The instrument is illustrated in Yeates 1877,31, and is described as: [Apparatus to show] "the revolution of current round magnet".

1730 MAY213 FRICTION HEATING APPARATUS - CALLENDAR

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD NO 14799

Sp 327; H 614; WhD 291. 1911. N.

Black cast iron frame; wheel and handle revolve brass calorimeter: friction fibre around drum.

Signature above cast on tripod frame; the serial number is on the calorimeter which also reads: "THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE. ENGLAND. 416.72 GRMS"; instructions with instrument have stamp: "ALL PRICES IN THIS LIST CANCELLED JANUARY, 1919."; latter presumably date of purchase.

1597 MAY086 FRICTION HEATING APPARATUS - TYNDALL

GEORGE PRESCOTT & CO 8, SOUTH KING ST. DUBLIN

L 743; MxW 375; WhD 337. 1879-1882. A.

Mahogany base; iron pulley wheel to turn vertical tube; hinged friction pad holder; boils water in tube.

Base is curved at the tube end and angled at the wheel end; wheel has six curved spokes; thong to connect to tube is missing; tube is of narrow bore and is mounted above a brass pulley wheel.

Illustrated and described as "Tyndall's Apparatus for boiling water by friction" in Yeates 1883,6&7 - the boiling water ejects a cork out of the tube.

Dates from Morrison-Low 1989,133.

1768 MAY251 GALVANOMETER

GAMBRELL BROS. LTD 48

Sp 150 & 111; Hs 173x109x97; H 215. Early 20 C. G.

Mahogany and glass housing; moving coil around cylinder; black horse shoe magnet; mirror; ivory scale 30-0-30.

Two level screws at front, third foot part of mahogany housing; hinged front part of housing with elliptical window; two brass contacts, one at each side of housing.

A second example has a broken top, and is numbered 49 (numbers engraved on reverse).

An identical instrument in the Royal Dublin Society (0389 RDS099) is co-signed T. Mason, 5 Dame Street, an address occupied by the firm from 1900-1916.

Date from Morrison-Low 1989,131.

4055 MAY318 GALVANOMETER

W.G. PYE & CO. CAMBRIDGE ENG.

B 216x128x9; Hs 138x72x64. c1914. R.

Three; mahogany glazed housing; fixed circular coil; small magnet in cork is attached to needle; 20-0-20.

The instrument is screwed to a modern plywood base; the top of the housing is sloping, and is glazed; there are two brass electric contacts at the sides of the housing; the needle and magnet are detached in all three.

Pye 1914,79 describes this as an "Economic" moving magnet galvanometer, very convenient for school use.

4061 MAY324 GALVANOMETER

H.W. SULLIVAN LTD. LONDON. No 788.

B 163x163x40; H 152; GD 140. c1930. D.

Cast iron base; brass ring holds black circular magnet; white-metal coil housing around metal cylinder.

On top of the magnet is a brass bracket holding four screw electrical contacts; a pillar from the base ends in a bracket supporting the moving coil and its hair spring; the instrument is covered by a glass dome.

A card with the galvanometer records that it is a moving coil relay galvanometer, with platinum contacts, having a sensitivity of 200 microamperes for full deflection; pres-ented by Mr J.F. Crowe, Essex.

A label under the base is dated 13:5:30.

1591 MAY080 GALVANOMETER

MADE BY YEATES & SON DUBLIN

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

BD 91; H 37. Mid to late 19 C. G.

Hardwood housing, glass top; white circular scale 0-90(X2) for magnetic needle; off-centre coil below.

Scale crudely cut losing most of the numbers; word "DUBLIN" in signature lost behind housing; at side of housing is an ivory push button which connects with a white metal contact inside; green-covered coil at one side under scale in wood spool (D 25); magnetic needle pointer held by brass bracket; input and output wires.

1599 MAY088 GALVANOMETER - ASTATIC, NOBILI

Unsigned

Sp 160; BD 137; H 180. Mid 19 C. G.

Mahogany base on wood arms for three level screws; mounted coil on four ivory legs; glass and brass suspension pillar.

Fibre and needle missing; groove for missing dome; rather crude construction.

1767 MAY250 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS. LONDON. NO. 2060

B 162x163x26; H 402. Late 19 C. G.

Mahogany base and housing; three level screws; ebonite top with six brass contacts; pillar and sliding magnet above.

Mirror in centre of upper of two coils; window at back of this (D60) and smaller brass-bound window (D13) for light to mirror in front; sliding magnet is flat and rectangular on a brass sleeve.

Instrument illustrated in Elliott 1895, 11.

1715 MAY202 GALVANOMETER - ASTATIC MIRROR

Yeates & Son Dublin

B 115x114x24; H 284. Mid to late 19 C. G.

Mahogany base; two tapering brass pillars to brass and ebonite coil housing; two mirrors; curved magnet above.

Base has three brass level screws and two contacts; glass disc windows at sides of coil housing; one rectangular mirror is at the centre of the coil and the other is in a small glass cylinder below the coil housing; astatic magnet can be moved up or down pillar on top of housing.

Similar to "S.M. Yeates' Improved Sir William Thompson's [sic] reflecting Galvanometer", illustrated in Yeates 1877, 26

1754 MAY237 GALVANOMETER - AYRTON MATHER

Unsigned - attributed to R.W. Paul - Base numbered "273"

Sp 131; H 177. Late 19 C. D.

Brass; three level screws; black circle magnet; removable coil/mirror insert; bubble level on top (empty).

A brass disc sits on the level screws (D148); the circular magnet sits on this, topped by another brass disc (D100); the coil insert slots into the pole gap of the magnet, and has a cut cylinder above the magnet with a glass front to contain the circular mirror; lower disc has two brass contacts.

The instrument seems identical to that Patented by Prof. W.E. Ayrton FRS and T. Mather in 1892, and "made only by" Robert W. Paul, 44 Hatton Garden, London, E.C., as advertised in their "LIST NO.5" published in May 1893 (N. Browne, personal communication).

1732 MAY215 GALVANOMETER - AYRTON MATHER

Unsigned

L 157&164; MxD 25&26. Early 20 C. G.

Pair brass inserts only; one has coil in ivory cylinder; other has rectangular coil round white metal cylinder.

Contained in boxes printed with "YEATES & SON, LTD. DUBLIN" (see Trade Label 1731 MAY214); a label in one box is from: "CAMBRIDGE INSTRUMENT CO., LTD., LONDON & CAMBRIDGE", serial number C136955 (1929) "Sold to Thomas H. Mason"; and the other box has a piece of paper with: "Griffin London" hand-written on it - but it is not clear if these actually relate to the galvanometer parts.

1983 MAY304 GALVANOMETER - D'ARSONVAL

NALDER BROS. & CO. WESTMINSTER NO.23,189

BD 153; H 275. 1890-1910. F.

Brass; cylinder cover with window over coil and mirror.

Three level screws; two contacts on base with ebonite insulating discs; originally property of TCD (see 1233 TDP031).

A plaque on a modern mahogany base reads: "PRESENTED TO REV. PROFESSOR MICHAEL T. CASEY, O.P. FROM SOME OF HIS FRIENDS AND ADMIRERS IN RECOGNITION OF HIS ENTHUSIASTIC AND ENLIGHTENED CURATORSHIP OF THE REM-ARKABLE COLLECTION OF HISTORIC SCIENTIFIC INSTRUMENTS IN ST. PATRICK'S COLLEGE, MAYNOOTH. MAY 19, 1989".

The firm issued catalogues from 1890-1910, Anderson 199,57-8.

4060 MAY323 GALVANOMETER - MIRROR

Unsigned TESTING 11

B 100x75x18; H 321; C 263x104x45. c1930. G.

Copper-coloured retort stand holds brass bracket for moving coil and mirror frame around a metal cylinder.

There are brackets above and below for the (missing) fibres attached to the moving coil, and a squirrel-hair brush is incorporated near one end of the coil; the mechanism is housed in a boxwood case, lined with blue velvet.

A card describes this as "Mirror galvanometer movement (less magnet), ribbon suspension, brush damping"; presented by Mr J.F. Crowe, Essex.

1586 MAY075 GALVANOMETER - TANGENT

YEATES & SON DUBLIN.

Sp 224; H 402; CoHsD 305. Mid to late 19 C. G.

Brass tripod foot and turned pillar to scale housing 0-90(X2) linear, 0-130(X2) log; mahogany coil housing.

Silvered scale with cylinder glass cover (probably replacement for domed cover - see 1580 MAY069); green -covered coil; two brass contacts below coil; three level screws on foot.

1580 MAY069 GALVANOMETER - TANGENT

Yeates & Son. Dublin

Sp 198; H 385; CoHsD 305. Mid to late 19 C. G.

Red-painted iron tripod base; mahogany coil housing; turned brass pillar to domed glass-covered magnetometer.

Silvered scale 0-90°(X4), two linear angles, two log scales; bent reading magnet; two brass contacts at bottom of coil housing; three level screws on base.

1752 MAY235 GALVANOMETER - TANGENT, GAUGAIN

NALDER BROS & CO LONDON NO 5490

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

B 237x153x11; H 348; CoHsD 338. c1891. N.
Mahogany base and two parallel circular frames for single and multiple turn coils; brass magnetometer in centre.
Scales on central magnetometer 90-0-90° and 100-0-100 (log); four brass contacts on ebonite mount on base.
The attribution to Gaugain comes from Griffin 1910,742; Baird & Tatlock 1924,448 attribute it to Helmholtz.
No.3084 dated 5:6:1891 - 3073 UDE 099; No.8242 dated 20:4:1892 - 3042 UDE 068.

1753 MAY236 GALVANOMETER - TANGENT, STEWART

GRIFFIN GARRICK ST. LONDON.
B 562x125x10; L 831; CoHsD 289. 1868-1895. A.
Mahogany base and frame; single and multiple turn coils on central mahogany ring; magnetometer on arms.
Latter with boxwood scales 120-350mm; magnetometer scale 0-90-0-90-0° on white card; parallax mirror below needle.
Dates from Anderson 1990,33-4 and Crawforth 1988,8; instrument described in Griffin 1910,742.

1588 MAY077 GALVANOMETER - UPRIGHT

YEATES & SON, DUBLIN.
B 218x144x19; H 235; MxW 314. Mid to late 19 C. G.
Mahogany base; brass housing for green-covered coil; moving magnet in centre, pointer to fan scale 40-0-40.
Mahogany back to white and black painted scale; two brass contacts on base.
Probably "S.M. Yeates' Vertical Galvanometer, extra large, for lecture purposes, a most useful and effective form of apparatus, highly recommended. £1:15:0" of Yeates 1877, 27.

1687 MAY174 GALVANOMETER - UPRIGHT

Unisigned
BD 128; H 75; ScD 62. Second ½ 19 C. G.
Mahogany base; three brass feet; wide brass coil housing; silvered scale 99-0-90°; moving magnet, red pointer.
Two brass contacts on base; semicircular scale; circular groove for missing dome.

4133 MAY337 GAS EXPLOSION PIPETTE - HEMPEL

Signature unreadable, but appears to end in "...NDON".
B 141x100x29; StH293. Early 20 C. G.
Black wood base and support for glass sphere with stop-cock below, and manometer tube with white back above.
This "pipette" was used, together with a Hempel "burette" (a graduated cylinder to measure volumes - attached to the end of the manometer), for the analysis of hydrogen, which was converted to water by explosion in an excess of air (Bruce 1947,483).
The apparatus is illustrated and named (with a separate reservoir) in Maiben 1914,57.

1623 MAY111 GLOBE - CELESTIAL

NEW CELESTIAL GLOBE Pubd. by J. & W. CARY STRAND.
D 760 (3"). 1791-1816. W.
Plaster globe in black spherical hinged case; central brass spikes in "Circ. Arcticus" and "Circ. Antarcticus".
Spikes not in the same place as the poles; case secured by two hook catches.
Dates from Clifton 1995,51.

1661 MAY148 GLOBE - CELESTIAL

Made & Sold by J. & W. Cary, No 181 Strand Mar 1 1799 LONDON
D 508 (20"); H 720. 1799. S.
Four leg wood frame; plaster globe; brass circle.
The wood rail around the diameter has been repaired and some of the material pasted onto this is gone
"CARY'S New and Improved CELESTIAL GLOBE, on which is carefully laid down the whole of the STARS AND NEBULAE, Contained in the ASTRONOMICAL CATALOGUE, of the Revd. Mr. WOLLASTON, F.R.S. Compiled from the Authorities of FLAMSTED, DE LA CAILLE, HEVELIUS, MAYER, BRADLEY, HERSCHEL, MASKELYNE & C. With an extensive number from the work of Mifs Herschel. The whole adapted to the year 1800 and the Limits of each Constellation determined by a Boundary line."

1662 MAY149 GLOBE - TERRESTRIAL

Made & Sold by J. & W. Cary, Strand LONDON March 1st 1806
D 508 (20"). 1806. S.
Plaster globe; missing circle, fittings and stand.
"CARY'S NEW TERRESTRIAL GLOBE EXHIBITING The Tracks and Discoveries made by CAPTAIN COOK, Also those of CAPTAIN VANCOUVER on the NORTH WEST COAST OF AMERICA; And M. DE LA PEROUSE, on the COAST OF TARTARY TOGETHER WITH every other Improvement collected from Various Navigators to the present time."

1043 MAY017 GONIOMETER - CRYSTAL

Elliott Brothers, 30 Strand
SH 249; L 358. 1858-1863. A.
Brass; tribach foot; three level screws; pillar to circle divided 10-360°, six spokes; fixed and moving telescopes.
Disc mirror raised in centre of circle attached to arm with window vernier, tangent and clamping screws; another arm at right-angles holds moving telescope with vernier onto circle; telescope mount covers part of signature, which suggests it is a later addition, although it matches the fixed telescope.
Dates from Crawforth 1988,8.

1044 MAY018 GONIOMETER - CRYSTAL

R. Fuess Berlin
H 253; L 333; SHsD 155. 1876-1913. FL.
Brass and silvered metal; three curved legs, level screws; table, two verniers; fixed collimator; moving telescope.
The table is a housing for a silvered scale with two reading windows and magnifiers; on a slim pillar from this is a crystal mount with four adjusting knobs, two to move it at right-angles in a horizontal plane, two arcs also at right-angles to adjust the vertical alignment; the collimator has a slit at the outside end; rack and pinion eyepiece focus for telescope but eyepiece optics missing.
Dates from Brachner 1985,139 and Anderson 1990,30.

1041 MAY015 GONIOMETER - CRYSTAL

Yeates & Son Dublin
TH 201; SD 148. Mid to late 19 C. G.
Red-painted iron tripod foot; brass pillar; ivory scale prism table; collimator and telescope; eyepiece missing.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Oxidised brass prism table has pointer to read scale which is around the edge of a brass disc below the smaller prism table; red-painted iron mounts for telescope and (missing) collimator; latter fixed, former can be rotated and is clamped on a red bracket from the tapered brass pillar.

1047 MAY023 GONIOMETER - CRYSTAL, WOLLASTON

Spencer & Son 19 Grafton St, Dublin

BD 150; DiD 122; H 171. 1866-1883. F.

Mahogany base; brass and oxidised brass; disc with bracket for crystal at one side and two wheels at other.

Endless screw at base to turn disc, scale 10-170° and 0-180°; at side of base away from disc support is an angled elliptical black glass mount on a moving arm with a clamping screw.

Dates from Morrison-Low 1989,136.

1048 MAY024 GONIOMETER - CRYSTAL, WOLLASTON

Yeates. 2, Grafton Strt Dublin

B 118x113x15; DiD 120; H 162. 1843-1858. G.

Mahogany base; support for brass disc with angled bracket at centre for crystal; two turning knobs.

Scale 0-180-0° on side of disc with vernier; angled black glass (30x25) on base adjusted by moving arm.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

1046 MAY022 GONIOMETER - CRYSTAL, WOLLASTON

Yeates & Son, Dublin

B 129x127x25; DiD 112; H 145. Mid to late 19 C. G.

Mahogany base; brass; tapering pillar to cube at axis of double disc; central crystal mount; turning knobs.

Latter at side of pillar away from crystal mount; silvered scale 0-350° with vernier at side of disc.

1665 MAY152 GUINEA & FEATHER APPARATUS

Unsigned

H 663; TuMxD 132; DiD 98. Mid 19 C. G.

Tall glass cylinder vessel; ground glass ends; brass disc on top with knob to release three trapdoors below.

Latter hinged plates on the ends of pillars below disc held by central pillar with notches which, when turned, allows the doors to open; at present two are not readily freed by this process since there has been some bending in the mechanism.

1054 MAY030 HALDAT APPARATUS

SPENCER & SON 19 Grafton St. Dublin

B 575x209x41; H 305; MxD 75. 1866-1883. A.

To demonstrate pressure independence of shape; mahogany base; glass tubes and brass brackets; vessels gone.

The tubes are filled with mercury; at one side, vessels of different shapes containing water are inserted into bracket; at the other, pressure exerted is measured by the level of mercury in a vertical tube; latter found to be independent of shape of vessels.

Description, Ganot 1890,90; dates, Morrison-Low 1989,136.

1675 MAY162 HARDNESS TESTER

YEATES & SON DUBLIN

B 403x216x34; H 275. Mid to late 19 C. G.

Mahogany base and mount; brass frame for flywheel, spring and point; cup for test material on pivoted arm.

Latter has grooves for weights 0, 10, 20, 30 (broken off at this point); spring above flywheel is around a fluted bar and can be pushed down and clamped.

1435 MAY055 HELIOSTAT - STONEY

YEATES & SON..Dublin.

B 209x200x33; CyD 129; H 80. Third ¼ 19 C. G.

Shaped mahogany base, three level screws, two spirit levels; brass cylinder for clockwork; mirror missing.

Brackets for mirror present; clamping screw to adjust angle of cylinder 50-60°.

Type of heliostat designed by Stoney about 1875, based on an earlier form due to Foucault about 1862, according to the legend on one at London Science Museum.

Yeates 1880,2 offers two - G.J. Stoney's Local Heliostat 10 0 0 and S.M. Yeates' Heliostat 12 12 0 - illustrated; this is probably the former; 1058 MAY034 is cruder and perhaps earlier.

1058 MAY034 HELIOSTAT - STONEY

Yeates & Son. Dublin.

B 270x160x30; Mi 204x102. Mid to late 19 C. G.

Mahogany base; bubble level and three level screws; black housing to brass table; usual couplings to mirror.

Housing contains clockwork mechanism; brass table with compass points; rectangular mirror cracked and corroded; different design from S.M Yeates' improved form illustrated in Yeates 1880,4a, which suggests its date is earlier than this.

1806 MAY289 HOPE APPARATUS

Unsigned

BD100; H322; CyD64; JMxD124. Mid to late 19 C. G.

Glass cylinder flask has brass water jacket around middle with drain spout; two thermometers in flask.

Label with instrument notes it is: "Hope's Apparatus for determining the temp. of water when at its maximum density"; thermometers are later additions.

1637 MAY124 HYDROMETER

T. MASON DUBLIN TEMP 60

L 162; MxD 24. Late 19 C. G.

Glass; spherical mercury weight; cylinder bulb; ivory scale in stem 30-p-20.

Also two diabetes hydrometers; both of these are glass with spherical mercury weights; one has engraved "DIABETES MS W" with the "M" and "S" in triangles shaped like an hour glass (L117,MxD19), with irregular cylinder bulb and ivory scale in stem 60-0; other has engraved "Diabetes", has a cylinder bulb and a paper scale inside the stem 60-0 (L129,MxD15).

There are several other more-modern hydrometers in the collection.

Morrison-Low 1989,131 lists Thomas Mason II from 1866-1922.

1611 MAY100 HYDROMETER

P. Stevenson Edinr.

L 130; MxW 36; C 145x72x47. Mid to Late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass or gilt metal; egg shaped bulb; conical weight below; stem scale 0-3; eight disc weights 3-50; case. Conical weight unscrews; weights 3, 5, 10, 20, 30, 40, 50; mahogany case lined with purple velvet. Bryden 1972,57 gives dates 1836-1900+ for Peter Stevenson, successor to Alexander Allan.

1604 MAY093 HYDROMETER

Yeates Dublin

L 282; D 11. 1826-1858. G.

Glass cylinder; constriction and red plug above mercury reservoir; paper scale inside stem at top 30-p-30, also reads "Tempe 60".

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

1636 MAY123 HYDROMETER

YEATES & SON DUBLIN TEMPE 60

L 76; MxD 15. Mid to late 19 C. G.

Miniature; glass; spherical mercury weight; red plug; pear-shaped bulb; ivory scale in stem 20-p-30.

1610 MAY098 HYDROMETER - NICHOLSON

Unsigned

L 214; D 35. Mid to late 19 C. G.

Two; tin cylinder with conical bottom; conical bucket weight below; disc table on rod on top.

Tesseract 19,1987-8,54 records that this type of hydrometer was invented by William Nicholson in 1785, and was designed for determining the specific gravity of minerals or other solids, by floating and balancing the hydrometer in water, with the sample successively in the upper pan in air, and in the lower weighted conical pan in liquid.

1634 MAY121 HYDROMETER - SIKES

Yeates & Son Dublin 14944 SIKES P 51°

L 176; MxD 41; C 202x96x52. Mid to late 19 C. G.

Brass or gilt; nine weights 10-90 and stem cap; broken thermometer 30-120°; in mahogany case with inlay.

Ivory plaque on top of case with indented corners and well engraved italic and olde-worlde script signature; rectangular boxwood inlay frames case top.

1635 MAY122 HYDROMETER - TWADDELL

MASON 11, ESSEX BRIDGE DUBLIN

L 178-202; MxD 29-34; C 231x187x47. 1845-1883. A.

Six; glass; spherical mercury weight; pear-shaped bulb; ivory scales in stem 0-25 to 135-175; mahogany case with blue lining. Dates from Morrison-Low 1989,131.

1607 MAY096 HYGROMETER - DANIELL

Unsigned

BD 108; H 233; BusD 34&35. Mid to late 19 C. G.

Turned rosewood? base and pillar; glass; two mercury thermometers, one on pillar, one in long arm; two bulbs below arms.

White scales for thermometers -10-60°; cloth over bulb under short arm; "12/6" on base.

1667 MAY154 HYGROMETER - DINES

Unsigned

B 519x171x60; H 177; CyD 77. Third ¼ 19 C. G.

Mahogany base; brass cylinder, stop-cock below; groove to silver metal misting plate and thermometer -15-35°.

Standard Dine apparatus as illustrated and described in Preston 1894,358-9.

1666 MAY153 HYGROMETER - DINES

YEATES & SON DUBLIN

B 460x147x19; H 295; CysD 64. Third ¼ 19 C. G.

Mahogany base; two brass cylinders; Y-shaped pipe with two stop-cocks from bases of cylinders to misting plate.

Latter has sleeve for missing thermometer; one of the cylinders has an insert tube with a screw thread on top.

This design is unusual, since the standard Dine hygrometer has only one cylinder, into which is put iced water - when this passes to the misting plate the temperature at which misting occurs is measured, and so the dew point is known - Preston 1894,358.

The second cylinder is for ether, and is used when the dew point is below 0° - Knowles Middleton 1969,129: this type was invented in 1880.

1608 MAY097 HYGROMETER - MASON

YEATES & SONS [sic] GRAFTON ST. DUBLIN. 6008 6241

H(-Ha) 290; BMxW 230. Late 19 C. G.

Grey tin housing; alcohol wet thermometer 40-110°; mercury dry thermometer 10-130°; hinged top.

Humidity table printed in red between thermometers; sleeve on base for water bottle (missing); legends on white glazed scales include words "VERIFIED DRY" and "VERIFIED WET".

This is the only Yeates instrument with the "& Sons" signature - all the others are "& Son".

1723 MAY206 INTERRUPTOR

Unsigned - attributed to Nicholas Callan (1799-1864)

B 264x157x22; H 165. Mid 19 C. G.

"Callan's repeater or interruptor"; mahogany base; three wood cups; cog escapement to drive see-saw contact.

The cups, for mercury, are on turned bases; two vertical brass plates hold the cog wheel, driven by a metal and ivory handle; a rocker escapement on top of the cogs is

attached to the see-saw metal rod, such that first one end and then the other dips into one of the outside cups, that in the centre maintaining contact; wires extend from the cups.

1724 MAY207 INTERRUPTOR

W.G. PYE & CO MAKERS CAMBRIDGE

BD 240; H(+D0) 202. Turn 19/20 C. G.

Mahogany base, two contacts; brass clockwork; as this ticks, a side arm dips into a mercury cup; glass dome.

The cup (D12) is of white metal; one brass contact is connected to the cup, the other to the brass frame of the clockwork; apparatus covered with a bell jar with a copper wire attached by wax to the inside top - this is probably not the original dome as it is a little too wide for the circular raised part of the base around which it sits.

Card with instrument calls it an "electric timer".

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1787 MAY270 INTERRUPTOR

Signature plate missing.

H 353; MxD 192. Late 19 early 20 C. G.

Mercury; black metal cylinder vessel; ebonite discs on top, brass fittings; electric motor on tripod above.

Latter in black metal spherical container; from this descends an axle into the lower vessel; four clamping screws, three contacts, one switch "Strong" and "Weak"; two stop-cocks, and one vent on ebonite disc lid of lower vessel.

1693 MAY180 KALEIDOSCOPE

LONDON STEREOSCOPE COMPANY NEW PATENT JEWEL KALEIDOSCOPE

H 328; TuD 86. Mid 19 C. G.

Green paper-covered tube; brass and wood fittings.

Turned wood eyepiece; brass objective end with revolving glass-ended circular chamber holding coloured glass pieces viewed through kaleidoscope mirrors in the green tube; spike on side for missing handle or stand.

The kaleidoscope was invented by David Brewster and Patented in 1817 - Turner 1983,297.

1692 MAY179 KALEIDOSCOPE

THE DESIGNOSCOPE PATENTS APPLIED FOR IN ALL COUNTRIES

B 115x90x21; H 230; MisHsH176; DiD 115. c1924. R.

Black metal base; revolving disc for articles; triangular housing for tall angled mirrors; peep hole on top.

The disc has, at present, tidilywinks on it, but could have other articles to be observed through the kaleidoscope mirrors.

The "DESIGNOSCOPE", an open-ended kaleidoscope with a turntable, was brought out in 1924; one is illustrated in Harley 1988,19, the maker being: "TWEENDEN MANUFACTURING CP., LTD., 35 & 36 ALFIELD PLACE, LONDON W.C.1" (this signature is hard to see and may not be recorded entirely correctly).

1778 MAY261 LAMP

STOCKS' PATENT

Hs 226x217x149; MxH 737. Late 19 C. G.

Russian iron; lantern housing; paraffin lamp, four wicks; pivot reflector, blue glass centre; expanding chimney.

Lamp reservoir slides into groove in housing, which has a circle window in front, two square windows at sides, and open back; four brass knobs adjust the wicks; flame surround has transparent paper window on one side and frame for this at other; hinged circular reflector (D80) sits on top of wick controls; chimney in four telescoping parts, the top adjusted by a rack and pinion.

1708 MAY195 LAMP

A.C. WELLS & CO MANCHESTER WELL'S "UNBREAKABLE" OVER A MILLION SOLD

L 550; H 148; TuD 45. Turn 19/20 C. G.

Cast iron; large reservoir; handle; side tube arm.

Reservoir in shape of irregular ellipse with vertical sides, fuel input cap and handle on top; tube rises sideways from the bottom of the reservoir and has wick filling it at the end.

A label with the instrument reads: 'DUCK LAMP'.

1712 MAY199 LAMP - CARBON ARC

DELEUIL A PARIS POLE CHARBON POLE ZINC 192

Sp 328&263; H 627; TaH 192. Mid 19 C. G.

Cast iron, mahogany, and brass; three leg table, double coil control below; upper zinc electrode on angled bracket with ivory sphere on top (D21), adjusted manually.

Payen 1986,159 gives Deleuil Père 1820, Deleuil Fils 1855, succeeded by Pillion-Velter 1893.

1711 MAY198 LAMP - CARBON ARC

W. Ladd, 11 & 12 Beak St Regent St. W.

BD 132; H 564; CyD 108. 1861-1872. A.

Brass and oxidised brass; cylinder mechanism housing with one carbon at centre; other suspended from bracket.

Latter in two right-angles so that upper carbon aligns with lower; contacts on top of cylinder and at base of bracket; mechanism presumably clockwork.

Dates from Crawforth 1988,11.

1777 MAY260 LAMP - CARBON ARC

Unsigned

B 252x120; L 505; H 340. Mid to late 19 C. G.

Iron and brass; on sliding base plate for lantern; carbons adjusted by six ebonite knobs on iron bars.

1798 MAY281 LAMP - ELECTRIC

SUNBEAM LAMP

B 202x100x30; H 310; BuD 131. Late 19 early 20 C. G.

Mahogany base; two contacts; ceramic and brass holder with four strips and spring ring for glass bulb; arch element.

1683 MAY170 LAMP - MINER SAFETY

THE PREMIER LAMP & ENGINEERING CO. LTD. LEEDS

BD 98; H(-Ha) 273. Early 20 C. G.

White metal fuel cylinder; brass fittings; five brass bars around glass cylinder; fluted brass gauze shield.

S-shaped handle on top; also marked with an owl and "REG TRADE MARK".

1682 MAY169 LAMP - MINER SAFETY

Unsigned

BD 74; CyH 52; H(-Ha) 313; LeD 43. Early 19 C. G.

Tin fuel cylinder; brass bung on side arm; wire gauze tube; sliding mounted lens on two of three frame wires.

The latter arch over the gauze and meet with a figure- of-eight shaped wire handle; brass disc wick holder on top of fuel cylinder screws into the brass ring which holds the bottoms of the frame wires.

1707 MAY194 LAMP - OXY HYDROGEN

Unsigned

L 312. Mid to late 19 C. G.

Oxidised brass; two inputs for oxygen and hydrogen with stop-cocks meet at other end; bracket for cylinder - now missing.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1790 MAY273 LAND CHAIN

J C CHESTERMAN SHEFFIELD, ENGD"2 P IRISH". Late 19 C. G.

Two brass handles; iron links; brass markers.

Two other land chains "4P" and "CUNNINGHAM CHAIN" (hand-written).

Irish chain presented by Canon Hamell, Vice-President of Maynooth 16:10:60; the 4P chain has the same signature as the 2P Irish chain; the Cunningham chain was presented by Mr J. Curran, Letterkenny, Co. Donegal.

1780 MAY263 LANTERN - BIUNIAL

Made by Yeates & Son, Dublin.

Hs 418x262x215. Mid to late 19 C. G.

Mahogany housing, two doors; conical tin lens housings, brass screw threads; lenses gone; oxy-hydrogen lamps.

At bottom back, two brass gas inputs with stop-cocks, curved rack and pinion on handle to adjust gas input; gas outputs behind lenses - lamps incomplete; lid and cowl missing.

1779 MAY262 LANTERN - UNIAL

E.M. CLARKE, PHILOSOPHICAL INSTRUMENT MAKER 428, STRAND, LONDON.

L570; H 595. 1840-1851. A.

Mahogany sliding frame and lime-light mechanism housing; russian iron top and cowl; brass and tin lens housing.

Only one cracked biconvex lens remains; housing has doors on each side; brass and iron lime light system with

brass input pipes and two stop-cocks; on modern wood

struts to protect gas input pipe.

Dates from Clifton 1995,57.

3519 MAY308 LANTERN - UNIAL

NEWTON & Co OPTICIANS TO THE QUEEN 3, FLEET STREET, LONDON

B 408x202x22; H 365; L 650. Late 19 C. G.

Mahogany base; russian iron housing; two doors - brass fittings and blue disc windows; rack and pinion focus.

Brass-bound lens system with lens flap; blue velvet curtain on arc-shaped guide at the back; now fitted with an electric bulb.

Presented by Professor Jim Slevin 30:9:90.

Also a later unsigned russian iron lantern (Hs 270x 239x146) with a back flap and one door, a wooden slide changer, and a brass-housed lens system with rack and pinion focus; with a modern lamp and mirror.

Queen Victoria died in 1901.

1738 MAY221 LEVEL - SPIRIT

Unsigned

BD 151; L 256; Se 24x24. Mid to late 19 C. G.

Oak base with pivot for square section brass tube; spirit level in centre and pair of pin-hole/wire sights.

Screw holes on bottom of base indicate that the level was attached to a stand.

0732 MAY007 LEVEL - Y

Thomas Jones Charing Cross LONDON

L 310; H 188; CpHsD 120, H 19. 1816-1850. A.

Brass; silvered compass dial; square section sides hold Y brackets; telescope missing; on circular mount.

Compass points EW reversed; scale 10x80(x4)° and 10-360° on raised edge; cracked glass top; endless screw above base disc to revolve.

Jones was one of the most eminent of instrument makers, he was elected a Fellow of the Royal Society in 1835; dates from Crawforth 1988,10.

4132 MAY336 LEYDEN JAR

Max Kohl, Chemnitz

BD 135; JaH 171; H 288. Early 20 C. R.

Blue cast-iron base; glass cylinder with foil inside and out; rectangular wire frame with spark gap.

This is one of a pair of jars (the second is missing) described in Kohl 1911,838: "2 Lodge Leyden Jars for demonstrating Electric Resonance...One of the jars is provided with a closing wire which contains a spark gap bounded by two brass spheres; the other contains a fully closed circuit, which, however, is variable along its length by a sliding piece of wire. In addition, the inner coating of this latter jar is connected to the outer coating by a closing circuit interrupted only by a small spark gap. Both jars are placed alongside each other in such a manner that the closing circuits run parallel to each other....If now the first jar is excited with the fixed circuit by means of an induction apparatus, the second jar is also discharged at each passage of the spark by the action of resonance, assuming, of course, that the sliding contact occupies the correct position. Not too slight a motion of the sliding contact disturbs the resonance and stops the secondary discharge. Induction is also avoided by interposing a metal screen between the two jars; glass plates or wood screens have, on the other hand, no influence."

1776 MAY259 LEYDEN JAR

Unsigned

MxD 123; H(-Cn) 348; H 460; SrD 45. Mid 18 C. G.

Cylinder glass vessel with neck; foil inside and out; brass sphere, rod, wire and chain conductor in cork.

Another small (H155,D75) jar and parts of other jar conductors, including one bent in two right-angles, are also present.

1727 MAY210 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned

MnD 79; MxD 124; H 255. Mid to late 19 C. G.

Brass tapering vessel; glass conical insert; in this, brass vessel with crook top ending in a sphere (D23).

1050 MAY026 LIGHT RECOMBINATION MIRRORS

Unsigned

H 315; MisD 28. Second ½ 19 C. G.

Iron tripod foot; brass pillar; horizontal mahogany bar; seven circular mirrors each on a universal ball joint.

To recombine spectral colours back into white light.

The foot and pillar are reminiscent of the work of Yeates & Son.

1575 MAY064 MAGNET - ROTATING

YEATES & SON. DUBLIN.

Sp 193; H 380; M 270x16. c1877. CT.

Green-painted iron tripod foot; arched brass bracket for magnet with contacts to two boxwood mercury reservoirs.

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Knurled brass knob on top of arch to secure magnet; brass contacts to connect to mercury in central ring reservoir and bottom mercury cup.

Illustrated in Yeates 1877,31 "Apparatus to show Fara-day's experiment of the revolution of a magnet round a voltaic current"; (the magnet was missing but was found).

Similar instrument 0274 QBP069.

1577 MAY066 MAGNET & ROTATING CONDUCTOR

Unsigned

B 204x98x29; H 262; RssD 57. Third $\frac{1}{4}$ 19 C. G.

Mahogany base; red U-magnet; two helical coils rotate around poles; two mercury reservoirs on magnet limbs.

Brass adjustable arch at back of base holds central mercury cup with two bent and pointed wires to cups on tops of helices; underneath these are points to allow rotation around magnetic poles; other ends of helices dip into mercury ring reservoirs.

Elliott 1856b,8 notes "Apparatus to show contrary rotation of two helical-coiled conducting wires, each about its respective axis. This contrivance illustrates the opposite rotations of the same curvilinear current at the same time about the contrary poles of the magnet."

See also illustration in Turner 1983, opp177.

1819 MAY302 MAGNETOMETER

Unsigned

L 204; H 95. Early to mid 19 C. R.

Brass; ruler 1-5 inches; at end, brass arc with scale 0-90; pivot for white metal pointer and counterscrew.

Pointer of rectangular shape; the instrument appears identical to those illustrated in Turner 1983,174 and Lyall 1991,469, both of which were made by W. & S. Jones, who traded from 1791-1859 - Clifton 1995,155.

1802 MAY285 MAGNETOMETER - EWLES' DAMPING

REYNOLDS & BRANSON LTD LEEDS

Sp 145; H 190. Early 20 C. R.

Wood base; three brass level screws; magnet suspended in fluid from top; scale 0-340°.

Magnet sealed in glass has cross bars on top and is suspended in fluid in glass cylinder; bakelite disc on top rotates the suspension fibre (broken).

Bottle found away from the instrument reads: "DAMPING FLUID FOR EWLES' MAGNETOMETER. REYNOLDS & BRANSON, Ltd. MANUFACTURING CHEMISTS, 14 COMMERCIAL STREET, LEEDS."

Anderson 1990,72 lists catalogues for Reynolds & Branson Ltd in 1900 and 1914.

1075 MAY051 MANOMETRIC FLAME APPARATUS - CAPSULE

YEATES & SON, DUBLIN

L 247; H 131; MxD 58; HsD 48. Mid to late 19 C. G.

Turned mahogany; brass gas input at one side; bent flame outlet at other; two wood trumpets attached.

1646 MAY133 MANOMETRIC FLAME APPARATUS - TROMBONE

RUDOLPH KOENIG A PARIS

Sp 310; MnH 755. 1872-1901. R.

Interference apparatus; iron tripod foot; pillar for fixed and trombone-like moving arched tubes; scale on silver.

Illustrated in Koenig 1889,88 as part of "Manometric flame interference apparatus".

Instrument devised in 1872, Turner 1983,144; Payen 1986,160 gives firm dates 1858-1901.

1640 MAY127 MECHANICAL MODEL - TURBINE

YEATES & SON Dublin

B 690x150x45; H 355. Mid to late 19 C. G.

Mahogany base; metal pipe with inputs; brass table; cylinder glass chamber containing flanged wheel.

Water is passed into a brass tube with a stop-cock on the metal pipe, and exits through two bent pipes driving the flanges on the five-spoked wheel within the glass cylinder; it then drains away through a tube at the bottom of the metal pipe; three brass pillars rise from the brass table and the top of the cylinder is secured by a bracket from these, with the driven axle at its centre; base has hole for missing part.

1668 MAY155 MERIDIAN SOLAR GUN

Unsigned

B 227x112x8; TH 105, 199x94. Late 19 C. G.

Mahogany base and case; brass tribach, pillar and table; metal canon; lens; silvered compass; inclining dial.

The lens, in a housing between two arms which can be revolved around a scale of months, condenses the sun's rays to set off the canon; the dial, engraved with hours VIII-I-XII-III, can be inclined around a latitude scale 0-70°; silvered compass has raised scale 20-360°; two spirit levels at right-angles on table, which has latitudes of cities - e.g. Dublin, Glasgow, St Petersburg, Paris, Berlin.

1713 MAY200 MICROSCOPE - COMPOUND

Mon E.Hart & A. Praz A.Prazmowski Sucr Rue Bonaparte, 1, Paris.

Fo 88x75; MnH 275; C 281x193x113. 1876-1881. R.

Brass; plain and concave mirror; rectangular stage; four eyepieces; right-angle prism device; mahogany case.

U-shaped foot; two short turned bollards to pivot for pillar with fine focus knob on top; brackets from this to stage and sleeve for microscope tube; push coarse focus; oxidised brass objective in case with signature "F. 2m/m A. PRAZMOWSKI Rue Bonaparte 1 Paris"; right-angled brass and oxidised brass camera lucida fitting has small prism beside a ring (D10) at objective end; other end fits eyepiece tube.

Dates from Payen 1986,160.

1649 MAY136 MICROSCOPE - COMPOUND

NACHET 17, rue St Severin, Paris GEOL DEPT UCD DUBLIN

FoL 124, MxW 88; H 335; C 80x54x38. Post 1863. R.

Brass and oxidised brass; shaped foot, U indent; circle stage, condenser, suspended mirror; objective focus.

A single turned brass pillar rises from the foot; this is replaced by two brass pillars, one holding the rack on a bracket for coarse focusing by means of a knurled knob, with a fine focus knob and silvered scale 0-90 on top, the other holds a curved bracket to support the eyepiece end of the microscope; revolving plane and concave mirrors on arm below stage, which has a scale 0-180-0° with vernier; five extra lenses in case.

Nachet moved to this address in 1863, Turner 1983,170.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1066 MAY042 MICROSCOPE - COMPOUND

Spencer & Son 19 Grafton Strt, Dublin

Sp 186&193; MnH 365; GlHs 124x65. 1866-1883. A.

Brass; petrological; angled black glass, condenser, stage, sample probe with scale, microscope tube.

Y-shaped foot; black glass framed in oxidised brass on pivot attached to cylinder sleeve below stage; circular silvered scale (D89) 0-180-170° at side, with vernier, above stage, attached to probe below objective; stage scale (D79) 0-90(x4); rack and pinion focus for tube; circular scale at eyepiece end 0 45 90 135 180 225 270 35 0.

Dates from Morrison-Low 1989,136.

1052 MAY028 MICROSCOPE - COMPOUND, CULPEPER

Unsigned

B 170x163; H 426; C 214x216x460. c1745. R.

Octagonal wood base; three curved brass legs for stage and fishskin-covered tube; push focus; pyramid case.

Base has drawer for accessories; lignite optical system with green-covered draw; five brass-bound objectives; disc of eight specimens and black and white ground on stage; concave mirror below.

A note on the case reads: "I cleaned up this MICRO-SCOPE and repaired the stand and drawer, I also made a new case for it of oak, except the two sides which were not rotten as the rest. It is very old, probably before 1700. T.M. Ray March 1863".

Turner 1981,41 notes that the octagonal foot was used in the 1740s.

1807 MAY290 MICROSCOPE - DISSECTING

BAUSCH & LOMB OPTICAL CO. ROCHESTER N.Y. NEW YORK CITY CHICAGO

B 253x91x90; H 135. c1914. CT.

Hinged boxwood base holds accessories; angled mirror black/white back; glass cover; two lens systems.

After the design of Charles R. Barnes; advertised in Baird 1914,262.

Presented by Rev. Michael Casey.

1647 MAY134 MICROSCOPE - SIMPLE

Baker, 244. High Holborn, London

BD 113; MnH 149. Second ½ 19 C. G.

Brass; bracket for revolving mirror on base; pillar; square stage; lens on bracket on triangular rack.

Stage has a circular hole in the centre and two clamping strips; focus is by a knurled knob and pinion to drive a rack inside the pillar.

Charles Baker worked from 1851-1909, Clifton 1995,14.

1648 MAY135 MICROSCOPE - SIMPLE

E. Leitz Wetzlar

FoL 95, MxW 90; MnH 128. Late 19 C. G.

Black U foot; brass pillar with bracket for rotating mirror; rectangular stage; lens on bracket on rack.

White frosted glass disc on other side of concave mirror; two clamping strips and rectangular glass plate on stage; triangular rack; lens focused by double knurled brass knobs.

4051 MAY314 MICROSCOPE - TRAVELLING

Lucas Patent U.K. 13242 1908

Sp 231; H 493; TuL 190, D 250. 1908. P.

Black iron tripod foot; frame for vertical plate with spring clips; white metal microscope; drum micrometer.

The foot has two brass level screws; to one side is a vertical pillar (D28), moved by a screw and ivory drum micrometer 0-40 below, reading a vertical scale 0-1.5"; the white-metal microscope is attached by a bracket at right-angles to this pillar to view the entity being held by the spring clips; focus of the microscope is by a knob turning a small pulley-wheel which moves a rod attached parallel to the tube.

A summary of the patent, dated June 22, 1908 is: "Microscopes. - A friction-roller device is used instead of the ordinary rack-and-pinion mechanism employed for adjusting microscopes and the like. The microscope tube is guided by a support and is provided with a guide bar against which a roller provided with a groove is pressed by springs secured to the support. The springs are indented to form a bearing for the spindle. In a modification, the spindle is rigidly supported at one end by a bridge-piece having a spherical recess into which takes [sic] the rounded end of the spindle. Instead of the roller being grooved it may engage with a grooved rod." (The description includes letters referring to a diagram.) Reference: "Patents for Inventions - Abridgements of Specifications", HMSO, London 1912,1908.

1766 MAY249 MORSE KEY

Unsigned

B 166x134x23; H 62. Third ¼ 19 C. G.

Mahogany base and supports for brass fittings to hold two mahogany tapping rods; three contact key in front.

On one mahogany support are four brass contacts.

1064 MAY040 OCTANT

Elliott. Bros. 47. Charing Cross. London

R 250; L 306; W 250; C 347x314x127. c1857. A.

Ebony, ivory and brass; T-shaped inner frame; index and horizon glasses, no half-horizon; strengthened index arm.

Scale 0-105 with window vernier; three square and three disc filters; screw-in telescope; mahogany triangular case with lid detached.

Crawforth 1988,8 gives address at No 5 Charing Cross in 1857, but no No 47.

1062 MAY038 OCTANT

F.. Moore Dublin & Belfast

R 197; L 247; W 220; C 290x276x126. c1865-1875. G.

Oxidised brass; ivory scale 0-115, window vernier and clamp; curved T inner frame; four and three filters; case.

Index glass filters square shaped; horizon filters discs; fan-shaped mahogany case.

Burnett & Morrison-Low 1989,152 list the firm in Belfast and Dublin from 1864-99 when it became a Limited Company.

1045 MAY021 OCTANT

Yeates Dublin

L 354; W 287. 1826-1858. G.

Ebony, ivory and brass; curved T inner frame; index, horizon and half-horizon glasses; only one set of red, green and orange filters; two peepholes.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1578 MAY067 OERSTED APPARATUS

Unsigned

B 291x120x24. Third ¼ 19 C. G.

Mahogany base and two turned pillars; on top, brass single turn coil; points for needle; three mercury cups at ends.

Missing magnet needle can revolve as current is passed around coil; two mercury cups on bent wire extensions at one end of coil and one on other; coil can rotate and is held by two brass knurled knobs on pillars.

Elliott 1856b,6 notes that the needle is deflected whether the current is above or below, and that it is necessary only to remove the connecting wire from one cup to the other to demonstrate Oersted's effect.

3520 MAY309 OPTICAL COMPARATOR

Carl Zeiss, Jena. No 874

Sp 185, MnH 302; W 368. Pre 1898. D.

Brass, silver-metal and oxidised brass; tripod foot; tapering pillar to bench with scale and two microscopes.

The brass pillar from the foot holds a horizontal sliding brass optical bench with a clamping screw and adjusting knobs at one side; there are two vertical microscopes on arched supports above the bench; these have white-metal tubes and white cut-out arc ceramic extensions at the objective ends to help illumination; one microscope has a brass rack and pinion adjustment, and both use silver-metal drum micrometers for fine focus; the microscope with the rack and pinion adjustment is above a gap in the optical bench (L103W7) on which a slide to be measured would be placed; below this microscope is a hole which can be illuminated by a rotating plane and convex mirror on a semicircular pivot under the table; the other microscope is above a raised scale (120x15x8) 0-100, with a silver centre, on the bench; measurements on the slide can be made by taking the corresponding readings on the twin microscope above the scale; there is a certificate with the comparator, from "Charlottenberg der 6. August 1898."

1627 MAY115 OPTICAL ELEMENT

E.M. CLARKE OPTICIAN. 428 STRAND LONDON

Hs 160x56x14; MxD 38. 1840-1851. A.

Two; wood housing has central thick glass element; one has eight semicircle petals, other eight concave indents.

Elements have flat sides; their purpose is unclear.

Also similarly-signed mahogany and metal-bound housing for eight glass rectangles (39x9), four aligned one way, four on top at right-angles (Hs 203x57x18); and unsigned circular housing (D120) for damaged plano-convex lens cut in 25 faces - hexagon to triangle.

Dates from Downing 1988,23.

1750 MAY233 OPTICAL MODEL

Unsigned

BL 765-330x88x31; MxH 171. Late 19 early 20 C. G.

Set of seven; mahogany base; four ivory legs; long, short and normal sight; three telescopes; prism splitting of light.

Eye models have glass spheres (D53) with thread rays from arrow objects; Newtonian and Cassegrain reflecting telescopes and refracting telescope (twice the length of the other six models, which all have the same-sized bases) also have arrow objects; prism missing from splitting model, which has a star (sun) object; all objects and most other fittings of brass; some of thread rays now detached; part of refracting telescope gone.

1726 MAY209 OPTICAL STAND

J.H. DALLMEYER, London

Sp 274; H 343; SvD 44. Late 19 C. G.

Brass; folding tripod legs; hinged sleeve clamp on top; now holding 1915 periscope range finder.

Presumably originally for a telescope or direct vision spectroscope; the black and white metal instrument has German words inscribed "weniger", "mehr"; it allows viewing through two right-angles, and has three circular scales.

4158 MAY342 ORGAN PIPE - REED

Unsigned

Hs 240x56x56. Late 19 C. G.

Two; boxwood housings with tapering mahogany inputs; three windows around brass pipe with reed in front.

Each pipe has a flat mahogany top; the pipe with the larger reed has a wire from the top of the housing, bent to come between the pipe and reed; it has one of its windows cracked and some of the frame strips missing.

Similar reed pipes are signed by Rudolf Koenig of Paris, who operated from 1858-1901 - Payen 1986,160.

1816 MAY299 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN

Hs 605x74x64 - 297x46x42. Mid to late 19 C. G.

Five boxwood pipes with manometric flame capsule in centre; mahogany lip; two larger with slide on top.

The mahogany slide, in parallel runners, covers a long hole with rounded ends.

4159 MAY343 ORGAN PIPE WITH STOPS

Unsigned

Hs 439x42x40. Early 20 C. G.

Boxwood, with boxwood lip and tapering input; three holes in front with turned boxwood plugs.

4059 MAY322 PATENT PAPERS OF NICHOLAS CALLAN

1853. S.

Original Patent granted by Queen Victoria to Nicholas Callan for galvanised iron.

"Victoria by the Grace of God...do give and grant under the said Nicholas Callan...Our especial licence full power sole privilege and authority that he the said Nicholas Callan...shall and lawfully may make use exercise and vend his said Invention within Our United Kingdom...to HAVE HOLD EXERCISE and ENJOY the said licences powers privileges and advantages hereinbefore granted... unto the said Nicholas Callan...for FOURTEEN YEARS... from the...date of these presents.... We have caused these Our Letters to be made Patent this twelfth day of October one thousand eight hundred and fifty three of Our Reign and to be sealed as of the said twelfth day..."

1585 MAY074 PEDOMETER

J. ROBINSON & SONS 65 GRAFTON ST DUBLIN (Hall mark P)

D 45; C 93x91x24. 1890. H.

Silver case; circular scale 160-1760, small dial 5-60; in dark red leather-covered case with green lining.

Place in case for missing rectangular object; back of watch-like case opens to reveal weighted pendulum mechanism.

Presented by Mrs Margaret McCabe, 50 Old Finglas Road, Dublin, on 29:5:1983.

Lion, mask and p hall mark - the P in a shield.

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1709 MAY196 PENDULUM - GRIDIRON

Unsigned

L 1045; W 167; Bb 130. Late 19 C. G.

"Harrison's grid iron thermally compensated pendulum"; five iron, four brass bars; brass bound disc lead bob.

Five horizontal brass supports to hold vertical bars; details on card with instrument.

1643 MAY130 PERISCOPE

PERISCOPE ME IX 1918 R. & J. BECK LTD NO 26695

L 598; TuD 22. 1918. S.

Turned wood handle; brown metal tube; mirror prism on top; eyepiece on side arm at bottom, screw-in focus.

Card notes this is a trench periscope illustrating Howard Grubb's submarine periscope.

The collection has also a home-made periscope in a rectangular grey painted wooden housing (924x90x75); and a small wide periscope in a white-metal housing (H134,W115), with the inscriptions "U" (in a triangle) and "MD.2903".

4078 MAY327 PERISCOPE

C.P. GOERZ BERLIN Rundblick Fernrohr Nr 64392 D.R.P. Nr 156039 L 1038 TC [monogram] 1915 A

L 250; W 114. 1915. S.

Heavy iron casting; micrometers to adjust objective.

The casting has a side-pipe at the bottom for the eye-piece, a circular housing in the centre with a horizontal side tube, having an arm clamp at one side, and a white-metal drum micrometer on the other which alters the horizontal angle of the objective above, either "weniger" or "mehr"; the turn is recorded on a white-metal ring under the objective, divided 0-32; on top of the objective is another drum micrometer to alter the vertical angle of the eyepiece.

1749 MAY232 PHONIC WHEEL

7100 (on tripod) LUCAS (on bell)

Sp 163; H 250; DiD 224. c1903. SI.

"Raleigh Synchronous Motor or Phonic Wheel"; two iron tripod feet; cog and motor drive to rotate slotted disc.

Tripod feet at right-angles to position disc vertical or horizontal; steel cog wheel turned by two electric coils drives disc; endless screw mechanism attached to bell; very similar to 1340 TDP205, which is signed "THE VEEDER MFG. CO. HARTFORD CONN. U.S.A."; used to determine absolute pitch of tuning forks.

Name from Pye 1914,34; Patent on 1340 TDP205, 3:10: 1899; 2768 UCP221 numbered 7253/3 - presumably 1903.

1641 MAY128 PHONOGRAPH

MADE FOR INTERNATIONAL CORRESPONDENCE SCHOOLS SCRANTON, PA. BY THOMAS A. EDISON, INC. MODEL C NO 790321

C(+Ld) 330x295x230. Patents listed 1898-1905.

"Edison Standard Phonograph"; oak case; black metal.

Silver metal cylinder holder; one cylinder "The prettiest little song of all" (cracked).

Presented by Martin Kavanagh, Newbridge.

1624 MAY112 PHOSPHOROSCOPE

MADE BY YEATES AND SON, Opticians to the Univer-sity, 2 GRAFTON STREET, DUBLIN.

290x121. 1859-1864. G.

Black-covered card; tubes of chemicals spell "VOLTA".

Descriptive card on the back notes that the sulphurets of Calcium, Strontium, and Barium possess the property of remaining phosphorescent after being exposed to light; the phosphorscope should be exposed for a few seconds to sunlight or magnesium light and then withdrawn immediately to a dark place, the quicker the better.

A label on the front is signed: YEATES & SON 2. Grafton Street, DUBLIN. to/-; see 0823 UDP089.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son, listed as Opticians to the University from 1859.

1625 MAY113 PHOSPHOROSCOPE

Made by YEATES & SON, 2, Grafton Street DUBLIN

Hs 186x156x13. 1840-1846. G.

Mahogany frame; two glass plates with phosphorescent butterfly in between; see 0823 UDP089 & 1624 MAY112.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

1728 MAY211 PHOTOMETER - BUNSEN

Unsigned

B 99x100x32; H 274. Mid to late 19 C. G.

Grease spot; mahogany base, slide below for optical bench; brass expanding pillar; japanned tin housing.

The latter has two circular windows parallel with the faces of the white disc containing the grease spot; at the sides are two rectangular windows; the top is a hinged lid; the square frame for the grease spot disc is contained by two slides, and can be removed.

1801 MAY284 PHOTOMETER - JOLY

GRIFFIN LONDON

H 212; W 89; H(+St) 332; Sp 127. Early 20 C. G.

Blackened brass housing with wings for pair of wax blocks; on iron tripod stand (not original).

1697 MAY184 PHOTOMETER - JOLY

YEATES & SON DUBLIN.

Hs 159x88x90. Mid to late 19 C. G.

Mahogany housing with black shades for two paraffin blocks; windows at sides for light sources.

4143 MAY341 POINT AND PLATE VALVE

Unsigned - attributed to Nicholas Callan (1799-1864)

PD 130. Mid 19 C. G.

Pair of wire induction coil terminals, one ending in a point, the other in a crudely-cut copper disc.

Both have glass tube handles, and are mounted on modern wood stands with brass screw contacts, allowing the position of the terminals to be adjusted; the plate terminal has a purple patina on its used side.

4057 MAY320 POINT AND PLATE VALVE

GIV 204x122x120; H 251. Mid to late 19 C. G.

A glass tank holds an insulating bung with a platinum point facing a lead plate attached to the ebonite lid.

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The platinum point can be moved in or out using a screw (now stuck); there is a brass terminal on the lid to the plate, and at the bung for the point; this constitutes a "Callan point-plate valve". McLaughlin 1955,737 records that this arrangement was employed to illustrate the method used by S.M. Yeates to produce an undulatory current in his telephone transmitter; the platinum point dips in acidulated water.

0779 MAY020 POLARIMETER

F.E. BECKER & CO HATTON WALL LONDON NO 708

Sp 221; H 398; CyL 212, D 33. Late 19 early 20 C. R.

Black tripod, pillar, horizontal support and cylinder; brass lens housings; silvered scale 0-110(x2).

Two glass cells.

Dates from Anderson 1990,10-11.

1781 MAY264 POLARIMETER

Franz Schmidt & Hensch BERLIN S. Germany (on 1 cell)

L 502; H 275; HsD 37; C 544x152x99. 1864-1914. F.

Folding tripod legs; brass and oxidised brass; ivory scale 20-0-20 with vernier; two cells; mahogany case.

Legs unscrew, and instrument packs into fitted case; one full length cell (L215) inscribed "F S & H" seems of same date as instrument, other, shorter (L115) with above signature, is later, though it fits in hinged housing; scale read with prism and lens above eye-piece; knurled brass knob at eyepiece end turns long iron bar to focus objective through two cog wheels.

Dates from Brachner 1985,149 and Anderson 1990,75.

1436 MAY056 POLARISCOPE

HIGHLEY LONDON

Sp 224; PvH 275; L 445. Third ¼ 19 C. R.

Tripod base, folding tips; expanding pillar to optical bench for mirror, lens, aperture, lens, and analyser.

The mirror, of elliptical shape, rotates (one support broken) with quarter-circle scale 0-90°; circle of five apertures beyond the first lens; the second rotating lens is in a circular bracket on a pillar with a silvered scale at its base 90-0-90°; the analyser has a silvered scale disc at the end 10-360°, window vernier and clamp; bracket for missing magnifier; the units slide on three separate bases in bench.

Samuel Highley was active between 1853 and 1875, see: Turner 1989,364; Downing 1988,60; Anderson 1990,40.

1800 MAY283 POLARISCOPE

Unsigned

L 80; H 74; HssD 31&34. Turn 19/20 C. G.

Brass and oxidised brass; green tourmaline crystal held in frame; two glass heptagons revolve in two directions.

A convex lens near the base slides on a sleeve round a pillar; a glass plate is missing from the brass frame, turned by knurled knob, with a disc scale at the other side 90-0-90°; an aperture in a brass and oxidised brass disc, can be turned around scale 0-180-0°; the microscope tube in a brass housing revolves around a scale 0-180-0° with a vernier; the pinion focus is detached; the tube has a nicol prism arrangement in an oxidised brass housing on top, and extends downwards towards the aperture; eyepiece lens with hinged mirror in mahogany frame, nichol prisms, and other accessories in drawer.

Dates from Brenni 1988,3-4.

1751 MAY234 POLARISCOPE - NORREMBERG

J. Duboscq à Paris

B 183x184x53; H 583. 1849-1883. F.

Mahogany drawer base, mirror on top; two brass pillars; lens, plate frame, aperture, eyepiece with mirror.

A convex lens near the base slides on a sleeve round a pillar; a glass plate is missing from the brass frame, turned by knurled knob, with a disc scale at the other side 90-0-90°; an aperture in a brass and oxidised brass disc, can be turned around scale 0-180-0°; the microscope tube in a brass housing revolves around a scale 0-180-0° with a vernier; the pinion focus is detached; the tube has a nicol prism arrangement in an oxidised brass housing on top, and extends downwards towards the aperture; eyepiece lens with hinged mirror in mahogany frame, nichol prisms, and other accessories in drawer.

Dates from Brenni 1988,3-4.

0735 MAY010 POLARISCOPE - NORREMBERG

Mon Jules Duboscq Ph Pellin Paris

B 192x191x63; H 484; SD 98. 1883-1886. F.

Mahogany base with drawer; two pillars; mirror on base, lens, glass plate, aperture, lens, eyepiece viewer.

The two lenses, the rectangular framed glass plate, and the aperture (in a brass disc) can all move up and down the pillars; the top viewer rotates horizontally around a silvered scale 0-180-0° with vernier and clamp; scale at side of glass housing partly divided 40-0-40; alternative eyepiece with pointer to top scale.

Dates from Brenni 1988,3-4.

1049 MAY025 POLARISCOPE - NORREMBERG

SPENCER & SON, Dublin

B 243x244x60; H 605. 1864-1886. F.

Brass; heavy base and two pillars; base mirror; revolving glass, aperture, and eyepiece viewer adjustable.

Glass in oxidised brass frame; angled black glass in oxidised brass housing above eyepiece; disc attached to aperture can rotate about a horizontal axis with circular scale to side 80-0-80; eyepiece viewer and aperture can rotate separately in a horizontal plane, 10-360° with verniers.

Dates from Morrison-Low 1989,136.

1676 MAY163 POLEMSCOPE

JONES LONDON

H 72; MxD 45; CD 50, L 74. Early 19 C. G.

"Jealousy glass"; ivory cylinder; brass fittings; centre angled mirror; side hole; plain glass eyepiece.

Objective end has corroded mirror with cotton wool padding between this and angled mirror.

A polemoscope is defined as "a perspective glass so constructed as to give views of objects not lying directly before the eye" (Chambers Twentieth Century Dictionary 1948 - not in Shorter Oxford); masquerading as an opera glass, this was used to view your neighbours!

John R. Millburn, in a letter, dated 19:9:88, noted that the term polemoscope was old - Joannis Zahn's "Oculo artificiali teledioptrico sive Telescopio" (1686) includes a section on "Descriptio et explicatio curiosi panscopii polemi" with diagrams showing telescopes incorporating both inclined and right-angled mirrors for various purposes. He refers to the definition in the Chambers Dictionary. The term polemoscope occurs in one of the bills which George Adams submitted to the Office of Ordnance in 1758, for the use of engineers in North America. He notes that this clearly could not be an opera glass, though contemporary dictionaries indicate that the word was used for devices such as that above.

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Sotheby 1&2:10:92, Lot 586, is a lignum vitae example, and the catalogue records that the "lorgnette de jalousie" was described by Chevalier in his "Conservateur de la vue" as: "an eyeglass which makes it possible for us to see a person on whom our gaze does not seem to rest and which permits us to follow all his actions while concealing the attention we are paying him. Such an eyeglass must frequently lead to dissension, and it is by extension thus called a 'jealousy glass', for jealousy is not the most peaceful of passions. One can say that this glass satisfies the curiosity without impoliteness. From this point of view it is very convenient to use."

Could be Thomas Jones (FL 1806-1861) or William and Samuel Jones (FL 1792-1859) - Crawforth 1988,10.

1755 MAY238 PRISM - HOLLOW

Yeates & Son, Dublin

Sis 82; H 116. Mid to late 19 C. G.

Oxidised brass frame; three glass sides with deposits now clouding them; cylinder cap on central pipe on top.

1784 MAY267 PULLEY WHEEL

Unsigned

Sp 500&380; TaH 914; WhD 590. Mid to late 19 C. G.

Cast iron; tripod foot; vertical support to small wood table; large five-spoke wheel; two pulley wheels attached.

The wood table (W200 - broken) obviously supported some other part of the apparatus; the larger pulley wheel is attached to the spokes of the large wheel; the axle drives the smaller pulley wheel on the other side of the system, below the table.

2559 MAY306 PULSE GLASS

Unsigned

L 196; SrsD 27&28. Mid to late 19 C. G.

Glass; straight tube bent at both sides and ending in spheres; liquid inside boils under hand heat.

"Pulse glass, containing coloured spirit which has been boiled for some time to expel all the air from the apparatus. When one bulb is taken in the hand, as shown in the figure, the heat is sufficient to produce a pressure, which drives the liquid into the other bulb and causes brisk ebullition. The cooling of the liquid consequent on the evaporation produced is distinctly felt."; liquid colour now faded.

Quote from Griffin 1910,460.

1706 MAY193 REACTION VESSEL

Unsigned

BD 107; H 470; DiD 93. Mid to late 19 C. G.

Glass two-chamber cylinder; side arm at smaller bottom chamber; neck between this and tall upper chamber.

This apparatus can have a variety of uses, including the generation or drying of gases.

4050 MAY313 REFLECTION APPARATUS - SEARLE

W.G. PYE & Co ENG CAMBRIDGE

Sp 245&255; W 355; H 328; SD 105. Early 19 C. R.

"Searle's total reflexion apparatus"; grey iron base and tank with windows; mount with scale to suspend cell.

At one side of the tank is a horizontal bar holding a biconvex lens (D35); a sliding pin at the end of this is missing; two parallel vertical bars allow the tank to be raised to immerse a glass cell (49x50), which is held by a bracket below the brass disc scale 0-350°.

Pye 1914,123 describes this: "Searle's total reflexion apparatus for finding the refractive index of a liquid, consisting of a small cell containing a film of air with means for turning through an angle which is measured on a divided circle, trough with glass ends, lens and pin, on substantial metal stand."

1769 MAY252 RELAY

PO 2147 (GPO 2147 on base)

BD 129; H 100; CyHsD 75. Late 19 C. G.

Mahogany base; brass cylinder housing with glass top; two coils; six brass contacts on base "D D U U M T".

1763 MAY246 RELAY

YEATES & SON DUBLIN

B 218x155x40; H 100. Mid to late 19 C. G.

Mahogany tapering base on four feet; two green horizontal coils; brass frame for pivot; copper and iron rocker.

Copper strips on base to connect three (fourth gone) brass contacts to relay.

1765 MAY248 RELAY

Unsigned PHYS. LA(B) R. COLL(EGE)..

B 204x140x15; H 128. Mid to late 19 C. G.

Mahogany base; two upright coils on brass bobbins; brass frames for pivot and contact; glass and mahogany cover.

Coils covered in green paper; five brass contacts on base.

1764 MAY247 RELAY

Unsigned

B 182x139x19; H 178. Mid to late 19 C. G.

Mahogany base; two upright coils on iron base; frames of brass for pivot and contact; hollow cylinder pole piece.

Latter, of iron, is at right-angles to brass bar from pivot; four brass contacts on base.

1594 MAY083 RELAY

Unsigned

B 390x176x27; H 185. c1898. PC.

Mahogany base and supports for two coil relay, electric bell, and Branly coherer, used by Marconi in 1898.

A card notes "A Branly coherer and relay for ringing a bell on reception of wireless waves" used by Marconi for his experiments on a boat transmitting wireless messages back into Dun Laoghaire in 1898.

1076 MAY052 RESISTANCE (?)

SPENCER & SON DUBLIN.

B 450x120; H 140. 1864-1886. F.

Mahogany base and four feet; turned brass pillars at sides; brass and ivory brackets, presumably for metal bars.

Brackets have central groove and would fit two bars; pillars have spheres on top with knurled tightening screws - presumably electrical contacts.

Dates from Morrison-Low 1989,136.

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4335 MAY348 RESISTANCE - STANDARD

= 1 Ohm at 15.2 Cent No.11. Elliott Bros London

H 215; CysD 66&36; LgsD 7; C 288x255x187.

Late 19 early 20 C. G.

Coil housed in water-tight double brass cylinder with ebonite top; two copper wires bent in two right-angles.

The cylinder is hollow; a frame with two screws holds the black-painted wires parallel, as they run from the coil within the cylinder housing to the free ends for placing in mercury contacts; the resistance is housed in a fitted case with some purple velvet lining.

Elliott 1895,30 advertises similar resistances wound with platinum silver, in nickel-silver (rather than brass) cases.

4336 MAY349 RESONATOR - CUP

Unsigned

BD 158; H 280; CuD 185. Late 19 C. G.

Turned mahogany base and pillar lead to a brass sleeve holding a metal cup, to be bowed or struck.

A modern small wooden mallet, with white velvet at one end, accompanies the resonator, which gives out an attractive lasting note when struck with the mallet.

1739 MAY222 RESONATOR - HELMHOLTZ

K (monogram) - Rudolph Koenig

B 507x246x39; D 219-33. 1858-1901. F.

Set of nine brass spherical resonators (tenth missing) on boxwood base with pegs to hold resonators.

Circular hole at the bottom of each and conical projection on top, also with a hole; each resonator labelled with its note - e.g. UT2, SOL3, L.

Dates from Payen 1886,160.

1737 MAY220 RESONATOR - SAVART

Unsigned

B 354x151x46; H 388; CyD 105. Mid to late 19 C. G.

Mahogany base; four feet; metal cup bell on brass pillar; alongside, brass cylinder on expanding brass pillar.

The bell pillar can move away from the cylinder using a cut-out in the base; the cylinder is on a pivot and has a brass two-rod frame to hold a central rod which allows an inner cylinder to be pulled out from the fixed cylinder to alter the resonance volume.

An older version of this apparatus is illustrated in Brenni 1886,23, where it is described as follows (translated from the Italian): "The apparatus known as 'Timbro di Savart' is used to demonstrate the phenomena of acoustic resonance. It is composed of a hemispherical bronze cup fixed on a wooden base and mounted on a massive tripod. In the base is an axle (or stick) bearing a cardboard cylinder inclined at an angle and closed at one end. This, suitably dimensioned, acts as a resonator and, when it comes in proximity to the cup which has been made to vibrate by means of a bow, it considerably reinforces the sound produced. The apparatus is furnished with a second cylinder of lesser diameter made up of two cardboard tubes which move telescopically, one of which has a closed side. With this it is possible to show that resonance takes place only when the cylinder has a fixed volume. In fact the sound reinforcement only occurs when the tubes are in a precisely determined position."

1799 MAY282 RHEOSTAT

PO 502 G.P.O. 502 (8 10\83 hand-written on label below)

BD 101; H 66. 1883. D.

Mahogany base; brass cylinder housing, glass top; white metal scale 0-275; two keys in brass arc on base.

Latter has four holes, two of which join parts of the brass arc; there are three of these with "300" "G.P.O. 502" and "600" on them; keys are of wood and brass; base also has two brass contacts; top of brass cylinder housing moves around to put a different resistance figure opposite a pointer; glass cracked badly; card with instrument calls it a "switch for variable rheostat".

1741 MAY224 RHEOSTAT

Unsigned 1241

D 86; H 38. Late 19 early 20 C. G.

Ceramic base holds two brass contacts and a wire coil; a metal handle with contact revolves about the centre.

The base contacts are connected to one end of the coil and to the handle.

1710 MAY197 RHEOSTAT

Unsigned

L 627; MxH 148; CyD 66. Late 19 early 20 C. G.

Cast iron cylinder on two feet; coil wound on asbestos on this; above this is a screw thread for moving the brass contact, turned by a wood handle on a disc.

4333 MAY346 ROTATING COLOURED DISCS

Invented and Patented by H. Childe (? - indistinct)

B 242x91x5&10. Mid to late 19 C. G.

Stepped mahogany base; two coloured glass discs are counter-rotated to give patterns for a lantern.

On the thin end of the base is a double pulley wheel rotated with a brass and turned wood handle; two threads from this extend to the brass frames around the coloured discs, one of the threads being twisted so that the discs rotate in opposite directions; placed in front of a magic lantern, this mechanical device would project attractive colourful patterns.

0734 MAY009 SACCHARIMETER

Diabétomètre Yvon Duboscq à pinombres Th. & A. Duboscq à Paris

B 515x168x125; H 412; L 487; SD 63. Third ¼ 19 C. G.

Mahogany hinged case; screw-in brass and oxidised brass.

Instrument on expanding pillar; side scale divided on circumference 0-190 "Sucre diabétique" (?); three brass and oxidised brass sample tubes; smaller oxidised pillar screws into other end of base with screw thread for monochromatic light source; "on doit éclairer (light) l'appareil avec la lumière monochromatique".

Brenni 1988,3-4 - Théodore was a brother & Albert a nephew of Jules; illustrated in Duboscq 1885,94.

1857 MAY303 SEISMOGRAPH

Designed by Fr W.O'Leary S.J., built by Howard Grubb?

WesW 658; TaD 658; PrL 2750, D 57,110,450. 1917. R.

Remains of O'Leary inverted pendulum from Rathfarnham Castle; 30 metal hexagons, base table and core pillar.

Circular iron table on three short legs; hexagons with central hole; iron cylinder pillar with plate (D110) at one end and another (D450) 1990mm from this.

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Constructed by or for Fr William O'Leary S.J.(1869-1939) and set up at Rathfarnham Castle in 1917; the remains are parts of the heavy inverted pendulum which was the main part of the instrument.
See R.E. Ingram & J.R. Timoney, Geophysical Bulletin, No.9, 1954; A. Somerfield in Mollan 1990c,90-91.

1063 MAY039 SEXTANT

Heath & Co.Ld.Crayford London S.E. O.H.K.Maguire.R.N.
R 176; L 222; W 232; C 263x247x137. 1901. D.

"Bell" pattern No.1"; brass and oxidised brass; index and horizon glasses, four and three filters; silver scale 0-150.

Reading glass, window vernier and clamp; two screw-in eyepieces, one with three lenses; in square mahogany case.

National Physical Laboratory certificate, August 1901.

4135 MAY339 SIGNAL INDICATOR

G P O A 4645

BD 108; H 83; CyHsD 63. Late 19 early 20 C. G.

Mahogany base; brass cylinder housing with glass top; pivoted brass needle; central fixed brass pointer.

There are six brass screws on the base, and these are connected, under the base, to wires, tapping a hidden coil.

1714 MAY201 SINGING FLAMES APPARATUS

Yeates & Son Dublin

B 259x163x38; H 350; SrsD 39. Mid to late 19 C. G.

Cast iron base and frame for four glass tubes (missing); oxidised brass input tube to four brass spheres and pipes.

Input is horizontal; four stop-cocks in turned brass brackets lead to the spheres with tapering pipes above (two now missing) which would have fitted inside the glass tubes; feet on base have gold paint decoration; damaged - one tube bracket gone but found, one stop-cock lever missing, input pipe was soldered to base, and is now detached.

A card with the instrument calls it "SIR ROBERT KANE'S MUSICAL FLAMES".

1809 MAY292 SIREN - CAGNIARD

Yeates & Son, Dublin.

H 205; MxW 93. Mid to late 19 C. G.

Brass pipe and cylinder; revolving disc with 15 holes; silver metal scale plate 0-90 and 10-50, glass back.

Latter, cracked, reveals endless screw and cogs counting mechanism; one of the two watch hands to read the scales is missing.

1571 MAY060 SIREN - CAGNIARD

Unsigned (with Yeates & Son wind chest)

H 197; MxW 104; DiD 63. Mid to late 19 C. G.

Brass; pipe inlet below cylinder housing; revolving disc with holes; tube to silvered plate with two dials.

Counter plate supported by two turned brass pillars from base plate below cylinder; scales 10-120 and 12-72 (corroded) with watch-hand indicators; glass panel behind to reveal endless screw mechanism; with wind chest 1570 MAY059.

1672 MAY159 SIREN - ELECTRICAL

Yeates & Son Dublin

B 259x166x38; H 120; L 298. Mid to late 19 C. G.

Red-painted cast-iron base; brass siren with coil armature on arm through two coils; two watch-hand counter.

Base has four feet; siren consists of stationary brass cylinder (D65 W36) with air input and revolving disc with holes; the revolving central arm passes, via its armature, to the counter, which reads 0-90 and 0-20; two brass contacts on base.

1572 MAY061 SIREN - HELMHOLTZ DOUBLE

Yeates & Son Dublin

B 369x219x38; H 460. Mid to late 19 C. G.

Mahogany base, four legs, and frame; two brass cylinders; silvered scale plate between, two missing watch hands.

No divisions for one watch hand counter, 0-90 for other; Y-tube on turned mahogany pillar at end of base away from siren; V-shaped pipe on top of siren and right-angled pipe below; handle on disc on frame above upper cylinder to turn cylinder; four pull-out stops on each cylinder num-bered 8 10 12 18 below and 9 12 15 16 on top.

1060 MAY036 SIREN - SEEBECK

YEATES & SON 2, Grafton Street, DUBLIN.

B 482x212x22; H 695; DiD 490; Whd 295.

1840-1864. G.

Mahogany base, supports and driving wheel; pulley system to revolve large cardboard disc containing holes.

Both wheel and cog at centre of disc have three grooves for leathers.

This type of instrument was an improvement on the Savart disc, introduced by Louis Friedric Seebeck (1805-1849) - Turner 1983,136

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

4106 MAY329 SLIT

NEWTON & CO, 3, FLEET ST. LONDON.

Housing 95x57x14. Late 19 C. G.

Brass and oxidised brass; two plates with mechanism between to separate slit plates; two adjusting knobs.

The housing plates are separated by three short pillars; the two knurled knobs projecting from one of the shorter sides control the sprung slit plates.

Newton & Co. were at 3 Fleet Street from 1858-1911, Crawforth 1988,12, Anderson 1990,60.

1569 MAY058 SOUND CYLINDERS

YEATES & SON [sic] DUBLIN

B 381x128x20; H 218-386; CyD 20. Mid to late 19 C. G.

Mahogany base on four feet; four narrow brass cylinders with inserts closed on bottom and open on top.

When the inserts are pulled out they make notes of different pitch, depending on the length of the cylinder; similar instrument 0762 UDP031.

1067 MAY043 SPARK GAP

APPS, 433 STRAND London

BD 248; H 665; PrD 26; SvD 40. c1875. G.

Mahogany base; brass pillar; moving sleeves hold two systems for adjustable electrodes, one glass enclosed.

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The systems have brass disc ends with three ebonite insulated rods and fly nuts joining them, gas inputs and electrical connectors; electrodes in the form of pincer clamps; one has cylinder glass surround with circular window at centre, other is missing this; instrument presumably used to obtain spark spectra.

Firm was at 433 Strand from 1866 until at least 1900, Downing 1988,4.

1595 MAY084 SPARK GAP

Unsigned (π monogram) 1987

B 170x82x22; MnW 367; SrsD 27. c1898. PC.

Mahogany base; ebonite pillars with brass fittings for ebonite-handled sliding arms to two metal spheres.

Brass contacts on top of ebonite pillars; spheres can be revolved in semicircular mounts, with knurled tightening nuts at one side.

Reported to be used by Marconi when he transmitted wireless messages from a boat back into Dun Laoghaire in 1898.

1745 MAY228 SPECIFIC HEAT APPARATUS - REGNAULT

GRIFFIN LONDON

B 457x211x37; H 512. Late 19 early 20 C. G.

Mahogany base and frame; lagged copper water jacket; box below for (missing) calorimeter slides in grooves.

Body being studied is heated in the water jacket; a plate underneath holds it in until this is turned, when it falls into the calorimeter in the lagged mahogany box below; there is a vertical mahogany slide dividing the instrument in two - the box can be slid under the table holding the lagged jacket when this slide is raised.

Apparatus illustrated in Griffin 1910,434; see also Ganot 1877,369.

1042 MAY016 SPECTROSCOPE - DIRECT VISION

Yeates & Son, Dublin

H 330; L 478. Mid to late 19 C. G.

Iron tripod foot; brass; pillar to pivot; telescope, collimator and side collimator from prism housing.

Pillar has wider diameter on bottom half than top; bracket at slit end for reference prism (missing); telescope eyepiece focus by rack and pinion.

1039 MAY013 SPECTROSCOPE - TABLE

ADAM HILGER. London.

L 1880; H 1150; TD 260; SD 457. 1879-1912.

Hartley giant spectroscope; brass and oxidised brass; triangular wooden trolley; table above divided circle.

Fixed telescope (push focus) and moving collimator, rack and pinion slit focus; two eyepiece micrometers to read circle, divided on its side.

Accessories include micrometer eyepiece and grating holder.

Walter Noel Hartley (1846-1913) worked in Dublin from 1879-1912 on the spectra of elements. Another Hartley (ultra-violet) spectrometer by Meacher of London and Yeates & Son (see Ex0102) is in the Science Museum, London - J.Burnett in Mollan 1990,38.

1040 MAY014 SPECTROSCOPE - TABLE

Yeates & Son, Dublin

TH 221; L 403. Mid to late 19 C. G.

Blue-painted iron tripod foot; brass; tapering pillar; fixed collimator; arc scale 120-160° for telescope, focused by rack and pinion.

Prism table of oxidised brass with clamp for prism (present).

4431 MAY351 SPHEROMETER

MAIBEN & CO DUBLIN

Sp 50; H 100; DiD 50. Early 20 C. CT.

Brass and silvered metal; three legs to black-painted frame; central screw thread, with disc; vertical scale.

The screw thread has a point at the bottom and a knurled knob on top; the disc reads 0-90, and the vertical scale at the side 20-0-20 "CMS".

Maiben 1914,441 offers: "2038. Spherometer, feet 4cms. apart, measuring concave and convex faces, reading to 1/200mm. with silvered scales...each £0 7 0"

4160 MAY344 SPHEROMETER

Yeates & Son, Dublin

Sp 88; H 88; DiD 74. Mid to late 19 C. G.

Brass disc with silvered edge 0-90; iron screw below, knurled brass knob above; in three-legged base.

The three iron pin legs fit into a brass bracket which, at its centre, holds the screw from the disc; the instrument is housed in a glass dome on a black turned wood base, but the dome does not fit the groove on the base.

1495 MAY057 SPINNER

YEATES & SON [*sic*] DUBLIN

Sp 274&284; H 580; WhD 234. Mid to late 19 C. G.

Mahogany; tripod base, turned pillar; large wheel near base; two small wheels at top sides and one on top arm.

Wheels have grooves for missing leathers; hook from horizontal wheel on top arm will rotate anything attached to it around a vertical axis.

"By means of this apparatus it is possible to show the difference between static and dynamic equilibrium, where the position is governed by both gravitational and centrifugal forces..." - Turner 1973,163.

1690 MAY177 STEREO VIEWER - BREWSTER

DS (Duboscq-Soleil monogram)

B 187x95; H 160. Mid 19 C. G.

Mahogany fan casing; two brass push focus eyepieces; flap on side at bottom; with slide "Salon 1er Consul".

Damaged; slide has printed "RÉSIDENCES IMPÉRIALES LES TUILERIES" and hand-written "Salon 1er Consul".

The stereo viewer was invented by David Brewster (1781-1868) and announced in 1849, Turner 1983,op304.

DS monogram interpreted in Morrison-Low 1984,98.

4161 MAY345 STOOL - INSULATED

Unsigned

T 848x547x28; H 280. Mid 19 C. G.

Mahogany table, of three planks, with edging at the narrow sides, on four tapering glass legs.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1642 MAY129 SURVEYING STAFF

DIXON & HEMPENSTALL OPTICIANS 12, SUFFOLK ST. DUBLIN

L 2978; W 48. Early 20 C. G.

Mahogany with brass fittings; folding with two hinges; lead plumb bob in hollow; scales 1/1-1/30-level, etc.

Other scales 6/1-2/1-vertical and 95-175.

Firm at this address from 1904, Morrison-Low 1989,123.

1631 MAY118 SWITCH

YEATES & SON DUBLIN

B 330x180x12. Mid to late 19 C. G.

Vertical mahogany base and shelf for pivoted rod with copper wire to two mercury cups and core to electromagnet.

Adjustable weight on arm of rod on the other side of the pivot to the copper wire and core; four brass contacts on shelf, two for the green-covered coil.

1071 MAY047 SWITCH

YEATES & SON DUBLIN

B 214x142x22; PvH 103; CoHsD 50. Mid to late 19 C. G.

Electromagnetic contact breaker; mahogany base; pivot; one side has a coil with a moving iron core; the other has mercury cups.

Green-covered upright wire coil in brass mount with brass contacts; brass beam from central pillar for core and for wire dipping into two mercury cups with electrical contacts; tension spring attaches to the side of the beam with the wire.

1788 MAY271 SWITCH

Unsigned

Sp 208; Hs 171x171x95; H 219. Early 20 C. G.

Black metal cage housing for two coils on ceramic cores; on top, sprung handle with contact to seven switch points.

Top also has a small multi-turn copper coil; on side of housing are three terminals "L F A" hand-written and also "½PS ½L 220V".

A label on the instrument calls it a "starting switch" - could also be considered a rheostat.

1600 MAY089 TELEGRAPH - ALPHABETICAL

DELEUIL A PARIS

B 309x210x29; H 210; DID 139. 1855-1893. R.

Two; mahogany base; supports for brass ring with alphabet and numbers; two coil electromagnet and bell.

Ivory handle to revolve brass limb with circular window to

display required letter; four brass contacts on base; two of these are connected to arched copper rods - one contacts central wheel all the time and the other connects with one of 18 teeth as arm is revolved.

Assumed to be Deleuil Fils as Deleuil Père has dates 1820-1855, Payen 1986,159.

1757 MAY240 TELEGRAPH - MORSE

GENERAL POST OFFICE G.P.O. 280

B 152x82x22; H 176 c1880. G.

Mahogany base and housing; two brass contacts at sides; circular green dial; central needle, two ivory stops.

Dial, as well as having "GENERAL POST OFFICE" in a scroll on top, has a shamrock, thistle and rose below; dial has two small green knobs at either side.

Rheostat 1799 MAY282 (Serial No 502) has date 8 10/83 handwritten on label below.

1760 MAY243 TELEGRAPH - MORSE

YEATES & SON Dublin

B 265x117x28; H 277; ReD 114. Mid to late 19 C. G.

Mahogany base; brass; clockwork mechanism; electro-magnetic relay system; prints on tape from brass reel.

Arm on pivot from the brass structure has iron cross arm to poles of two green-covered coils wound on wooden bobbins; at the other end from the coils, it has a spike to hit the tape which is pulled by the clockwork.

1758 MAY241 TELEGRAPH - MORSE

YEATES & SON, DUBLIN.

B 210x132x55; H 210; DiHsD 76. Mid to late 19 C. G.

Mahogany tapering base; brass frame; two ebonite housed coils; cylinder dial housing on top for needle.

Base has brass contacts; the brass bridge holding the glass-covered green dial has two tightening knobs for the taper which has an iron side piece over the poles of the coils; the needle is held by a brass support, and the dial has two ivory stops for it on top.

1762 MAY245 TELEGRAPH - MORSE

Unsigned

B 154x81x24; H 300. Late 19 early 20 C. G.

Black boxwood base and frame; brass supports for red and blue coils with needles on both sides between.

Rather rudimentary apparatus, presumably designed to be inexpensive; two brass contacts on base, which has four feet.

1761 MAY244 TELEGRAPH - MORSE

Unsigned

B 179x154x14; H 186. Mid to late 19 C. G.

Mahogany base; needle on front moved by two coils; horse-shoe laminated magnet, two coils in front turned by arm.

The white paper behind the needle, which had a morse key, is almost completely gone; the arm behind has an ivory plate at right-angles at the end which is pressed to alter the position of two coils on a spring across the poles of the triple horse-shoe magnet; the base has four brass contacts and copper strip connectors.

A card with the instrument notes it is a "Morse signalling key and receiver".

1759 MAY242 TELEGRAPH - MORSE

Unsigned

B 240x205x34; H 453. Mid to late 19 C. G.

Mahogany housing has two wood rods below, inclined tray in centre, and green dial with needle & code key on top.

Dial has brass fittings to hold and stop the needle; two brass contacts at sides.

1782 MAY265 TELESCOPE - REFRACTING

GUN SIGHTING TELESCOPE X8 J.H. Dallmeyer LONDON 1918 No. 88198

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

L 523; D 64; C 685x145x116. 1918. S.

Oxidised brass; eyepiece focus by revolving short draw; central inclined lens on screw thread.

Boxwood case inscribed: "X8 GUN SIGHTING TELESCOPE G 340".

4048 MAY311 TELESCOPE - REFRACTING

Made by Yeates & Son DUBLIN

B 318x235x24; BD 143; TuL 1233; LeD 70.

Mid to late 19 C. G.

Oak base; iron equatorial support; brass declination and

hour circles, tube, and finder; eyepiece focus.

The mount leads to an angled cogged disc (D86), turned by a worm screw (key missing); a bar through the axis of this leads to the hours circle (D116) I-XXIII, near the bottom of the mount; a cross bar above leads, on one side, to the declination circle divided 0-350°, with a vernier and, on the other, to the bracket for holding the telescope tube, which has a small finder; the rack and pinion eyepiece focus does not now work.

1813 MAY296 TESLA COIL APPARATUS

W. & J. GEORGE LTD. LATE F.E. BECKER & CO 33-37 HATTON WALL, HATTON GARDEN, LONDON WORKS:- BIRMINGHAM 035

B 620X290X45; MxH 605; CosD 155&53. Early 20 C. G.

Slim coil in centre of wider coil; spark gap has one end attached to wide coil and other end to leyden jar.

The black wide-diameter coil is on three brass and glass insulating legs on a mahogany table slightly raised from the mahogany base; the slim coil is of green wire and surrounded by glass between brass ends; the spark gap contact to the leyden jar is to the central conductor, through a mahogany lid.

Historical Technology 109,1974,267 records that Nikola Tesla (1856-1943) was born in Europe but became an American in 1884; he was a major worker in the early years of electrical power, inventing a system of arc lighting in 1886, the Tesla motor and system of alternating current power transmission in 1888, generators of high frequency current in 1890, the Tesla coil high voltage transformer in 1891, and many other concepts and devices centred on the use of high frequency currents.

0733 MAY008 THEODOLITE - PLAIN (ALTAZIMUTH)

Tho Heath Londini Fecit (base "Rev G. Griffith Dublin")

L 426; CrD 208; SD 204; C 465x241x127.

Second ¼ 18 C. R.

Brass; telescope on large arc of vertical circle over compass with spirit level; racked horizontal circle.

In octagonal boxwood case with elongated sides to fit telescope; circle divided 10-360° with three verniers; compass scale 10-80°(x4), on raised edge 10-360°; arc scales 90-0-90; 90-0(x2) and 25-0-25; level with orange liquid alongside telescope, line and window sights above and below; flaps for lenses.

Turner 1983, 250 records that the addition of telescopic sights by Heath closely followed this introduction by Jonathan Sisson in 1725.

Good photograph in FitzMaurice Mills 1983,83.

1038 MAY012 THEODOLITE - SIMPLE

F.W. Breithaupt & Sohn in Cassel 1876 St: 1762

Sp 107; H 144; TeL 316. 1876. S.

Brass; tribach foot; three level screws; horizontal divided circle; spirit level; telescope mounted above; scale 0-350°.

Firm exhibited at 1851 London Exhibition, Turner 1983, 309.

0763 MAY019 THEODOLITE - TRANSIT

J. Hughes, London.

Sp 171; H 374; CrsD Ho168, Ve151. 1849-1878 R.

Brass and oxidised brass; tribach base; tripod, three level screws; circle; compass; vertical circle and level.

Horizontal circle adjusted by tangent screw with clamp, magnifier and spirit level; compass on top; trunnions to axis of vertical circle, spirit level on side; circle read by two magnifiers; spirit level on axis of circle; rack and pinion objective focus of telescope; scale of vertical circle 0-90-0-90-0°, and of horizontal 10-360°.

Clifton 1995,144 lists a Joseph Hughes II from 1849-1878.

1576 MAY065 THERMAL CONDUCTIVITY APPARATUS - DESPRETZ

YEATES & SON DUBLIN

B 383x127x23; H 335 c1883. CT.

Mahogany base; brass pillar and (replacement) wood frame to hold metal bar and support three thermometers.

Second bar found; bars extend beyond frame where they can be heated; each has three holes along its length for bulbs of thermometers; mahogany cross bar on top, also with three holes to support thermometers (latter not now with apparatus, though there are several Yeates ther-mometers in the collection).

Yeates 1883,19&20 lists "Despretz's Apparatus for measuring the difference in conduction power of different metals, with three bars and three thermometers."

1618 MAY107 THERMOMETER

Unsigned

D 56; W 9; CD 66, W 17. Mid to late 19 C. G.

Silver housing, glass top and bottom; registers through expansion of circular metal bar; in red case.

Scales of "Fahrenheit, Centigrade, and Réaumur"; end of bar attached to a fan-shaped lever with cogs at other end which turns a cog wheel on a hair spring to revolve the indicator watch hand; in red leather-covered case lined with silk and velvet.

1602 MAY091 THERMOMETER WITH ELECTRICAL CONTACTS

YEATES & SON DUBLIN.

B(-Ris) 190x44; B(+Ris)L 214. c1883. CT.

Boxwood base scale 0-110°; two brass electrical contacts - one to lower mercury bulb, one to upper (broken); mounting rings at rounded base ends.

Yeates 1883,9&11 illustrates a similar thermometer (though with a spherical mercury bulb rather than the elongated bulb here) "Thermometers, with electrical contacts, which can be set to complete any electrical circuit at any required temperature, and thus ring bells, discharge guns, &c £1:1:0." - Yeates 1883,51.

1055 MAY031 THERMOMETER - DIAL

Made by Yeates & Son, Dublin.

Sp 195; PrH 510; DID 231. Mid to late 19 C. G.

Iron tripod foot and pillar; silvered disc dial; 0-110°F; mercury reservoir, contact to missing needle.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1638 MAY125 THERMOMETER - GLASS MERCURY

DR. FORBES SPECIFICATIONS.

L 145; D 13; HsL 255, D 22. Mid to late 19 C. G.

Turned boxwood housing with windows for bulb and paper scale around stem 0-140°; removable top.

3518 MAY307 THERMOMETER - GLASS MERCURY

Yeates & Son Dublin

L 182; TuD 6. Mid to late 19 C. G.

Thin cylinder reservoir; white-backed scale 30-50°C; hand-engraved signature.

4047 MAY310 THERMOMETER - GLASS SPIRIT

Yeates & Son Dublin Centigrade

L 320; TuD 7. Mid to late 19 C. G.

Dark red spirit indicator; white-backed scale 0-40°; hand-engraved signature.

1603 MAY092 THERMOMETER - GLASS SPIRIT

Yeates & Son Dublin

L 181-321; WorD 4½-8. Mid to late 19 C. G.

Three; dark red spirit indicator; white-backed scales -10-40°(x2) -20-40°; elliptical cross-sections.

Hand-engraved signatures.

1605 MAY094 THERMOMETER - LESLIE DIFFERENTIAL

YEATES & SON, DUBLIN

BD 113; H 438; BusD 32. Mid to late 19 C. G.

Boxwood base and frame for glass U-tube; two bulbs at top and stop-cock in high connecting arm; white scale 0-90°.

Scale on one side only.

1601 MAY090 THERMOMETER - MAXIMUM

YEATES & SON, 2 GRAFTON-ST., DUBLIN MAXIMUM NO..220

B 352X51. 1840-1864. G.

Oak base; white ceramic back with raised scale 0-140°; mercury glass thermometer; mounted horizontally.

Address suggests early date - probably George Yeates & Son 1840-1846 or 1859-1864, Morrison-Low 1989,139.

1606 MAY095 THERMOMETER - MAXIMUM & MINIMUM

T. MASON 11. ESSEX BRIDGE DUBLIN

Hs(-Ha)L 284, +Ha 350; MxW 76. 1878-1883. FA.

Grey tin housing; glass three-limb thermometer; mercury

and alcohol (now mixed); white glass scale 20-130°(X2).

Hinged lid; maximum and minimum markers (one now in upper bulb); glass broken at bottom of middle limb, and some mercury gone.

Dates from Morrison-Low 1989,131.

1609 MAY099 THERMOMETER - MINIMUM

CASELLA'S PATENT MERCURIAL MINIMUM 372 23 HATTON GARDEN LONDON

B 354X54. 1865-1870. A.

Oak base; white ceramic backing and scale -30-0-120°.

Scale raised above backing; glass/mercury thermometer with small bent mercury-filled side arm on stem just above mercury bulb.

Dates for Louis Casella from Clifton 1995,51.

4130 MAY334 THERMOMETER CALIBRATION HEATER

GRIFFIN KINGSWAY LONDON W.C.

BD 116; H 392; CysD 50&35. Early 20 C. R.

Copper; cylindrical water tank (feet missing); fixed cylinder with top hole for thermometer; inner cylinder.

The tank at the bottom has three grooves for the missing feet, which would have allowed a heater underneath to boil the water; the outer fixed cylinder has an angled drain pipe near the bottom, and a horizontal pipe near mid way for a (missing) manometer; the inner cylinder fits into the outer, and would protect the bulb of the thermometer.

The apparatus is illustrated in Griffin 1910,422: "Copper heater for determining the boiling point of a thermometer.

With a suitably calibrated thermometer, the apparatus could also be used as a hypsometer, and a label giving this latter designation is attached to the apparatus.

4105 MAY328 THERMOMETER SCALE

R. Spear Dublin Instrument Maker to His Majesty's

Revenue for Ireland

325x42. 1791-1837. F.

Brass plate, with scale 10-210°F; thermometer missing.

The scale notes the positions "Freezing" and "Water Boils" on one side; and "Spirit Boils", "Fever Heat", "Blood Heat", "Summer Heat", and "Temperate" on the other; the scale has a circular hole for the reservoir, and other holes for securing the thermometer.

Dates from Morrison-Low 1989,135.

1650 MAY137 THERMOPILE

Made by YEATES & SON Dublin

BD 98; H 255 Mid to late 19 C. G.

Brass; base has two contacts with external wires to thermopile above pillar and pivot; one removable cone.

1731 MAY214 TRADE LABEL

YEATES & SON, LTD. MANUFACTURING OPTICIANS CONTRACTORS TO H.M. GOVERNMENT, 2 Grafton Street, Dublin.

184x58x28. Early 20 C. G.

On two cardboard boxes containing galvanometer parts.

Boxes made by "Cherry & Smallbridge Ltd., Boxmakers, Dublin"; each contains brass inserts for D'Arsonval galvanometer (1732 MAY215).

Morrison-Low 1989,140 - listed as "Manufacturing Opticians" in Directories from 1911.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1744 MAY227 TUNING FORK - LISSAJOUS

Made by Yeates & Son, Dublin.

BD 127; H 440; SrD 29. Mid to late 19 C. G.

Cast-iron fluted base and pillar; on top, brass sphere, hole for horizontal fork; mirror and weight on prongs.

Sphere has square hole and knurled clamping nut for base of fork; similar to 1743 MAY226, except that the fork is mounted horizontally rather than vertically; signature is on brass weight disc which balances the plane mirror on the other prong.

1743 MAY226 TUNING FORK - LISSAJOUS

Made by Yeates & Son Dublin P S STUBS STEEL 2.70

BD 129; H 413-430. Mid to late 19 C. G.

Three; cast iron fluted base; turned brass pillar; white metal fork with mirror and brass disc on prongs.

Pillar ends in a sphere (D28) with a square hole for the base of the fork and a tightening nut - one of these is knurled and the other two are screws; the signature is on the brass disc which balances the weight of the plane mirror on the other prong; "STUBS" on only one fork, which is secured to its square base with a brass nut - the other two do not have this nut.

1817 MAY300 TUNING FORK ON RESONANCE BOX

YEATES & SON OPTICIANS DUBLIN UT3

Bx 309x120x68; H 294. Mid to late 19 C. G.

Two; boxwood resonance boxes with mahogany veneer; upright white-metal forks on turned wood bosses.

The boxes have one open end; each is labelled UT3.

4126 MAY330 TUNING FORK STAND WITH ELECTROMAGNET

W.G. PYE & CO CAMBRIDGE ENG.

Sp 210; H 624. Early 20 C. R.

Heavy iron foot; slot for clamping tuning forks; pillar has bracket for electric terminal, and pivoted magnet.

The apparatus can be use vertically or horizontally; there are four tuning forks, labelled 30, 64, 64 and 100 cycles per second; the electric terminal is on an adjustable brass and ebonite bracket and, when the fork vibrates, a spring on its side makes contact with a point connected to the terminal; further along the pillar is another adjustable brass bracket with a pivot holding the coil, which can be placed between the prongs of the fork.

Pye 1914,34 describes this as: "Tuning Fork Stand for holding large forks vertically or horizontally, fitted with improved platinum contact makers and electromagnet for maintaining the vibrations in both positions. The contact maker which we fit to our stands and tuning forks enables the forks to be run for long periods without attention. Mercury is entirely dispensed with and the forks vibrate with increased amplitude and at constant rates."

1748 MAY231 TYPEWRITER

Hammond MADE IN U.S.A.

B 370x356x24; H(-Ld) 178. c1905. D.

Oak base; 32 keys; Ivory space bar and signature plate; keys raise rods in springs, varying pivoted arm above; a wood lid fits over the shaped base and instrument.

Presented by J.F. Lynch, 29:9:88, who supplied a photocopy of two pages of "History of Typewriter Manu-facturers" - includes details of Hammond instruments dating from 1893; this is Model 12 dating c1905.

1573 MAY062 VAPOUR PRESSURE APPARATUS

YEATES & SON DUBLIN

B 307x205x18; H 1008; TusD 15. Mid to late 19 C. G

Mahogany base and frame; iron mercury reservoir; brackets for two (of four) glass tubes with funnels and stop-cocks.

Taps missing; central boxwood scale 0-899mm; floral pattern brass flaps to secure glass tubes, top and bottom; two original glass tubes gone; third tube is not original; reservoir secured to base by two brass knurled knobs.

1812 MAY295 VIBRATING ROD FOR LISSAJOUS FIGURES

Yeates & Son Dublin

BD 126; MnH 330. Mid to late 19 C. G.

Cast iron fluted base; brass frame to disc with clamp; white metal rod, pointed piece at right-angles on top.

The bottom half of the vibrating rod is rectangular and can be clamped at any height in the disc; the top half is welded at right-angles to this and tapers to a point at top.

See also the entry for the Kaleidophone, 0803 UDP069.

1677 MAY164 VOLTAMETER

AC or CA (monogram) Nos 125789 & 125793

BD 115; H 163. Late 19 C. G.

Two; mahogany base, two brass contacts; brass pillar to glass goblet, two exposed wires in red plug at bottom.

"8/-" on base.

1678 MAY165 VOLTAMETER

F.E. BECKER & CO.. W. & J. George, Ltd. Succrs. 33-37, HATTON WALL Hatton Garden LONDON, E.C.

B 170x110x18; H 228. Early 20 C. R.

Mahogany base; copper vessel and disc; electric contacts.

To measure strength of a current by deposition of silver due to electrolysis; disc supported by bent wire pillar from the base, with clamp to adjust rod attached to the disc; the latter can be lowered into the copper basin on the base; two brass contacts on base to connect to disc and basin; base stamp reads: "W.& J. GEORGE LTD. LONDON & B'HAM"; signature plaque has "Speciality: Balances & Weights".

Dates from Anderson 1990,10-11.

1679 MAY166 VOLTAMETER

W.G. PYE & CO CAMBRIDGE ENGLAND

B 127x102x15; H 135. Early 20 C. G.

Two; mahogany base; brass support for rod and copper cylinder; copper crucible; electric contacts.

Support bent in right-angle and ending with a clamping screw for the rod, which can thus be lowered into the crucible.

The type is called Poggendorf's silver voltameter in Ganot 1890,831, and used to measure the strength of a current using electrical deposition from silver nitrate; illustrated in Pye 1914,105 but advertised with a teak stand which suggests this is pre 1914.

1068 MAY044 WEATHER STATION

Yeates & Son Dublin

Sp 445; H 1304; T 762x179. c1877. CT.

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Mahogany stand; table top holds wind speed and direction indicators and a rain gauge; electric contacts. Designed to be connected to external mounted anemometer, vane, and rain collector; wind speed indicator and rain gauge on mahogany bases with glass surround and each with two silvered circular scales actuated by electromagnetic coils; central larger wind-direction indicator is similarly mounted and has a compass rose face; the scales on the wind speed indicator are "Hundreds" 0-90 and "Miles" 0-90; on the rain gauge, "Inches" 5-45, "Hundredths" 0-90; mounted on a turned wood stand with an iron tripod base; six brass screw electric contacts near the base of the stand. Indicators illustrated in Yeates 1877,47-9.

1056 MAY032 WEIGHTS - IMPERIAL

J. SPENCER Optician 13, Aungier Street DUBLIN
C 122x69x21. 1852-1863. A.

Mahogany case holds nine rectangular brass weights, 2-1000 grains; space for smaller weights, two present. Paper label inside lid, more small weights in box in drawer of balance 1057 MAY033, where this set is located. Dates from Morrison-Low 1989,136.

1570 MAY059 WIND CHEST

YEATES & SON OPTICIANS DUBLIN

Sp 279&177;H 138;Ch 202x100x61. Mid to late 19 C. G.

Iron base, four legs; mahogany; three brass pipes at one side; two stops at other; two holes on top for pipes, sirens, etc. One of side pipes has a stop-cock; stop wires have turned wood knobs, but one is now missing; displayed with siren 1571 MAY060.

1596 MAY085 WIRELESS EQUIPMENT

THE MARCONI SCIENTIFIC INSTRUMENT CO LTD

B 178x175x98-268x175x98; H 140-165. Early 20 C. G.

Amplifier, condenser, detector, and tuner - all with mahogany bases, ebonite plate tops, and brass fittings.

Amplifier and detector note "filament resistance", condenser "NO 1211 UNIT SYSTEM", and tuner "NO 1109 UNIT SYSTEM".

4127 MAY331 WOLUFF BOTTLE

Unsigned

BD 66; H 125. Mid 19 C. G.

Glass; cylindrical vessel widens slightly with height; closed top but for two vertical lipped openings on top.

Both openings have the glass ground inside. This bottle is named after its Irish inventor, Peter Woulff (c.1727-1803) - Turner 1983,206.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

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Valentia Observatory
Cahirciveen
Co. Kerry
Telephone (066) 72115

4520 MET019 ANEMOMETER - ROBINSON BECKLEY RECORDING

R. & J. Beck London [on clock]

C 590x532x310. 1867. R.

Cup anemometer and direction vane on roof; rods to brass mechanism in glazed mahogany case; Valentia.

The angular velocity of the shaft which carries the cups is reduced by a train of wheels so that the rod which leads into the recording instrument revolves once for every 700 revolutions of the cups, thus limiting friction; one revolution of this rod results in one turn of a horizontal cylinder which carries the "velocity pencil" in the shape of a spiral slip of brass projecting from its surface; the pencil presses on a sheet of metallic paper wrapped around a clockwork cylinder to record the velocity; another rod allows the recording of the wind direction; the clock operating the horizontal recording cylinder is mounted on a mahogany base, and is signed "R. & J. Beck".

The Valentia Observatory Catalogue (Anonymous, undated) records that Thomas Romney Robinson's anemometer, with certain mechanical modifications by Mr Beckley, was adopted by the Meteorological Committee in 1867; the instrument was made partly by R. & J. Beck and Mr Casella; when the velocity spiral has revolved once, the wind will have passed through 50 miles. The instrument was in operation in Valentia Island from August 1868 until March 1892, when it was moved to the mainland, continuing in operation until 1964; it was replaced as official station anemometer in 1931 by a Dines Pressure Tube Anemograph.

The instrument is described in the Report of the Meteorological Committee of the Royal Society for the year ending December 1867, pages 47-51 and Plate IV.

4503 MET002 BAROGRAPH - ANEROID

WILSON, WARDEN & CO LTD LONDON No 2805/36 [Trade mark M O - with the O inside the M]

Hs 310x195x155. 1936. N.

Mahogany base on four feet with hinged glazed lid; brass mechanism; seven evacuated chambers; Dublin.

The glazed cover is damaged; at the side of the base is a long hollowed-out thin drawer for an extra scribe arm.

4521 MET020 BAROGRAPH - DINE'S FLOAT

Unsigned - but made by the British Meteorological Office

C 1104x494x314. 1921. R.

Glazed mahogany case houses mercury barometer with float mechanism to clockwork recording drum; Valentia.

The glass mercury tube is of a more than usually complex shape - a short narrow vertical limb on the left side turns 180° into a long limb of the same diameter, which again turns 180° at the top and leads to a wide bulb with an air surface above a new column of mercury of greater diameter than the first; this again turns 180° at the bottom to a cylinder cistern of the same wide diameter as the bulb, and in this cylinder is a glass sphere float, surrounded by ball bearings floating on the mercury surface; the height of this float is translated, via a mechanism involving a four spoke wheel (Dc130) to a clockwork recording drum.

The Valentia Observatory Catalogue (Anonymous, un-dated) records that the barograph was received in 1921. "This is a siphon barometer. The movements of the mercury in the lower cistern are communicated by means of a glass float and a platinum wire suspension to the smaller of the two wheels mounted on the same axis. The larger wheel carries a platinum suspension to which the recording pen is attached. The magnification introduced by the different size wheels causes changes of pressure to be reproduced on about twice the scale of the mercurial barometer. The barometer is constructed with the upper portion of the same diameter as the cistern so that the movement of the mercury in the cistern is very much greater than in a barometer of the normal pattern. Compensation for temperature changes is obtained by enclosing a definite volume of air under the float. The ball bearings under the float are to reduce friction. This instrument can record sudden minor changes in pressure due to the magnification of the movement of the mercury and its open time scale."

Reference is given to the Meteorological Observers' Handbook 1939.

4511 MET010 BAROGRAPH - PHOTOGRAPHIC

Adie London

[On lens] J.H. Dallmeyer LONDON 13841 BAROGRAPH LENS

St 1681x1093x358. 1868. AQ.

Brass; mahogany and slate stand holds mercury barometer, lamp, lenses, and recording clockwork drum; Valentia.

A glass and brass lamp is located at one end of the stand, then comes a bulls-eye condenser, by means of which an enlarged image of the flame is thrown upon the void space above the mercury of the barometer; a slit then narrows the beam which is bounded on the bottom by the surface of the mercury, so that, as the barometer falls, this luminous slit becomes longer and, as it rises, it becomes shorter; next comes the Dallmeyer photographic lens, by means of which the luminous slit is projected onto the sensitive paper on the recording drum; this is turned by a pendulum-controlled clock so that it turns once in 48 hours; the clock also operates a stop which cuts off the light from the paper for four minutes every two hours to check the accuracy of the chart; the instrument also incorporates a means of allowing for the temperature using zinc rods attached securely at one end to the slate base and, at the other, to a pointer, which acts on levers to move a light stop, thus giving a base line on the chart.

The instrument was received new in Valentia in August 1868. It is described in the Report of the Meteorological Committee of the Royal Society for 1867, pages 40-42, and Plate III. It was moved to the mainland in March 1892, and was maintained in operation until 1977.

4510 MET009 BAROGRAPH - PHOTOGRAPHIC, TABULATING INSTRUMENT

R & W Munro London

L 764; W 346; Fr 718x241. Mid to late 19 C. G.

Mahogany frame, with glass plate; brass; sliding bar with scales, vernier and two viewing tubes; Valentia.

The frame sits on two parallel inclined feet; the glass plate covers about three quarters of the frame; on top is a brass guide bar with an adjust knob on the left hand side; on this slides a shorter bar attached to a large arm at right-angles; on this, at the top, is a sliding plate with a small turned pillar holding a pivoted viewing tube; the position of this plate can be adjusted a little by a screw on the bottom, which also adjusts a scale 90-105 and 27-32; a larger sliding plate with a window vernier 0-5

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

moves on the scale with a rack and pinion adjust, and it also holds a pivoted viewing tube on a small turned pillar. The instrument was used to tabulate the photo charts from the photographic-barograph.

4509 MET008 BAROMETER - FORTIN

Adie London. 1274.

H 1035; MxD 81. Pre 1877. D.

Brass; glass-covered cylindrical brass scale with vernier; thermometer on front of shaft; Valentia.

The scale is 27-32", and the vernier in the middle, 1-5, is adjusted by rack and pinion; the glass-mercury thermo-meter has scale 0-140°; the cistern surround is of black-painted metal, with two small windows to see the ad-justment of the mercury level; the adjusting knob at the bottom is detached.

A card with the instrument notes that the first record of this barometer was February 1894, and it was used as the Valentia standard from 1894 to 1917. However, the Observatory Museum Catalogue (Anonymous, undated) records that it is probably pre-1877 since, from that date, all instruments verified at Kew Observatory were hall-marked with a symbol, which does not appear on this instrument.

4507 MET006 BAROMETER - FORTIN

CHADBURN BROS. SHEFFIELD No 463 463 STANDARD TEMPERATURE TEMPERATURE FOR 1000 MB 285°.1A[K]15 [K] = Kew symbol

H 1020; MxD 65. 1915. D.

Brass; glass-covered cylindrical silver metal scales, with vernier slide; thermometer on front; Valentia.

The scales are 27-32" and 91-110, and the verniers in the middle, 1-5 and 1-10, are adjusted by rack and pinion; the glass-mercury thermometer in front of the shaft has scale 260-340° "ABSOLUTE"; the mercury surface is surr-ounded by a glass cylinder, with three supports outside, and with an ivory pin inside to reflect in the surface; a knob at the bottom adjusts the mercury level.

A card with the instrument gives the date 1915, and records that it was the standard barometer at Valentia from 1917-1949.

The [K] represents a symbol incorporating an O with a shape like a Greek alpha inserted, with two small ° signs at top and bottom left.

(Note: The standard barometer used at Valentia from 1955 is a Casella [1950], No. 3854; and that used since 1963 a Tonnelot [1961] No.919.)

4508 MET007 BAROMETER - MARINE

ADIE London 1673/22/34 MD. STANDARD TEMPERATURE FOR 1000 MB 283.2a[K]22 282°.7A[K]16 [K] = Kew symbol

H 886; MxD 50. 1916. D.

Brass; glass-covered cylindrical silver metal scale with vernier; gimbal mount; thermometer; Valentia.

Kew pattern; the scale is 88-109, and the vernier in the middle, 1-10, is adjusted by rack and pinion; the glass-mercury thermometer in front of the shaft has scale 270-320°, and is marked "D12026"; the cylindrical mercury reservoir is painted black.

A card with the instrument records that it was the spare station barometer, first calibrated in Kew Observatory in 1916, and re-calibrated in 1922 and 1934.

The Valentia Museum Catalogue (Anonymous, undated) notes that it is not necessary to adjust the level of mercury in a Kew pattern barometer as a correction is built into the scale to compensate for the rise or fall of the mercury - the scale is shortened by 0.04 of an inch for every inch.

The [K] represents a symbol incorporating an O with a shape like a Greek alpha inserted, and with two small ° signs at top and bottom left.

(Note: The Dublin Office has a Kew Pattern Marine barometer by F. Darton & Co. Ltd. London, No. S. 3455/47, presumably dated 1947.)

4505 MET004 BAROMETER - STICK

J. HICKS 8, HATTON GARDEN LONDON M.O. ?144 s e 105

[Plaque] LENT BY THE METEOROLOGICAL OFFICE LONDON

H 985; MxW 180. 1864-1884. R.

Carved oak frame with flat, layered top and square cistern cover; glazed ivory scale plates; thermometer; Dublin.

The angled scale plates 26-31" have sliders "10 A.M. YESTERDAY" and "10 A.M. ToDAY", with the addition "ADD ONE TENTH FOR EACH NINETY FEET ABOVE THE SEA"; two turned ivory knobs below the scales move the sliders; on front of the case is a glazed glass-mercury thermometer 10-140°.

A card with the instrument reads: "The Coast or Fishery Barometer This form of barometer was designed by Admiral Fitzroy, who as Captain Fitzroy had commanded H.M.S. "Beagle" when, with Charles Darwin on board, she had made her historic voyage to south America. The inscription was also designed by Fitzroy. It had been the practice (and unfortunately still is, in the case of ornamental household instruments) to indicate on the dials that high pressure meant "very dry", low pressure "stormy" conditions. This new form was intended to show that weather depended on more than atmospheric pressure. This type of barometer was of very robust construction to make it suitable for use in exposed conditions. Introduced before 1850, by 1870 over 100 had been installed at various places around the British and Irish coasts, primarily for the use of sailors and fishermen. This particular example, dating from about 1875, was for many years at Killybegs, Co. Donegal."

Banfield 1985b,189 records that Fitzroy devised the weather indications of the scale plates in the early 1860s; these are different from those on the usual stick barometers - "RISE FOR N. ELY. NW. N. E DRY OR LESS WIND EXCEPT WET FROM N.ED FALL FOR S. WLW. SE. S.W. WET OR MORE WIND EXCEPT WET FROM N. ED".

James Joseph Hicks was at No 8 only from 1864-1884, when he expanded to 8, 9 & 10 Hatton Garden, Crawforth 1988,8.

4502 MET001 CHRONOMETER - MARINE

Litherland Davies & Co LIVERPOOL No 957/18500 H.

HUGHES & SON LIMITED 59, FENCHURCH ST., LONDON [on labels]

Hs 177x164x164; DIHsD 115 Early to mid 19 C. R.

Brass-bound oak housing with two handles; double hinged lid; chronometer with silvered face on gimbals; Dublin.

The thin upper lid covers the glazed top of the deeper lower lid; when the latter is opened it gives access to the chronometer; this has hours I-XII, with minutes 5-60 outside; there are two small dials, one marked from UP at 0 to DOWN at 54, and the lower a seconds dial 10-60; the chronometer sits in brass gimbals with a clamping lever, and the case also holds the brass key; the case has two pasted-on paper labels of H. Hughes & Son, London, E.C.3, one giving the "No" 5135 and "NAME" Meteorological Office [hand-written]; the other "V. STITT DUBLIN 1958 CMD[?] RETd" with "Cleaned & Overhauled Apr 1932".

A note with the chronometer records that it "was used for many years as a time standard at Valentia Observatory. It was checked daily against a noon time signal transmitted to the Observatory by land-line until eventually radio time-signals became available. It was also used in magnetic observations to find the time of oscillation of the magnet in the magnetometer."

Clifton 1995,170 dates Litherland, Davies & Co. from 1814-1865.

(Note: Valentia has a marine chronometer by H. Hughes & Co. Ltd, No. 15453, purchased by the Irish Meteorological Service in 1941.)

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4517 MET016 DIP CIRCLE

Dover Charlton Kent. Circle 118
Sp 184; H 260; CrsD 145. 1898. R.

Tribach base; horizontal circle, vertical circle outside glazed mahogany box which contains the needle; Valentia.

The brass and enamelled base support the horizontal circle, divided 90-0-90-0-90°, which has a vernier 0-30; above this is a spirit level under a frame which supports two turned pillars for the vertical circle, divided on silver 90-0-90-0-90°, read using two verniers 0-30 and 30-0 with a magnifier; the needle is housed in the glazed mahogany box with two small telescopes to determine the position of the pointed ends of the needle; the glass back of the needle box is frosted; each circle has tangent and clamping screws.

The Valentia Museum Catalogue (Anonymous, undated) records that magnetic observations were begun at Valentia in March 1888 at the instigation of Professor Francis Fitzgerald of Trinity College Dublin using a dip circle and a unifilar magnetometer (identified in O'Sullivan, undated, page 7, as the [Robinson and] Barrow circle [1165 TDP151] and the Jones magnetometer [1171 TDP158]); when these were needed at TCD in 1896, the new Dover circle and magnetometer were obtained, being tested at Kew Observatory, and used in Valentia from January 1899.

A card with the instrument records: "This Dip Circle was in use from 1899 to 1953 for the measurement of magnetic inclination or dip. It has a hardened steel needle with a horizontal axle, very accurately turned, which rests on polished agate knife-edges. There is a horizontal circle for setting the instrument in the magnetic meridian, and a vertical one to indicate the angle of dip. From the angle, and the horizontal force measured with a companion instrument, the unifilar magnetometer, vertical and total magnetic force were calculated using the formulae: Vertical force = horizontal force x tan of the dip Total force = horizontal force / cosine of the dip.

A similar dip circle by "John Dover, Charlton, Kent" was offered by Tesseract 49,1995,26, where it is recorded "This is a fine example of the famous Kew pattern dip circle developed by John Dover (1842-1881) and used extensively on magnetic surveys. Examples by Dover (who had apprenticed to T.C. Robinson) are uncommon... \$4450."

4519 MET018 GALVANOMETER - DEFLECTION

Unsigned - but purchased from Gent & Co. Ltd, London
HsD 120. 1917. R.

Circular mahogany base; glazed brass; double needle deflected by a phone line pulse from Greenwich; Valentia.

The brass face of the galvanometer has a bridge covering the pivot of the needle; two stops limit the deflection of the needle; an inscription on the face reads: "THIS NEEDLE IS DEFLECTED PRECISELY AT 10 AM BY ELECTRIC CURRENT DIRECT FROM GREENWICH OBSERVAT-ORY".

The Valentia Observatory Catalogue (Anonymous un-dated) records that the galvanometer was purchased in April 1917 for £3-1-11. It records: "Radio signals were being transmitted from the Eiffel Tower at this time and wireless receiving apparatus would have been made available to the station, but it was thought that 'The military authorities would be by no means desirous of allowing a private wireless set here, considering the doubtful sympathies of many people in this part of the British Isles'".

4518 MET017 MAGNETOMETER - KEW PATTERN

Dover Charlton Kent 139
L 680; H 590; CrD 155. 1898. R.

Brass; tribach base; horizontal circle; telescope; mahog-any box for suspended magnet; thermometer; Valentia.

The horizontal circle is divided 0-360° with two verniers 0-20 read by magnifiers, and has tangent and clamping screws; on top is a spirit level and a frame to hold a horizontal cylinder with an extension telescope with a curved scale 0-40 directed away from the eyepiece; above the frame is the mahogany box with a sliding front and, on top, a glass cylinder with a brass top for the unifilar suspension fibre to hold the magnet; on top of the box also is a glass-mercury thermometer 10-40° "CENTE A 139 M.O 19204", with an ivory scale and glass cylinder cover; above the main horizontal tube are brackets for a telescope, and two pivoted shades; at the other end is a revolving bracket with two clamps.

The Valentia Observatory Catalogue (Anonymous, un-dated) records that the Dover (Kew Pattern) Magnetometer was used to determine the value of the horizontal intensity of the earth's magnetic field, and also the value of declination, the angle between the geographic and magnetic meridians. A cylindrical magnet, suspended horizontally from the top of the instrument by a fine fibre, is free to oscillate in a horizontal plane and will come to rest with its axis in the plane of the magnetic meridian. The direction of the axis is observed in the telescope and a corresponding angle is read on the divided circle. The telescope is now directed to a fixed distant object, the true bearing of which is known, and again the angle of the circle is read. These two circle readings yield the angle of magnetic declination. If the magnet is now deflected from the meridian and released, it will oscillate horizontally at a rate proportional to the magnetic moment of the magnet. A second magnet placed at a precise fixed distance from, and at right-angles to, the suspended magnet is used to deflect the latter from the meridian. From these measurements can be calculated the horizontal intensity. Observations were continued with this instrument until 1959.

See also the entry for the Dover dip circle 4517 MET016.

4522 MET021 NEPHOSCOPE - HILL'S MIRROR

CAMBRIDGE SCIENTIFIC CO LTD CAMBRIDGE
H 775; Fr 778x778; Mi 660x660. 1921. R.

To determine upper air wind speeds and directions; engraved mirror on mahogany mount; two sights; Valentia.

A mahogany support holds the horizontal mahogany frame for the plane mirror, which is divided into squares by two sets of lines each labelled 0-5; the sights have angled metal bases, brass pillars, and angled frames for the pin-hole in a small disc with three spokes to a solid disc frame.

The Valentia Observatory Catalogue (Anonymous, un-dated) records that this instrument was used to determine upper-air wind speeds and directions from the movement of medium and high clouds. It was also used to determine lower level wind speed and directions for artillery. Fires were set and the smoke was followed.

4515 MET014 RAIN GAUGE - BECKLEY SELF-RECORDING

BECKELY'S RAIN GUAGE [sic]
Unsigned, but made by James Hicks, London
T 709x610x622; FnMxD 292. 1868. AQ.

Mahogany table with slate top; iron casing and funnel; brass, copper and ebonite components; Valentia.

The funnel, which is enamelled on the inside, and has a lip to retain splashes, directs the rain into a copper chamber containing a siphon; the chamber sits on a hollow ebonite cylinder floating in mercury; as the rain enters, the float descends, displacing more mercury; a mechanism trans-lates the mercury height to a pencil recording on a clockwork drum; the siphon empties the rain after a fall of two-tenths of an inch.

A card records that the instrument was installed in Valentia Island in 1869, and was moved to the mainland in 1892, where it was maintained in operation until 1945.

A description is published in the Report of the Meteoro-logical Committee of the Royal Society for the year ending 31 December 1869, pages 36-39. It was invented by Robert Beckley of Kew Observatory and made by James Hicks of London.

4506 MET005 SUNSHINE RECORDER - CAMPBELL-STOKES

B 191x191x29; SrD 100. c1880. D.

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Slate base; oxidised brass; short pillar holds glass sphere; around part of this is the chart paper support; Dublin.
The cardboard chart strip which would be burned by the sun passing through the sphere is missing; this is the 1880 modification by Sir George Stokes of J.F. Campbell's original recorder (which used a wooden bowl burned by the sun) - Knowles-Middleton 1969,238-240; Stokes was born in Screen, Co. Sligo.
For more information, see the entry for the similar Valentia sunshine recorder, 4514 MET013.

4514 MET013 SUNSHINE RECORDER - CAMPBELL-STOKES

Unsigned M O 4

B 190x190x27; H 185; SrD 100. 1880. D.

Slate base; oxidised brass; short pillar holds glass sphere; around part of this is the chart paper support; Valentia.

This instrument is essentially identical to the Dublin recorder (4506 MET005), but a chart has been preserved "Summer Card F 6730A" with "Southern Hemisphere" on top, and "Northern Hemisphere" below, with a scale 6-18.

The Valentia Museum Catalogue (Anonymous, undated) gives a date of 1880, reporting that the recorder was used in Valentia from 1881 until 1942. It notes that Professor Stokes developed the supporting surface and the present type cards. "Construction of the supporting surface for sunshine card A ring of the approximate form was cast. The shaping of the inner surface and the undercutting for cards was done on the lathe. When shaped, the ring was cut in two through its axis at an angle equal to the latitude of the place for which it was intended. (One ring made two instruments.) The angle of the support pieces were [*sic*] cast at an average for all the stations in the service. These were mounted on a slate slab. The slate slab for each station was bevelled to give the correct angle of elevation."

A fuller description of the card supporter is given in the Report of the Meteorological Council to the Royal Society for the year ending March 31, 1880, pages 32-42.

Another description of this sunshine recorder M O 4 conflicts with the details in the catalogue, for it reports that it was received at Markree Castle, Sligo, from the British Meteorological Service in 1879, and was in operation at Markree Castle until 1974. Since two such recorders are preserved, now located in Dublin and Valentia, it seems likely that one was used at Valentia and the other at Markree.

4504 MET003 THEODOLITE - PLAIN

Piggott & Boddy London

BD 90; HoCrD 165; VeCrR 77; L 412. 1849. R.

Two disc, four screw base; full horizontal circle; half vertical circle; Y supports for telescope; Dublin.

The silver angled horizontal circle, 10-360°, is read with a vernier and magnifier; on top of the circle are two spirit levels at right-angles and, in the centre, a glazed compass with silvered face and eight directions, the circumference being divided 10-360°; two trunnions rise from the circle to the axis of the vertical half-circle, which is divided on brass on one side 30-0-30 "Diff of Hypo & Base", and on silver on the other 90-0-90°, with vernier and magnifier; both circles have tangent and clamping screws; above the half circle are two Y-brackets for the tube, which has a (damaged) spirit level on top; the tube has been painted black, and the rack and pinion focus is stuck.

A label with the instrument reads: "PILOT BALLOON THEODOLITES".

Downing 1988,101 gives the single date 1849 for Piggott & Boddy at 523 Oxford St & 3 Great Charter Lane.

4512 MET011 THERMOGRAPH - PHOTOGRAPHIC

Adie London [Lenses] J.H. Dallmeyer LONDON 13836 and 13837 THERMOGRAPH LENS

St 457-1255x1196x1108. 1868. AQ.

Brass; mahogany and slate stand holds lights, lenses, thermometer supports, recording clockwork drum, Valentia.

Two brass and glass lamps provide light sources, which are condensed with bull's eye condensers to mirrors, and thus reflected through an air break in the mercury tubes of wet bulb and dry bulb thermometers; two Dallmeyer photographic lenses project these images, arranged so that one is above the other, onto the sensitive paper on the single drum, turned by a pendulum-controlled clock so that turns once in 48 hours; the clock also operates a stop which cuts off the light from the paper for four minutes every two hours to check the accuracy of the chart. The instrument was received new in Valentia in August 1868.

It is described in the Report of the Meteorological Committee of the Royal Society for 1867, pages 27-35, and Plate I. It was moved to the mainland in March 1892 and was maintained in operation until 1977.

4513 MET012 THERMOMETER - GLASS MERCURY

NEGRETTI & ZAMBRA, SCIENTIFIC INSTT MAKERS, LONDON Nos 173972 1701 and 173974 1702

H 732 & 726; MxW 73 & 70. Mid to late 19 C. G.

Two; brass and glass; glass scale with white cover 250-320°; rounded brass protection for bulb; Valentia.

Both are now mounted on mahogany backboards; the first recorded test of these standard thermometers at Kew Observatory was in 1915, but they date from before this; they were used as standards from January 1919 until 1977, when the photographic thermogram was withdrawn from service.

4516 MET015 THERMOMETER - SOLAR RADIATION

(Negretti & Zambra) [Signature could not be seen - but is reported in the Valentia Catalogue.]

L 390; MxD 65. 1896. R.

Glass-mercury thermometer with blackened bulb, contained in a glass cylinder with a sphere around the bulb; Valentia.

Now mounted on a mahogany base board; the Catalogue (Anonymous, undated) records: "Black Bulb Thermometer in Vacuo 1896 Made by: Negretti and Zambra, London. Was used for obtaining an indication of the intensity of the sun's radiation. Was not regarded as very satisfactory."

INSTRUMENTS IN MISCELLANEOUS INSTITUTIONS - MIS

The "MIS" category includes instruments in locations housing five or less items:

Aras an Uachtarain, Phoenix Park,
Dublin 4444-5
Armagh County Museum, Armagh
3708
Carndonagh Co. Donegal 3294-5
Clogher, Co. Tyrone 4243
Connemara Folk Museum, Lenane,
Co. Galway 3853
Cork Public Museum, Cork 3367-9
Culdaff, Co. Donegal 1568
Dublin City Hall 1439
Dun Laoghaire Pier, Co. Dublin 3530
Electricity Supply Board, 65 Merrion
Square, Dublin 4027
Ferns, Co. Wexford 4241
Glasnevin Cemetery, Co. Dublin
4251
Grand Masonic Lodge, Dublin 0357,
0894, 2834
Headford School, Co. Meath 3741
Howth Yacht Club, Co. Dublin 1984
Iniscaltra, Lough Derg 4237
Johnstown Castle, Wexford 4026
Kells, Co. Meath 4242
Kilcummin, Co. Mayo 4239
Killala, Co. Mayo 3857
Kilmalkedar, Co. Kerry 4238
Knowth, Co. Meath 2134
Lisduff, Co. Kilkenny 4245
Malahide Castle, Co. Dublin 1565,
1567
Moate, Co. Westmeath 2847

Model Railway Museum, Malahide,
Co. Dublin 1566
Monasterboice, Co. Louth 3712
Mother Redcap's Tavern, Dublin
2590
Muckross House, Killarney, Co. Kerry
3649- 3650
Murray McGrath's Shop, Dawson
Street, Dublin 2373
Nenagh, Co. Tipperary 2137-8
Nendrum, Co. Down 4247
Newgrange, Co. Meath 2133
Poulaphuca House, Co. Wicklow
4156
Presbyterian Association, Dublin
3742
Royal Irish Yacht Club, Dun
Laoghaire, Co. Dublin 1862-4
Royal St George Yacht Club, Dun
Laoghaire, Co. Dublin 1858-1861
Russborough House, Co. Wicklow
0355, 1423, 1425, 1428, 1430
Saul, Co. Down 4240
Steam Museum, Straffan, Co. Kildare
3613, 4169, 4471
Stephen's Green Club, Dublin 1985-
6
United Services Club, Dublin 1417-8
University College Cork, Civil
Engineering 1441-3
University of Limerick 0737
Westport House, Co. Mayo 3854-6

1443 MIS006 ALIDADE - TELESCOPIC

CARY LONDON

L 461; W 81; H 216. Turn 19/20 C. G.

Brass with parallel rule; oxidised brass telescope above semicircular scale; UCC Civil Engineering.

Alidade has two oxidised brass spirit levels at right-angles at end away from telescope pillar; silvered scale 40-0-40 with brass vernier 30-30; magnifier to read scale; spirit level above telescope on pivot with spring clamp adjusted by screw with knurled top.

1566 MIS022 ANEMOMETER - DINES' RECORDING

R.W. MUNRO. CORNWALL ROAD. SOUTH TOTTENHAM. LONDON N.

No measurements available. Early 20 C. G.

Iron, copper, and brass; from Quilty Station, West Clare Railway; Model Railway Museum, Malahide Castle.

Iron tripod base; copper cylinder to table for brass recording drum and pen mechanism; right-angled frame for electric bell; on the side of the pillar is the revolving vane.

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Brendan McWilliams (The Irish Times 27:1:93) records that this instrument was invented by William Henry Dines during the 1890s, and is the most accurate means of measuring wind; in it, an open tube is kept facing into the wind by a wind vane; variations in the strength of the wind cause changes in the air pressure at the opening, and these are pneumatically transmitted down the tube and applied to a float which bobs up and down in a container of water; the movement of the float, which can be harnessed to a pen, corresponds to increases and decreases in the wind-speed.

3530 MIS051 ANEMOMETER - ROBINSON

Unsigned(?)

No measurements available. 1852. D.

On top of a little granite building on the East, or Carlisle, Pier at Dun Laoghaire, Co. Dublin.

Lorna Siggins, writing in The Irish Times, on 20:6:88, apparently using information from Matt Byrne of An Taisce, records: "But this is not just any old wind gauge. This is the cup-anemometer, of the type invented by an Irish astronomer and mathematical physicist, Thomas Romney Robinson (1792-1882), who was born in Dublin and worked at the Armagh Observatory. The essential parts were devised while he was at Armagh in 1843, and he completed it in 1846. Nor is this any old Robinson cup-anemometer. Remember Samuel Beckett's Pauline conversion on one stormy post-war night as he wandered around Dun Laoghaire harbour? Remember the passage in "Krapp's Last Tape", when on "that memorable night in March" with the "foam flying up in the light of the lighthouse and the wind gauge spinning like a propeller", he "suddenly saw the whole thing"? The anemometer has recorded wind speed and direction, placed on top of the little granite building, since 1852. And it is its cup attachment that the OPW [Office of Public Works] restored about three months ago. However, it proved impossible to obtain supplies of the wax paper used to record data, which ran out about eight years ago. Never mind, an OPW spokesman told me. Apparently, the anemometer's location on the pier makes it unreliable. "A nice piece of Victoriana, but pretty ineffective..."

4169 MIS063 ATLANTIC CABLE SAMPLE

Unsigned (?)

No measurements available. 1865-6. R.

Reported in The Irish Times 7:9:91 as purchased by Robert Guinness for The Steam Museum, Straffan, Kildare.

"A highly unusual and collectable item, a small piece of the first communications cable laid across the Atlantic by the Great Eastern is included in...the auction at the home of Louise Kent at Church Hill, Wicklow town". She is a relative of Captain Robert Halpin (1836-1894), the Irishman who commanded the Great Eastern.

Dates from Finn 1973,27.

2847 MIS042 BALANCE - EQUAL ARM

Unsigned

L c1360 Mid 19 C. G.

Iron; hangs from three poles; three couplings, sheers and pointer; double hook brackets on ends; Moate Co. Westmeath. Prominently displayed on the main street of the town; the beam is pivoted from the shears; below the centre is a pivoted metal arc with a small bob underneath; two horizontal bars at right-angles to the ends of the beam hold the brackets with double hooks below for the missing pans.

1860 MIS027 BAROGRAPH - ANEROID

DOLLOND, LONDON. PRESENTED TO THE MEMBERS ROYAL ST. GEORGES YACHT CLUB KINGSTOWN BY EUSTACE TRACEY 1895.

B(Mx) 357x212; H 205. Presented 1895.

Mahogany drawer base and glazed housing; eight evacuated capsules; Royal St George Yacht Club.

Brass and white metal fittings; glass vial for ink; signature gives month "JUNE. 1895."

2373 MIS039 BAROGRAPH - ANEROID

RICHARD FRERES CONSTRUCTEURS BREVETES PARIS 9782

No measurements available. 1882-1891. F.

Glazed oak case, brass handle; eight evacuated capsules; brass fittings; Murray McGrath, 1 Dawson St, Dublin.

White-metal pen rod; in optician premises which now has the sailor with octant, formerly the trade mark of Richard Spear.

Dates from Payen 1986,160; sailor with octant from Morrison-Low 1989,46.

1986 MIS034 BAROGRAPH - ANEROID

YEATES & SON LTD 2 GRAFTON ST DUBLIN

B 358x220; H 188. Late 19 early 20 C. G.

Oak glazed case; seven evacuated capsules; oxidised brass base plate and fittings; Stephen's Green Club.

Brass sleeve for non-original ink vial; still working.

0894 MIS003 BAROMETER

HEMPENSTALL DUBLIN MADE IN ENGLAND

H 856; W 320; DIHSD 220. Early to mid 20 C. G.

Mahogany; marquetry Masonic emblems; white dial, three pillars to arc top; Grand Masonic Lodge, Dublin.

Brass and glass dial housing.

1423 MIS018 BAROMETER - ANEROID

Gilles Mari(e?) AParis

H 700+300(B); MxW 390. c1760-90. G.

Brass bound and decorated red wood; porcelain weather labels; glass front; matched clock; Russborough House.

Signature plate missing on this, but on clock; Marie Gilles not found in references, but Gille (Gilles) l'ainé (senior) Paris is, "many clocks" including one in the Louvre; guide referred to clock and barometer as by Boule - Boulle (Boule, Buhl) (1642-1732) recorded as famous chaser and inlayer, but clock has above signature - perhaps a Boule type clock, or he made the cases, dating the clock earlier.

Gille dates from Baillie 1947,34&123.

1861 MIS028 BAROMETER - ANEROID

F.M. MOORE. BELFAST. & DUBLIN.

D 228. 1864-1899. F.

Black metal cylinder case, glass cover; white metal face 28-31"; thermometer; Royal St George Yacht Club.

Horizontal thermometer, scales -10-0-130° "FAHREN-HEIT" and -20-0-65° "CENTIGRADE".

Burnett & Morrison-Low 1989,152 lists the firm in Belfast and Dublin from 1864-99, when it became a Limited Company.

2138 MIS038 BAROMETER - ANEROID

R.B. ST.. JOHN NENAGH

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D 460. Late 19 early 20 C. G.

Brass(?) glazed cylinder case; white dial 26-31"; blue, black and white writing; Ewing's, 42 Pearse St, Nenagh, Co. Tipperary. Paint on dial in poor condition, but still intact; writing: "STORMY RAIN CHANGE FAIR VERY DRY"; set hand from centre with brass knurled knob in front to adjust position; reading hand stretches beyond centre ending with a crescent at the opposite end to the reading arrow.

The owner of the shop noted her father came to work for watchmaker Mr St John around 1927, and later took over the business. The barometer in the window of the shop.

3369 MIS012 BAROMETER - BANJO

BINDA CORK.

L 1015; MxW 323; DiD 245. 1846-1852. F.

Mahogany veneer with mother-of-pearl inlay; rounded top and bottom; scale 28-31"; Cork Public Museum.

The extensive inlay is of flowers, leaves, and birds; a rectangular insert (275x36) on the stem above the dial presumably originally housed a thermometer, but now has a replacement mirror; there is no sign that there were other accessories like a hygrometer or spirit level; the silvered dial has a glazed front in a brass frame; it has blue-metal and brass hands, with a rod underneath to turn the marker hand (key gone).

The Museum also has clocks by: James Aickin CORKE; Matthew Bagnell, CORK; William Nutty Cork; and Ja. Mangan Cork. Dates for Binda from Burnett & Morrison-Low 1989,145.

4027 MIS046 BAROMETER - BANJO

(Tedeo Dublin)

No measurements available. 1830-1850. R.

In the hall of the Electricity Supply Board house at 65(?) Merrion Square - Reported by M. Kenny.

Estimated dates given in Banfield 1991,214.

1862 MIS029 BAROMETER - BANJO

YEATES. DUBLIN. Registered. 1586 14. Sept. 1848. No1.

L 1037; DiD 325. 1848. SI.

Hardwood veneer; mother-of-pearl inlay, including parrots; white metal face; Royal Irish Yacht Club.

Screws for thermometer above face present, but thermo-meter now gone.

1418 MIS007 BAROMETER - BANJO

Yeates & Son 2 Grafton St Dublin

L 1035; MxW 270. 1840-1864. G.

Rosewood?; scroll pediment; hygrometer; thermometer; silvered dial; spirit level; United Services Club.

Hygrometer glass cover broken; thermometer with silver metal scale 10-100°; dial "STORMY MUCH-RAIN RAIN Change FAIR SET-FAIR VERY-DRY", with brass-bound glass front; spirit level at bottom with brass-bound rectangular window; ivory adjust knob.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

1863 MIS030 BAROMETER - FITZROY

LITTLEWOOD & CO Manufacturers 45 SAUCIEHALL STREET, GLASGOW

Hs 970x232. 1868. R.

Glazed mahogany frame; Royal Irish Yacht Club.

Wood-backed thermometer; blue trade label; signature also on thermometer; "REMARKS" inscribed on paper backing including details of the "MOUNTAIN SCALE" and "THE BAROMETER"; weather glass missing from bottom left above Trade Label.

Bryden 1972,51 records the firm at this address only for 1868; it moved to 25 Howard Street 1869-1895.

1864 MIS031 BAROMETER - MARINE

L. Casella Maker to the Ordnance London Presented by Charles J. Dunlop 1933

B 1105x125; L 965. Late 19 C. G.

Black metal; Kew pattern; Royal Irish Yacht Club.

White metal scale with glazed cylinder cover; on mahogany base board but with no gimbal mount; thermometer, which had been mounted on the shaft, now gone.

Firm became C.F. Casella & Co in c1900, Anderson 1990,17, so "1933" is not manufacture date.

3742 MIS058 BAROMETER - STICK

(Jno. Alment, Dublin, fecit)

No measurements available. c1772. S.

Mahogany back; broken pedestal top; thermometer; hygrometer; perpetual calendar; Presbyterian Association.

The rectangular baseboard, assumed to be of mahogany, has an urn finial between the sides of the carved broken pedestal; under the urn is the glazed circular hygrometer; on the left side is the vertical thermometer, and, on the right, the stick barometer, both ending below in matching fluted carved feet; taking up the whole centre of the baseboard is printed "A Perpetual Regulation of Time", which shows the dates of Easter from 1773-1872, suggesting a date of c1772 for its making; the perpetual calendar also has tables of "Moveable Feasts", "A Regal Table", an "Explanation" for the use of the calendar; and various windows with revolving sheets underneath to show the days and dates of the week, days of the month, phases of the moon, etc; it is not recorded if this calendar is signed, but another is recorded (Ex0498) with the calendar signed: "Published by JNo ALMENT MARY'S ABBEY DUBLIN", so possibly this is too.

A (rather indistinct) photograph of the barometer was taken by a Mrs C.M. Currie (néé Alment) in 1962, and she also reported details, including the signature. She also gave its history - it was presented to the Presbyterian Association, No.16 St Stephen's Green, (designed in 1772, it had been the home of the Huguenot Bankers, the La Touches, and, from 1821-1921, the Palace of the Archbishop of Dublin) in 1948 by a Mr Brown (then deceased), who had lived in Monkstown; he had picked it up at auction in Blackrock, Co. Dublin - he had thought it appropriate to have a barometer with the same date of making, by a Huguenot maker, as the building design.

The instrument is different from, though has very many similarities to, an angle and stick barometer sold by Philips at the Poly Peck (42 Berkeley Square, London) auction on 19.2.1991 (Ex0498); while there may be room on this instrument for the vertical shaft of an angle barometer, there does not seem to be enough for the angled part, so it is assumed that there was never an angled barometer included.

Two great grand-children of John Alment, May and Elizabeth, lived in Blackrock, and it is possible that the barometer had belonged to them. It was no longer in the PA in 1967, and may have been sold to an antique dealer living in an upper flat of the building.

Morrison-Low 1989,120 records John Alment at Mary's Abbey from 1767-1788.

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3854 MIS060 BAROMETER - STICK

CARPENTER 24 Regent St LONDON

H c1024 1827-1833. A.

Mahogany; flat layered top; glazed silver-metal plate 27-31"; thermometer on shaft; Westport House, Co. Mayo.

The scale plate has a slider moved by a knob at the top of the shaft; the glass mercury thermometer has a glazed frame with a rounded top, and a silver-metal scale plate 10-120°; the cistern has a flat disc cover.

Dates from Crawforth 1988,5.

3855 MIS061 BAROMETER - STICK

Jas Long Royal Exchange LONDON

H c1008 1781-1811. R.

Mahogany; scroll top; glazed silver-metal plate 27-31"; thermometer on shaft; Westport House, Co. Mayo.

The scale plate has a slider moved by a knob at the top of the shaft; the glass mercury thermometer, which has a flattened bulb, has a glazed frame with a rounded top, and a silver-metal scale plate 10-100°; the cistern has a flat disc cover.

Dates from Clifton 1995,171.

0357 MIS005 BAROMETER - STICK

Mason & Co.. 11 ESSEX BRIDGE Dublin PRESENTED TO THE Grand Lodge of Ireland by SEACOME MASON

JUNR. P. M. LODGE 93 AUGUST. 1875.

L 1215; MxW 230; BoD 175. Presented August 1875.

Carved mahogany; Grand Masonic Lodge, Dublin.

Carving on top depicting square and compass, on bottom, star of David; ivory scale 27-31" with two slides labelled "10.A.M. YESTERDAY." and "10.A.M. TO DAY." moved using square keys in ivory framed circular holes; thick mercury column; thermometer with flat reservoir on stem reading "CENTIGRADE" 0-40° and "FAHRENHEIT" 30-120°.

Lodge 93 is Shamrock Lodge Dublin.

4156 MIS062 BAROMETER - STICK

(R. Spear, 28 College Green, Dublin)

No measurements available. 1843-1864. R.

In Poulaphuca House, Ballymore Eustace; reported by John Butler in January 1992.

Morrison-Low 1989,135 does not give the address 28 College Green for Richard Spear, this address being used by Spears & Co from 1843 to 1864; it is assumed that the instrument dates to this period in spite of being signed R. Spear.

1565 MIS021 BAROMETER - STICK

R. Spear 27 College Green Dublin

No measurements available. 1812-1837. A.

Rosewood veneer?; flat top; glazed door over silvered register plates; flat cistern cover; Malahide Castle.

Example of the Spear Patent barometer, as illustrated in the Frontispiece of Burnett and Morrison-Low 1989,viii.

Dates from Morrison-Low 1989,135.

1858 MIS025 BAROMETER - STICK

SPEARS & CO. COLLEDGE [sic] GREEN DUBLIN Presented to the Kingstown Boat Club By Thos. Newenham June, 1843.

L 940; MxW 108. 1843. S.

Mahogany; rounded top; Royal St George Yacht Club.

Ivory scale 27-31" with thermometer 10-120° "FAHRT.." -10-0-40° "REAUr.."; hemispherical cistern cover.

Firm listed from 1838-64, Morrison-Low 1989,135

1859 MIS026 BAROMETER - STICK

Troughton & Simms London

L 992; MxW 122. Early to mid 19 C. G.

Walnut(?) veneer; flat top with lid; white metal scale 27-31" with thermometer; Royal St George Yacht Club.

Layered lid has ivory pillar handle on top; thermometer scale 10-110° "Fahr" -10-0-30 "Reaur"; urn-shaped cistern cover; ivory knob broken and incomplete above cistern.

Firm lasted from 1826-1922, Crawforth 1988,15 - this looks early.

4445 MIS009 BAROMETER - STICK

G. YEATES, Dublin

H 915; MxW 110. Mid 19 C. R.

Mahogany; circular ebonite cistern cover; ivory plates 27-31"; thermometer on front 0-130° REAMUR; Aras an Uachtarain.

A turned ivory knob under the glazed plates alters the position of a slider on the scale.

This is the only instrument so far discovered signed "G." Yeates - that is George Yeates (1796-1862) who was in charge of the firm at 2 Grafton Street from 1843 until his death - his usual signature was Yeates, with the address; he had operated on his own at Camden and Charlemont Streets from 1826-1837, and is believed to have gone to France between then and 1843 (Morrison-Low 1989,139, and Prof. Kendal Dixon, personal communication).

Aras an Uachtarain is the Residence of the President of Ireland in the Phoenix Park, Dublin.

1985 MIS033 BAROMETER - STICK

YEATES & SON 2 Grafton St, Dublin No 336

H 1010; MxW 161. 1840-1864. G.

Mahogany; flat top; ivory scale plates with glass cover; red alcohol thermometer; Stephen's Green Club.

"Corrected for Capacity"; two key-holes for ivory slides "10 A.M. Yesterday" and "10 A.M. To Day"; glass-covered thermometer 20-110° "FAHRENHEIT" and 0-40° "CENTI-GRADE" on front of housing; cistern cover in the form of a tall rectangle with a narrower top.

Assumed to be George Yeates & Son.

1417 MIS008 BAROMETER - STICK

YEATES & SON 2. Grafton Strt. Dublin Presented to the HUS Club by Capt. Willm Hamilton

L 1120; MxW 207. 1840-1864. G.

Carved mahogany/rosewood/ivory; United Services Club.

"FAIR Change RAIN Stormy"; scale 27-31; key to adjust slides "10. A.M. Yesterday" and "10. A.M. To Day"; "FAHRENHEIT" 0-120° and "REAMUR" 10-40° mercury thermometer with ivory scale and glass cover on rosewood front of instrument; ivory shaft for missing knob on top of cistern housing; rounded carved top; fine instrument.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

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3856 MIS043 BAROMETER - STICK

Unsigned

H c922. Early to mid 19 C. G.

Mahogany; broken pedestal top; unglazed brass plate; large thermometer on stem; Westport House, Co. Mayo.

The scale plate, 28-31" has a manual slider with a trefoil and pointer; the glass mercury thermometer has an unglazed brass scale plate, with a rounded top, filling the entire front of the stem, 0-110° "FAHRENHEIT", -10-0-30° "REAMUR"; the cistern has a fluted pear-shaped cover.

2834 MIS041 CLOCK - REGULATOR

J. BOOTH & SON. 4 STEPHENS GREEN. DUBLIN.

Hc 1510; W 504; De 280. Mid to late 19 C. G.

Mahogany back and framed case; glazed on three sides; brass cylinder and pulley wheel weight; Grand Masonic Lodge, Dublin.

Black Metal pendulum in shape of long cylinder.

1984 MIS032 COMPASS - MARINE

PRESENTED BY CHANCELLOR & SON, DUBLIN. HOWTH AMUSEMENTS COMMITTEE. 1894.

(CHRISTIE & WILSON, GLASGOW)

ScRD c160; HsD c195. 1894. S.

Brass housing; in Glasgow binnacle; Howth Yacht Club.

Black and white paper circular compass card signed: "CHANCELLOR & SON DUBLIN" around centre; brass, glass-covered cylinder housing in gimbal mount in binnacle signed: "CHRISTIE & WILSON - MAKERS - PATT. 890 SERIAL NO 932 GLASGOW."; presentation inscription (above) engraved around glass frame on top of card.

3853 MIS059 DIAL

Unsigned

BD 177. Early to mid 19 C. G.

Bronze; base disc; angled half meridian circle, diagonal gnomon; hours half circle; Connemara Folk Museum.

The base disc has "N E S W" directions engraved on an outer circle, with a diagram of the sun inside - this has eyes and mouth and eight flares; its nose is a small tapered pillar, which holds the angled meridian half circle (ID171) with its wire gnomon; at right-angles to this is the hours half circle VI-XII-VI (ID176); in Connemara Folk Museum, Lenane, near Killary Harbour, Co. Galway.

4249 MIS074 DIAL - HORIZONTAL

(Made by Michael Donovan MRIA)

D c360 (14"). c1857. R.

Brass; hour lines on white card-paper; gnomon of human hair tied to a brass arch, plus a floating hair.

M. Donovan published a paper in the Transactions of the Royal Irish Academy, Vol.XXIV, 17-29, Read 23:2: 1857, with the title "On a moveable horizontal Sundial, capable of indicating apparent Solar Time within a small fraction of a minute."; the dial is of cast brass - strong, heavy, perfectly flat, and free from magnetism - covered with white card-paper on which the hour lines are drawn; a human hair is stretched from a small hole in the centre of the dial through a fine slit in the top of a brass arch fixed to the edge of the dial plate, so that it makes the proper angle of latitude; a second loose hair is used to get round the problem that the image of the first hair widens as it gets further from the centre - the second hair is stretched along the centre of the shadow to the hour circle; on the plate is a magnetic needle (L 330) to obtain the correct angle of declination; he had a dial submitted to the Academy with its divisions drawn by an engine on a very thin lamina of talc, and viewed with a compound microscope constructed to obviate parallax; the instrument stood on levelling screws and, as it turned on its axis, it was provided with tangent screws, and had a glazed cover. A smaller dial, mounted on a bar magnet, is described by Mr Donovan in the RIA Proceedings Vol.VII, 111-115, Read 10:1: 1859: "Description of a horizontal sundial, which, when removed from one situation to another, resumes the position necessary for indicating solar time..."

4243 MIS070 DIAL - HORIZONTAL

Unsigned

No measurements available. 18 C. R.

Cut on a tombstone in Clogher, Co. Tyrone; recorded by Mrs Gatty (1900,85); assigned to 18 C.

4242 MIS069 DIAL - HORIZONTAL

Unsigned

No measurements available. 16 C. R.

On slab of grit stone, used as a headstone, divided into 24 equal parts in double circle; Kells, Co. Meath.

Recorded in Mrs Gatty (1900,85) as described by Geroge du Noyer; "The four principal lines are elongated, and three of them end in crosses. They may have been intended to mark the points of the compass if the dial was originally placed horizontally. The letter R is carved on the stone, and resembles the capital letters of the sixteenth century. Part of the gnomon remains in the centre of the circle."

2137 MIS037 DIAL - HORIZONTAL PEDESTAL

P.M.D. L 59 30 (1860)

362x362. Early to mid 19 C. G.

Slate; hours 4-12-8 beneath two arcs ending in scrolls; iron gnomon c52.5°; Nenagh Heritage Centre Tipperary.

The scrolls end at 12 hours and, from between them, a heart-shaped arrow reaches to one corner of the slate; the dial has frame lines around it parallel to its sides; at the opposite corner is a circular interlace pattern with the initials P.M.D. between it and 4 hours; in the interlace are inscribed L 59 30, and scratched 1860; the gnomon is corroded, but appears to have had an "S" insert; one corner of the dial is chipped; the opposite corner includes a crude head and torso; the interlace pattern has a central heart.

A card notes that the slate is from a quarry above Portroe, the gift of Mrs Margaret Ryan, Newtown. Portroe overlooks Lough Derg.

The scratched 1860 is not original, and can probably be used as a "not later than" date - the attendant reckoned the dial was of earlier date than this.

4444 MIS002 DIAL - HORIZONTAL PEDESTAL

Arabella Diana DUCHESS OF DORSET 1815

D 444; GnH 254. 1815. S.

Bronze; central compass; calendar; signs of zodiac; cities; hours IIII-XII-VIII; Aras an Uachtarain.

The gnomon, angle 53°, is supported by a scroll design insert; the dial is very weathered and pitted, and the Duchess of Dorset's name was identified only after reference to Burke's Peerage; George John Frederick Sackville, the Fourth Duke of Dorset (1793-1815) was killed when he fell from his horse while hunting near Dublin; at the time he was visiting his mother,

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Arabella Diana, wife (1790) of the late John Frederick Sackville, Third Duke (died 1799), who had subsequently married Charles, Lord Whitworth, then Lord Lieutenant of Ireland - hence the presence of the dial at Aras an Uachtairín (the residence of the President of Ireland in Phoenix Park).

0737 MIS001 DIAL - HORIZONTAL PEDESTAL

Chars., Harrison LIMERICK LATITUDE 52D 25M NORTH
D 347. c1770. PC.

Circular brass; roman hour numerals IIII-XII-VIII; gnomon with S-insert; University of Limerick.

On the wall of the entrance foyer of Plassey House; an inscription notes "Sundial made by CHARLES HARRISON LIMERICK c1770. Harrison was a Clockmaker, Watchmaker, Maker of Gold Weights and Scales. Presented in 1972 by Mr John B. O'Dwyer, Knockalisheen, Founder Member of the University Project Committee."

Fennell 1963,18 gives dates 1766, 1776, and 1786; a horizontal compass dial is recorded by Taylor 1966,207, with the inscription: "Made by C. Harrison in his 85th year, his gift of love to his Grand Daughter Rosetta Hughes 1810" - giving life dates c1725-c1810, agreeing with Fennell's dates. Tesseract D,1983,4 offered another compass dial signed "Harrison" for latitude 52°16" - corresponding with the Limerick area. Harrison seems thus to have been a more important dial maker than had been previously realised. Crawforth Hitchins 1994,1802 notes that Charles Harrison was first recorded working in 1766; he was recorded as a watch and bit-maker, bookseller and stationer in Main street, Limerick, in 1769; he had an advertisement in the Limerick Chronicle on 13 July 1786, stating that he was a maker of watches, gold scales and weights; by 1788 he was a watch and clock-maker opposite St Mary's Church, Limerick; an Irish light guinea weight signed "Chas Harrison, Limerick" has been recorded.

For details of Harrison dials, see C. Mollan, *BullSIS*, 30,1991,p29.

3367 MIS049 DIAL - HORIZONTAL PEDESTAL

HUNT CORK OD [interlaced monogram]

W 198; GnH 119. Early to mid 19 C. G.

Bronze; octagonal; hours IIII-XII-VIII; brass gnomon, c54°, S-insert; crest, winged bird and boat; Cork Museum.

The large bird has a long neck, and overwhelms the boat in size; the crest is inscribed between the IIII and VIII hour marks; between outer circles are the hours separated by small fleur-de-lis designs; inner circles are divided into quarter hours and five minute intervals.

The Hunt firm was active from 1792 until 1895, Burnett & Morrison-Low 1989,149.

3650 MIS053 DIAL - HORIZONTAL PEDESTAL

The Quadrant of Altitude Calculated for 74° Longitude Latitude 53:30 from London Anno 1843 Thos.. Martin

MxD 255; OCrd 235. 1843. S.

"Valentia Slate Sundial"; octagonal; Muckross House.

The outside of the dial is fairly conventional - hours IV-XII-VIII with quarter hour divisions inside; half hour divisions are extended further inwards, ending in trefoil arrows; the quarter hours have the same, but shorter, inward extensions; however, the central circle inside these divisions has two parallel lines across it, below the centre, and the lines are divided into eighteen boxes; each box has six divisions at one side, and a central cross extending into the box; above this design (towards hour XII) is "The Quadrant of Altitude", which has several semi-circle lines; the central semi-circle is blank; then comes the inscription; then about eighteen boxes on each side of the gnomon meridian; each box contains a number: "9 0 8 0 7 0 6 0.....8 0 9 0"; then a smaller semi-circle with hatches or divisions, and, finally, a thin, blank semi-circle; two parallel lines run through the centre of the dial, from below hour XII, at right-angles to the other parallel lines, to near the edge between hours IV and VIII; marks on this indicate that this was the gnomon meridian, though the gnomon is missing; most of the inscription lies in the centre circle below the parallel lines: "Calculated for 74° Longitude Latitude 53:30 from London Anno 1843 7+45÷"; in an outer circle is the (partly obliterated) name: "Thos.. Martin" and, beyond this: "Property M Hanly".

A letter (6:12:90) from the Librarian, John McCarthy, at Muckcross House, Killarney, Co. Kerry, where the dial is in store, notes that it was presented in 1967 by Mr T.J. Egan, Castlegregory, Co. Kerry; it was apparently embedded in concrete; the partially illegible name is recorded as "Martin".

3368 MIS050 DIAL - HORIZONTAL PEDESTAL

By T. O'Connell Macroom JULY. A.D. 1839 (Co)nstructed (for) E Barrett Esqr Carrigboy. LAT...W c730. 1839. S.

Slate; fragments only; Cork Public Museum.

Originally had flat angled sides - perhaps octagonal; dragon decoration inscribed; the main dial has Roman hours; the outermost part has months with "EQUATION OF TIME"; next is a circle of rings and lozenges with inscriptions such as: "LEO JULY 23" in a ring, and "SUNRISE 4H?M", "Length of Day 11H2M" in lozenges; inside this is the hours circle, and, in the centre, a compass; one of the smaller dials (D130), located near hour VII, has dates from 1839-1856 (at least) with corresponding numbers - 1840 26, 1841 7, 1842 18, etc.; another smaller dial (D154), at the opposite side from hour XII, names cities around the world, including Mecca, Baghdad, Cambodia; a third smaller dial has radial lines with number combinations 28 21 14 7, 29 22 15 8 1, on two remaining.

3649 MIS052 DIAL - HORIZONTAL PEDESTAL

DELINEATED For The Knight of Kerry By P. Roche 1845D 551. 1845. S.

Slate (damaged); incomplete lead gnomon c52°; hours IV -XII-VIII; 32 compass points; world cities; Muckcross House.

One side of the dial has a largish chip, and there are other smaller chips on the edge; much of the inscribed matter is indistinct; outside the central compass rose are time corrections for dates - e.g Feb 28 12 48, Jan 31 15 40; then equations of time, then a large area with names of many cities, including Santa Fe, New York, Delhi, San Salvador, Rio de Janiero, with rather small divided hours on the outside; the gnomon is broken off, but seems to have been a "V" with decoration on the inside; it is now held in place with two pairs of metal strips; the "DELINEATED" is inscribed in large letters in a decorated arc at one edge, between hours IV and VIII, with the rest of the legend inside the arc; on stand in Muckcross House, Killarney, Co. Kerry. In a letter (1:2:91), the Librarian of Muckcross House, John McCarthy, records that the dial was donated by Col. and Mrs Uniacke, Glanleam House, Valentia, in May 1974, per Dr Daphne D.C. Pochin Mould, Aherla, Co. Cork.

In Dr Mould's book "Valentia - Portrait of an Island", Blackwater, Dublin, 1978, she includes two photographs of the dial, and records that it was made of Valentia slate.

1564 MIS020 DIAL - HORIZONTAL PEDESTAL

(Daniel Voster Cork)

No measurements available. 1742-1760. FL.

Brass; offered for sale to Cork Museum, July 1988; information from Michael Kenny; not purchased.

Whereabouts now unknown.

Dates from Burnett & Morrison-Low 1989,156.

3741 MIS057 DIAL - HORIZONTAL PEDESTAL

Unsigned Misspend no Time

D 230; H 100. Early 19 C. G.

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Brass; hours IIII-XII-VIII; within this, foliate design; then central eight-point compass; Headford School.
Outside the hours, on the circumference of the dial, are divisions by quarter hours and five minutes; the shaped solid gnomon has angle $c46^{\circ}$; the dial is on a single piece carved sandstone pod (total height 1200), at Headford school, Kells, Co. Meath.

4247 MIS072 DIAL - IRISH PILLAR

Unsigned

No measurements available. 800-1200. R.

On top of stone pillar; five radial lines with Y ends; four intermediate lines; Nendrum, Strangford Lough.

Recorded and illustrated by H.C. Lawlor in the *Irish Naturalists' Journal*, Vol.1, 1926, 53-55; the dial is in the shape of a rectangle with an arc instead of a straight line for the bottom side; the intermediate lines end in small circles; the top two lines are not straight, indicating later than 6am and earlier than 6pm prayer times; all lines meet at a gnomon hole; at Nendrum, Mahee Island, Strangford Lough, Co. Down.

4241 MIS068 DIAL - IRISH PILLAR

Unsigned

H 1523 (5'); D 254 (10"). c1300. R.

Tall stone pillar with semicircular dial on top incised with 11 radial lines; Clone, near Ferns, Co. Wexford.

Illustrated in article by G.H. Kinahan in the *Journal of the Royal Historical and Archaeological Association of Ireland*, 1883, 39, and further details given by Mrs Gatty (1900,85); there are two holes for the missing gnomon (one on a semicircular mound on top of the dial) which suggests that it was angled, representing a great advance in dialling; George du Noyer found that the hours corresponded to 6, 7.5, 9, 10, 11, 12, 1.5, 2.5, 3.5, 4, 5, 6; the remains of the church are reported by Mrs Gatty as thirteenth century, and the dial is thus also so dated by her.

4240 MIS067 DIAL - IRISH PILLAR

Unsigned

No measurements available. 800-1200. R.

Stone slab, with irregular part circle on top; this has seven radial lines; Saul, near Rahalt, Co. Down.

Recorded and illustrated by Mrs Gatty 1900,84-5; the dial has a central hole; not all the lines correspond to the canonical hours - the top two are not linear, and would correspond to 7am and 5pm, rather than 6am and 6pm (they appear to have worshipped less assiduously in Saul!). The site was given to St Patrick by his first convert, the chieftain, Dichu, and St Patrick returned there to die.

The illustration is signed "GEO.V.DUNOYER".

4239 MIS066 DIAL - IRISH PILLAR

Unsigned

No measurements available. 800-1200. R.

Rectangular stone slab; five radial lines on top, one divided into three; Kilcummin, near Killala, Co. Mayo.

Recorded and illustrated by Mrs Gatty 1900,84; the dial has a central hole; in this case only the top (diameter) line only is divided into three - at the left hand side when facing the dial; St Cummin or Camin became Bishop of Clonfert, and was buried at Kilcummin in 658.

4238 MIS065 DIAL - IRISH PILLAR

Unsigned

PrH 1118, ToW 533. 800-1200 R.

Pillar of grit stone, shaped like a wine glass; five radial lines plus other decoration; Kilmalkedar, Co. Kerry.

Recorded and illustrated by Mrs Gatty 1900,83; the dial has a central hole; the shaft has dimensions 735x127x 270; the arc at the top is rather more than a semi-circle, and there is ornamentation on the shaft and the back of the dial; "The day divisions are given by double lines, the ninth hour, or 3 p.m. being indicated by three lines. All these branch off into small semi-circles, touching the outer rim of the dial."

George J. Hewson (*Journal of the Royal Society of Antiquaries of Ireland*, 1892, 438-9), records that this dial, and that at Monasterboice (MIS056 3712), have strange central holes, the entrance being slightly funnel shaped, and the hole widening out to one and a half times its narrowest diameter a short way in, before narrowing again to a blunt point. While he has no explanation for it, he considers that this was clearly done for some purpose. Mrs Gatty suggests that the hole was made after the gnomon was lost and used as a betrothal or swearing hole. "In former days, when a priest could not be had, it was a common practice amongst the Irish for the bride and bridegroom to put each a finger in the hole, and pledge themselves in the presence of witnesses. The engagement held good until a priest was procured to solemnize the marriage."

Further information about this dial is given in G.M. Atkinson, *Journal of the Royal Historical and Archaeological Association of Ireland*, 1887, 249-253.

Suggested dates of Irish pillar dials from Butler 1990,9.

4237 MIS064 DIAL - IRISH PILLAR

Unsigned

PrH 1523 (5'), W 406; D c380. 800-1200. R.

Upright stone pillar with pediment top; semicircular dial on top with five radii; Iniscaltra, Lough Derg.

Recorded and illustrated by Mrs Gatty 1900,82; the dial has a central hole; "The semicircle is divided into four parts by five lines deeply cut; the perforation at the top is large, and intended possibly to receive a gnomon of wood, which, being shaped to a point, threw a slender shadow on or near the circumference of the semicircle beneath. Each of these lines has lateral branches to the right and left, where it touches the semicircle, excepting that at the western end of the horizontal line, which has only one branch."; details of the dial were recorded by Mr Du Noyer, who assigned it to the time of St Camin, who died in 658, after having founded the abbey of Iniscaltra, or Holy Island; the lines are believed to represent the five chief canonical hours: Matins (6am), Nones (9am), Prime (Noon), Tierce (3pm), Vespers (6pm).

Du Noyer details were published in paper by Albert Way, *Archaeological Journal* Vol. xxiv, p.213 (date not given).

Butler 1990,9 suggests dates of 800-1200 for these Irish pillar dials.

3712 MIS056 DIAL - IRISH PILLAR

Unsigned

No measurements available. 800-1200 AD. R.

Upright rectangular stone has hole with inscribed fan design below; Monasterboice, Co. Louth, site.

Illustrated in Butler 1990,9, who records that the dial indicates the times of morning and evening prayers, which were held three hours before and three hours after midday. "About ten such monastic sundials, which date from 800 to 1200 AD, are known in Ireland."

(For further details about the shape of the central hole, see DIAL - IRISH PILLAR 4238 MIS065.)

4248 MIS073 DIAL - UNIVERSAL EQUINOCTIAL RING

Unsigned

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

No measurements available. Early 17 C. R.

Brass; missing axis and slider; "made by French artist residing in Ireland"; found in Kilkenny c1853.

The dial is recorded in the Transactions of the Kilkenny and South-East of Ireland Archaeological Society, Vol.II, 1853,361-3 as having been found in a sand pit at Shankill, Co. Kilkenny "a short time hence"; it was shown to Mr McCarthy, the mathematical master at Kilkenny College, who pointed out that the hours were only divided into quarters, suggesting a date in the early part of the seventeenth century, a date also suggested by the names of some of the cities; these are in French, the number of French towns being much greater than of any other country; next in number were Irish towns, with only two English - London and York; other countries being only represented by their chief cities; hence his conclusion that it was "obviously made by a French artist residing in Ireland".

3295 MIS048 DIAL - VERTICAL

(Cut by J. McMurray 1835)

No measurements available. 1835. S.

Stone; from the old Market House in Carndonagh, Co. Donegal now in the Carndonagh Museum, Bridge Street.

A report from the Derry Journal, dated Friday, 17:2: 8?, notes that the dial went missing when the old Market House was demolished (March 1953), and was returned anonymously outside the ICA premises in Bridge Street (in 1983?), where a Museum was to be opened in 1984; "The date of manufacture is given as 1835 and the inscription states that it was cut by J. McMurray...there are many drawings etched on the stone."

Article reproduced in "Carndonagh", published by Maura Harkin & Sheila McCarroll, 1984, p201.

4251 MIS010 DIAL - VERTICAL

Unsigned DUM LUCEM HABETIS CREDITE IN LUCEM UT FILII LUCIS SINT HAEC LOCUTUS EST JESUS John XII 36 c1220x760. Mid 19 C. G.

Rectangular sandstone; open metal gnomon with scrolls; on wall between Glasnevin Cemetery and Botanic Gardens.

On the slab is engraved an ellipse, with twelve lines running from the point of contact of the inclined edge of the gnomon to the circumference of the ellipse, where the hours VI-XII-V are engraved, the XII being to the right of the other end of the gnomon; the latter has three sides in a right-angled triangle, with scroll patterns inside.

The inscription, translated, reads: "Jesus said: While ye have light, believe in the light, that you may become sons of light".

3857 MIS044 DIAL - VERTICAL

Unsigned

No measurements available. 17 C. R.

On the East wall of St Patrick's Church of Ireland Cathedral, Killala, Co Mayo; The Irish Times 24:4:91.

"Sundial found in cathedral There has been a further significant find during restoration work at St Patrick's Church of Ireland Cathedral in Killala, Co. Mayo - a 17th century sundial on the east wall. Originally it was thought to be an ogham stone, but archaeologists have confirmed it is a sundial."

3294 MIS047 DIAL - VERTICAL

Unsigned

No measurements available. 1835. S.

Slate(?); rectangular; on wall of Donagh Church, Carn-donagh, Co. Donegal.

A rather poor picture of the dial is included in an article on "THE CHURCH OF DOMHNACH MOR MUIGHE TACHAIR" in "Carndonagh", published privately by the authors, Maura Harkin and Sheila McCarroll, in 1984, page 11, where it notes that "The sundial dates back to 1835"; perhaps it was made also by J. McMurray who "cut" the dial on the old Market House in 1835 - see 3295 MIS046.

2134 MIS036 DIAL - VERTICAL

Unsigned

L c2100; W c900. c5000BP (3000BC). R.

Decorated stone slab at Knowth, Co. Meath with a hole

and semicircle fan decoration, looking very like a dial.

Referred to in Kelly 1989,112&114 as the "sun dial" stone, it has 18 widening lines spreading out from the hole in a semicircle; a stick in the hole would cast a shadow around the fan depending on the orientation of the sun, and it would not seem to be too much of a claim to suggest that this was noticed, and used as a clock; the Site 1 does not seem to have been dated, but other sites at Knowth date from c3780-2610BC.

See Kelly 1989,112,114,350.

1568 MIS024 DIAL - VERTICAL

Unsigned 1820

W c610. 1820. S.

Slate; square; curved top; hours VI-XII-VI; solid metal gnomon; St Buadan's Church, Culdaff, Co Donegal.

Slate cracked in half; each hour with 12 divisions.

4245 MIS071 DIALS CUT ON STEPS OF STAIRS

Unsigned

No measurements available. Unknown date.

Ten semicircles cut on the stone steps of the old tower of Ballagh, near Lisduff.

Recorded in the Journal of the Kilkenny and South-East Ireland Archaeological Society, 1867,4-5:

"By Bernard E.B. Fitzpatrick Esq.: ten rubbings of sundials cut on the stone steps of the stairs of the old tower of Ballagh, near Lisduff, the seat of his father, the Right Hon. John Wilson Fitzpatrick...."There are ten stairs on which they are cut, and the dials decrease in size from the upper stairs to the lowest one...they are only semicircles, and...they do not decrease in size with any great regularity. They are situated opposite two windows, one window being placed higher up in the stairs than the other; the stairs are circular...."This communication excited much interest, none of the members being aware of any other instance of sun-dials existing on the staircases of old castles.."

3708 MIS011 DRAWING INSTRUMENTS - SET

Unsigned[?]

No measurements available. Late 18 C. R.

In green shagreen-covered etui; right-angled ivory scale; owned by Francis Johnston; Armagh County Museum.

Johnston was the architect of Armagh Observatory (1790), and also of the Chapel Royal and the General Post Office in Dublin.

1441 MIS014 EXTENSOMETER

Patrick Adie, Broadway Works, Westminster, London, S.W.

L 640; C 750x310x194. 1890-1901. A.

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Goodman's; brass; steel claw clamps; scale 200-0-200; boxwood case; UCC Civil Engineering. Pointer detached; clamps placed on bar whose extension is to be measured; these are connected by a triangular brass frame with a break for the pointer between the clamps and with the (broken) scale at the apex; case has stuck-on Adie trade label and includes words: "OPTICIAN, Mathematical & Scientific Instrument Maker"; case also has pencil inscription: "Professor Alexander University College Cork".
Dates from Clifton 1995,4; from "Goodman" name from Prof. Dillon.

0355 MIS017 GLOBE - CELESTIAL

CARY'S NEW CELESTIAL GLOBE.....Made & Sold by J.& W. CARY, Strand, Jany. 1st. 1800.
Sp 400; H 620; GD 305. 1800. S.
Mahogany tripod; plaster and brass; Russborough House.
Now mounted upside down.

1428 MIS016 GLOBE - TERRESTRIAL

CARY'S NEW TERRESTRIAL GLOBE.....Made & Sold by J.& W. CARY, Strand, Jany. 1st. 1800.
Sp 400; H 620; GD 305. 1800. S.
Mahogany tripod; plaster and brass; Russborough House.
Slight damage to plasterwork.

1567 MIS023 INHALER

DR. NELSON'S IMPROVED INHALER LYNCH & CO 171A ALDERSGATE ST. LONDON.
No measurements available. 1880. A.
White porcelain, black signature; Malahide Castle.
Date from Downing 1988,79.

1442 MIS004 LEVEL - TELESCOPIC

Davis Derby
L 325; H 135. 1828-1873. R.
Brass; four-screw double-plate base; spirit level on top of tube; mahogany/brass stand; UCC Civil Engineering.
Rack and pinion objective focus; cover flap on objective; legs of stand unscrew into two.
Dates for John Davis from Clifton 1995,79.

3613 MIS076 MECHANICAL MODEL - PISTON ENGINE

PRESENTED BY JAMES BENNETT
B 715x212x90; H 311; WhD 309. Mid to late 19 C. G.
A six-spoke wheel at one side with U-indent on its axis drives a pivoted horizontal piston rod; Steam Museum.
The piston barrel is of brass-bound coopered oak; an off-set ring and wheel coupling from the axis drives the valve rod; the large wheel has a pulley groove and, at the other end of its axis, there is another ring (D61,W39) with a slightly curved edge - which could be used for a flat ribbon.
From the North Monastery Cork Collection, transferred to The Steam Museum at Straffan in March 1995 via Charles Mollan.

4471 MIS077 MECHANICAL MODEL - STEAM ENGINE

Unsigned - but made for Richard Trevithick by William West
No measurements available. 1797. R.
Metal; horizontal cylinder; two large and two small wheels; Straffan Steam Museum, Co. Kildare.
Described as "certainly the oldest four-wheeled self-propelled mechanical device in existence", this a key exhibit in the Straffan Steam Museum, which has a fine collection of other models, notably model trains, as well as full-sized stationary steam engines; the collection is really outside the parameters of the instruments inventory, but this item is particularly attractive and important; Richard Trevithick (1771-1833), described in the DNB "as inventor, one of the greatest that ever lived", asked his friend William West, to make and perhaps modify some prototype models of road locomotives; this model is named as the third his father had made about 1797 in Francis Trevithick's biography; it was probably purchased by a Peruvian called Uvillé, who brought it to Peru, and it led to orders for engines from Trevithick; "We derive all our present-day people-movers from this and its sister models, whether on rail or road."
Details of this and other exhibits are given in The Steam Museum catalogue (by Robert Guinness).

1425 MIS015 MICROSCOPE - COMPOUND

ANGELO GOZZI FECE IN PARMA MDCCLXXII
B 104x103; H 375; C 617x170x147. 1772. S.
Gilt bronze; curved pillar; kingwood case; reputed to be a wedding present to Marie Antoinette; Russborough House.
Revolving concave mirror on base; openwork stage; long screw at back of pillar to adjust focus; eagle on cap over eyepiece; tapering tube to objective; case with double doors; two drawers at base for accessories; six small drawers at sides of case, now empty.

3687 MIS055 MICROSCOPE - COMPOUND

Unsigned - attributed to William Ladd
H 356-419; C 273x190x152. 1851-1855. R.
Brass; Y-foot; bar limb; chain drive; "Armagh Natural History Society"; Historical Technology 111,1975,154.
"CHAIN DRIVE PRESENTATION MICROSCOPE - English, probably between 1851 and 1855, no maker's name but marked on the bar limb 'Chain Adjustment REGISTERED May 18th 1851' with the body tube engraved 'To B.P. Davidson, Esqr. From the Members of the Armagh Natural History Society In token of their sense of his Valuable exertions for that Institution'. Bright brass, original lacquer finish...chain drive coarse focus and nose-piece fine focus screw, two axis driven mechanical stage 2½" sq with rotating aperture disc and 2" dual mirror below. The stand is derived from Ross with the bar limb supporting the 7 3/4" long microscope tube. Included are 2 oculars, objective with triple button lenses (achromatic?), live box, paired Nicol prisms, stage forceps, stage condenser, and fitting and lens for conversion to a simple microscope. Original dovetailed mahogany case." - illustrated. Moscovitz states that "this is an example of the early work of William Ladd who seems to have been the first instrument maker to use a chronometer fusee chain to control the large scale focusing motions of a microscope."

4250 MIS075 MICROSCOPE - COMPOUND

A. ROSS. LONDON No 509
No measurements available. 1845. R.
Brass; Y-foot; trunnions to limb for mirror, condenser, stage and tube; property of Mary Ward (1827-1869).
The limb is cylindrical at the bottom, and has a revolving mirror sliding on this; above this is the condensing system below the square stage; at the top of the limb is a right-angled bracket to the tube, which is held parallel to the limb at right-angles to the bracket; coarse focus is by rack and pinion, with fine focus knobs at the top of the limb bracket.

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The instrument was exhibited at the "William and Mary" (i.e. Third Earl of Rosse and Mary Ward), "Kings County Cousins" Exhibition at Birr Castle in 1990, but its present location is not known.

A display with the instrument recorded: "The Ross microscope arrived at Ballylin in 1845 when Mary was 18 years old. It was recommended to her parents as the best instrument then available by the astronomer Sir James South (1785-1867). Sir James was a frequent visitor to Birr Castle during the period the giant telescope of the 3rd Earl was under construction. In her journal for the year 1845 Mary wrote "Ross's microscope came - bespoke by Sir James South". She taught herself the various techniques required to prepare objects for microscopic examination and searched the scientific literature available to find references to the art and science of microscopy. She was fortunate in being a close relation of William, the 3rd Earl of Rosse, as through him she was brought into contact with many distinguished scientists during her visits to Birr; she says in 1852 "I was a good deal at Birr Castle this autumn and met Sir David Brewster, Dr Scoresby and other savants". In the same year she travelled north to stay at Glencraig, Co. Down, and was able to attend some of the sections of the British Association Meeting in Belfast. Her book on the microscope began as a series of short letters to her childhood friend Emily Filgate. The original letters to Emily were published privately in 1857 in a small book called "Sketches with the Microscope" of which she had 250 copies published by Shields, the printer and proprietor of the "King's County Chronicle" at Parsonstown (Birr). In her journal for 1853 we find the following: "I began at this time (February) to work a good deal with the microscope and wrote my letter to Emily Filgate describing and sketching a number of microscopic objects and promising a description of living things in April - a promise which I fulfilled just 10 years later."

For more details of Mary Ward (born King) see Owen Harry in Mollan 1985,52.

3683 MIS054 MICROSCOPE - COMPOUND

(J. SWIFT & SON, LONDON Geol. Dept. U.C.D. Dublin)

MnH 314-365. Fourth ¼ 19 C. G.

Four brass petrological microscopes, from UCD Geology Dept; on sale Christie 5:3:87, Lots 379,382,388,406.

The microscopes were from the John H. Bassett Collection - Bassett was formerly the proprietor of James Swift & Son, Ltd; James Powell Swift founded the firm in 1853, and died in 1906.

"379 An oxydised and lacquered brass petrological monocular microscope with rack and pinion focusing, double nose piece, circular stage with vernier reading, nicol prism, substage condenser and swivel mirror on a horse-shoe stand signed 'J.SWIFT & SON, 81 TOTTEN-HAM COURT Rd. LONDON' and further engraved '18 Geol. Dept. UCO [sic] Dublin'" - MnH 349; £120-150.

"382 A lacquered brass and black enamelled compound monocular petrological microscope, the horse-shoe base signed 'J. SWIFT & SON LONDON' and further engraved '16 Geol. Dept. U.C.D. Dublin', with rack and pinion coarse and micrometer fine focusing, nicol prism and Klein plate double nosepiece with 1/8" N.A.O.92 and 1" objectives, sub-stage condenser and swivel mirror, the horizontal bar stamped with the Swift trademark" - MnH 355; £120-150.

388 A lacquered brass and black enamelled compound monocular petrological microscope, the horse-shoe stand signed 'J. SWIFT & SON LONDON' and further engraved '8 Geol. Dept. U.C.D. Dublin', with rack and pinion coarse and micrometer fine focusing, nicol prisms, double nose-piece with 1/16" and 1" objectives, the circular stage with engraved 360° scale, substage condenser and mirror" - MnH 365; illustrated; £140-160.

"406 An unusual lacquered and oxydised brass compound monocular petrological microscope, signed on the horse-shoe stand 'J. SWIFT & SON LONDON' and further engraved '2 Geol. Dept. U.C.D. Dublin', the 'Dick' model, with Swift Patent geared motion for the eye-piece and stage with slide, having rack and pinion coarse and micrometer fine focusing, double nose-piece with 1" and 1/6" objectives, nicol prism and folding magnifier to the body tube, substage condenser with swivel mirror" - MnH 314; illustrated; £100-120.

Firm became J. Swift & Son in 1877, Turner 1989, 184-201.

4026 MIS045 MICROSCOPE - COMPOUND, BINOCULAR

(Watson & Sons, Holborn, London 1795)

No measurements available. c1890. N.

Brass; on mahogany base; with extra lenses; in mahogany case; Teagasc, Johnstown Castle, Wexford.

Reputed to have belonged to Arthur Wilson Stelfox (1883-1972), the naturalist (see Frank Winder in Mollan 1990,60-1), and father of the first Irish-born conqueror (in 1993) of Mount Everest, Dawson Stelfox; the microscope was later in the possession of Evelyn Booth (1897-1988), the author of Flora of County Cavan, who passed it onto Dr Austin O'Sullivan of Teagasc.

Turner 1989,108&13 records that the firm made its first microscope in 1876, and had made around 3000 by 1893.

1430 MIS019 PAINTING

(Jacques de Lajoue 1734)

1190x1520. 1734. S

Le Cabinet de Physique de Mr Bonnier de la Mosson; plus another painting of his Library; Russborough House.

"The Cabinet of Bonnier de la Mosson (1702-1744)" is the title of a paper by C.R. Hill in Annals of Science, 43 (1986) 147-174, who records that this painting is by Jacques de Lajoue (1686-1761), signed and dated 1734; it includes lenses, mirrors, polyhedra, and an array of mechanical models, and was one of four "dessus-de-porte" made specifically for panels above doors as part of a larger decorative scheme in the Hôtel du Lude, Paris c1730.

2133 MIS035 PASSAGE TOMB - NEWGRANGE

Unsigned

ChL c27000; D c79500. c5150BP (3150BC) R.

Arguably a scientific instrument; rays of the rising sun hit chamber end at winter solstice, December 21.

The entrance to the now-restored megalithic tomb faces south-east and, for about a week before and after the solstice, the rising sun shines through a roof-box at the entrance; it seems reasonable to assume that the orientation was deliberate, and hence the tomb could be considered a time piece or season indicator; other ancient stone structures in Ireland have significant solar, lunar, or equinoctial orientations.

In the case of stone alignments in Cork and Kerry, Kelly 1989,231 quotes Ann Lynch's views that: "the alignment builders were aware of the more obvious events in the solar and lunar cycles, as, for instance, mid-winter sunset and midsummer sunrise, and their observations of these points would not have required any detailed scientific knowledge but would have become quite obvious to a farming people who must have spent much of their time in the open during both day and night. There is nothing, therefore, to suggest that the alignment builders had made an organized systematic study of the movements of the celestial bodies." These alignments may date around 3000BP.

A stone circle in Drombeg, Co. Cork, has an axis, when projected to the local horizon, which points to the point of sunset at the winter solstice, and another at Bohonagh to the sunset at the equinoxes. Kelly 1989, 236 notes: "There seems no doubt that orientation was important to Neolithic and Bronze age peoples, not alone in stone circles, but also, as we have seen earlier, in megalithic tombs. But whether the more extravagant claims that have been made will ever be substantiated or not, it is difficult to say in the present state of knowledge."

A report by Lorna Siggins, based on the work of Dr Tom Ray of the Dublin Institute for Advanced Studies, records that Newgrange is believed to have been built to "house" Oengus, son of the sun-god Dagda, around 3150BC, when the tilt of the earth's axis was slightly more than it is to-day, so that the alignment was more accurate than it is to-day. The paper in Nature (Vol. 337, 26:1:89) by T.P Ray records: "When the monument was constructed, however, first light would have occurred at

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sunrise in the form of a very narrow beam bisecting the chamber. Here I suggest that the width and height of the gap in the floor of the roof-box may have been deliberate, tracing the path of the Sun at the solstice. Newgrange predates the astronomical structures of Stonehenge by 1,000 years and as such may be the oldest astronomically oriented structure in the world."

See Kelly 1989, 103, 106, 231, 236; T.P Ray, Nature 337, 6205, 343-345.

1439 MIS013 STANDARD LENGTH - IMPERIAL

YEATES & SON Dublin 1900 IMPERIAL YARD

L 1000. 1900. S.

One and two feet and imperial yard with inches marked; Paris Metre at right-angles; in wall of Dublin City Hall.

Date 1900 stamped on it with portcullis.

An article entitled "Degrees of Confidence", by Martin Hynes of EOLAS, in Technology Ireland, May 1989, 21-23, gives an illustration, and the description: "Mural tablet of length set into the North façade of City Hall, Dublin. Made in brass by Messrs Yeates and Son, 2 Grafton Street and inserted in the wall in December 1877."

2590 MIS040 THERMOMETER & BAROMETER

Stephens' Inks E.BARNES, MAKER, HATTON GARDEN, LONDON.

H c1680; W c340. Early 20 C. G.

White enamel back; large thermometer gone; scale 10-150°; barometer scale 27-32"; Mother Redcap's Tavern.

Black writing includes: "For all Temperatures", "BARO-METER RISE FOR COLD DRY FOR LESS WIND", "FALL FOR WARM WET OR MORE WIND".

The Tavern, dating from 1768, is near Taylor's Hall, close to Christ Church, Dublin.

NATIONAL BOTANIC GARDENS - NBG

Glasnevin

Dublin 9

Telephone (01) 837-7596

1120 NBG001 DIAL - HORIZONTAL PEDESTAL

LYNCH 26 Capel St. DUBLIN

W 350; GnH 250. 1784-1807. R.

Bronze; octagonal; worn and pitted; hours IIII-XII-VIII; gnomon has a curved insert, and a flat brass style.

Central compass with sixteen directions; next equation of time; then days and months; outside this, cities, e.g. Babylon, Alexandria, Rome, Amsterdam, Paris, London; then minute divisions 15, 30, 45, 60 followed by the roman hours; and finally minutes again 10, 20, 30, 40, 50, 60; the open-work bronze gnomon has a curved insert and a flat brass plate on its long side.

James Lynch made a "large horizontal dial for ye Garden" of Trinity College Dublin between 1788 and 1793, Burnett & Morrison-Low 1989,30.

Assumed to be James Lynch, active 1784-1807, but could be his son James active 1826-1839 - Morrison-Low 1989,129.

4412 NBG013 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 29102

[On case] J. ROBINSON & SONS 65, GRAFTON STREET, DUBLIN

F 131x90; MnH 279; Sa 87x75; C 332x196x193.

c1893. N.

Brass and oxidised brass; U-shaped foot; pivoted; limb and bracket to tube; triple nose piece; fitted case.

A short pillar on the foot rises to a pivot; above this is the stage, which has two slide clips; under the stage is a condensing lens system with an iris diaphragm; this can be replaced with a fitting for apertures; below the stage is a rotating arm to a rotating plane and concave mirror; above the stage, the pillar rises to a fine focus knob; and has a bracket with double knob rack and pinion coarse focus to the tube; the fitted case has box sliders for three brass lens cylinders with objective lenses 2 4 7, three apertures and two eyepieces; the slide-in accessory drawer is missing; the case has an ivory plaque for Robinson & Sons, and is also stamped 29102.

4403 NBG006 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 85486

[On case] Made Especially for F.E. BECKER & Co.. W. & J. George Ltd. Succrs. 83-87, HATTON WALL, Hatton Gardens, LONDON, E.C.

Speciality, Balances & Weights 85472

Sp 150&133; MnH 268; C 320x174x158 c1905. N.

Brass, oxidised brass and black enamelled metal; shaped tripod foot; limb and bracket to tube; fitted case.

The foot rises to a pivot; above the pivot is the stage; under the stage is a condensing lens with an iris diaphragm below; a bar with a semicircular section descends from the stage, and on this is a sliding sleeve for a rotating plane and concave mirror; above the stage is a cylinder limb (with a fine focus knob on top) holding the bracket to the tube; coarse focus of this is by double knob rack and pinion; double nose piece; the mahogany case contains three objective lenses 1x 3 and 7 in brass screw-top cylinders, and a fitting which replaces the condensing lens below the stage, and which allows the insertion of either of two apertures; a drawer in the case holds knives, tweezers, and a metal point with a wooden handle; the case has a handle on top.

A label on the case gives Leitz addresses: "Wetzlar, den Zweiggeschäfte: Berlin N.W. Luisenstr. 45.", "E. Leitz. New-York 411 West 59th Street"; the number stamped on the case 85472 is different from that on the microscope 85486 - presumably the Museum owned both microscopes, but 85472 has not survived.

Date for serial number from J. Bennett.

4405 NBG007 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 85173

[Case with Becker plaque also numbered 85173]

Sp 150&133; MnH 268; C 320x174x158. c1905. N.

As for 4403 NBG006, but with no lens cylinders, only two objectives (3 and 7); only glass slides in drawer.

4406 NBG008 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 85186

[Case with Becker plaque also numbered 85186]

Sp 150&133; MnH 268; C 320x174x158. c1905. N.

As for 4403 NBG006 but without the condensing lens system; two eyepiece lenses; two apertures; two objective lenses.

The latter, 3 and 7, are in brass cylinder cases; only glass slides in drawer.

4408 NBG009 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 80415

[Case with Becker plaque also numbered 80415]

Sp 150&133; MnH 268; C 322x180x175. c1903. N.

As for 4403 NBG006, but with five objectives, three eye-pieces, two apertures, and blue frosted glass disc.

Three lenses have brass cylinder cases (1x 3 6), and the two others are rated 3 and 7; the drawer contains twee-zers, razor and glass slides; the Leitz signature is on the back of the foot, and not on the front of the tube as is the case with Nos 85486, 85173 and 851286.

4409 NBG010 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 90371

[Case with Becker plaque, numbered 80422]

Sp 153&120; MnH 272; Sa 87x77; C 322x180x175

c1906 [Case c1903] N.

Similar to 4403 NBG006 but with a flat curved Y-shaped foot, a triple nose piece, and four objective lenses.

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The latter are rated 1x 1x 3 and 7, and there are three brass cylinder cases (1x 3 7); there is one aperture and one eyepiece; in the drawer are glass slides and a small white box for specimen covers with sponge protectors (decayed).

4411 NBG012 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 71438

[On foot] No 113 Dublin Museum (Botany)

Sp 137&110; MnH 280; Sa 87x87; C 326x185x175.

c1903. D.

Brass, oxidised brass and black enamelled metal; U-shaped foot; no pivot between foot and stage; case.

The pillar on the foot is of black enamelled metal to the stage, and brass above; the microscope can only operate in a vertical position as there is no pivot; the stage retains only one slide clip; below it is a wheel of five apertures, but no condensing system; a rotating bar under the stage holds a rotating plane and concave mirror; the fine focus knob is on top of the pillar; a bracket with double knob rack and pinion coarse focus holds the tube, which has a double nose piece with objectives 3 and 7; no eyepieces remain; the fitted case, also stamped 71438, whose drawer for accessories is gone, has a Leitz label (as for 4403 NBG006), which, in this case, is dated 3/XI 1903; in pencil is written "See order 400 1903".

4410 NBG011 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 163776

[On foot] DUBLIN MUSEUM (BOTANY) 304

Sp 160&122; MnH 282; Sa 104x103; C 340x216x182.

c1910. N.

Brass, oxidised brass and enamelled metal; Y-shaped foot; curved limb; double knob fine and coarse focus; case.

The foot is a curved flat Y-shape with a short stem; from this rises a support to the pivot; just above this is the large stage, which has two slide clips; under the stage is a condensing system with an iris diaphragm, and a rotating bar to a rotating plane and concave mirror; above the stage is a curved limb (contrasting with the cylinder pillar limb of the other Leitz microscopes in the Botanic Gardens collection); the top of the enamelled limb is attached to a brass block with the double knob fine and coarse focus, the former not now working, the latter operating a rack along the tube; the double nose piece has objectives 3 and 7; there are two apertures, and two eyepieces (x4 and 7.5); the fitting for the apertures (which would have replaced the condensing lens) is missing; the fitted mahogany case has sliders for objectives, apertures, and eyepieces (single pieces of wood rather than the box type in the other examples), and the drawer contains a glass slide, tweezers, and a small box for specimen covers "Chance No2"; a label on the box lists objectives 3 and 7, and the magnification with the eyepieces II and IV, 62 and 103 for objective 3, and 375 and 625 for objective 7; the label gives Leitz addresses: "E. LEITZ, 18, Bloomsbury Sq., LONDON, W.C. And at NEW YORK, BERLIN, FRANK-FORT [sic], ST. PETERSBURG :: Works: WETZLAR.

4399 NBG002 MICROSCOPE - COMPOUND

POWELL & LEALAND 170 Euston Road, LONDON

[Pencilled on case lid] W.R. McNab March 4th 1880

Sp 145,175,185; MnL 360; TuD 31; C 281x200x88.

c1880. D.

Brass; portable folding; tripod legs; stage and condensing system rotate for folding; double nose piece; fitted case.

The folding tripod legs lead to the limb holding the rotating stage, which has rack and pinion adjustments in two directions at right-angles; below the stage is a mount for a condensing lens with a wheel of four apertures below, and two rack and pinion movements; on a sleeve below is a double-jointed arm to rotating plane and concave mirrors; coarse focus is by rack and pinion with a triangular insert in the limb; fine focus is by a knob on top of the limb, at one side of the arm at right-angles which supports the tube; this has a double nose piece; the fitted mahogany case contains three Powell & Lealand objectives in cylinder brass cases 1IN ½ ¼, two eyepieces, an "R & J. BECK LONDON" objective 1/8, a 1/10 "IMMERSION R & J. BECK 31. CORNHILL LONDON", a blue glass, a Beale camera lucida (Turner 1989,321), and an aperture; The instrument and case are contained in a somewhat distressed leather carrying case.

A note with the instrument by T. O'Connor 7/11/1940 records: "The spherical aberration with the ½ & ¼ (Powell & Lealand) objectives of this microscope is such as to render the instrument of no practical value to-day unless it can be fitted with modern optical parts. I have not examined the 1/8 & 1/10 (Beck) objectives".

William Ramsay McNab (1844-1889) was born in Edinburgh, and became Professor of Botany at the Royal College of Science in Dublin in 1872; he was appointed Scientific Superintendent to the Botanic Gardens (but not Curator) in 1880; he wrote a "Guide to the Royal Botanic Gardens" in 1885 (Nelson 1987,149,178-9).

Powell & Lealand operated at this address from 1857-1905, Turner 1989,114.

4413 NBG014 MICROSCOPE - COMPOUND

J. SWIFT & SON LONDON

[On label] JAMES SWIFT & SON, 81, TOTTENHAM COURT ROAD, LONDON, W.

Sp 160&132; MnH 305; Sa 100x90; C 331x202x165.

c1909. D.

Brass and oxidised brass; shaped tripod foot with rounded back; pivoted; triple nose piece; fitted case.

The curved foot rises to a pivot; at the side of this is the stage, which has rack and pinion movement in two right-angled directions; below this is a condensing system with an iris diaphragm, with rack and pinion position adjust; there is a cylinder under the pivot for a sleeve for rotating plane and concave mirrors; above the pivot, the pillar is topped with the fine focus knob, and holds a bracket with double knob rack and pinion coarse focus to the tube; there are three eyepieces 1 2 3 (the latter also marked 5.5), one empty objective lens cylinder 1½, with a label inscribed "Case for Objective of Museum Microscope 1909"; three objective lenses marked "1 IN", "P-A ½ IN N.A.O. 35 J SWIFT & SON LONDON", "P-A 1/8 IN N.A.O. 92 J SWIFT & SON LONDON"; the fitted mahogany case also contains a blue glass disc, and has a label: "Table, showing the Magnifying Power of Objectives with the Eye-Pieces mentioned therein, at the 2 positions of the Draw-Tube, named in table"; circular supports for accessories on the door have been partly sawn off.

The firm moved to this address in 1881 Turner 1989,184.

4401 NBG004 MICROSCOPE - DISSECTING

E. Leitz Wetzlar No.71, Dublin Museum (Botany [sic])

[On case] S. & A. MUSEUM. DUBLIN 1905 VEROR: BOTANY. No71.

F 140x100; MnH 147; Sa 110x103; C 246x174x168.

1905. D.

Brass and oxidised brass; U-shaped foot; pillar to glass-covered stage; jointed arm to sleeve for lenses; case.

Coarse focus is by double knob rack and pinion, which alters the height of a triangular insert in the limb; two lens systems marked "VEROR: 20" and "VEROR: 16"; below the dissecting stage is an arm for a rotating plane mirror with a white disc on the reverse; mahogany and boxwood fitted case with handle on top.

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4400 NBG003 MICROSCOPE - DISSECTING

E. Leitz. Wetzlar New-York 30. E. 23d. Str.

Fo 136x103; H 162; Sa 110x100. Early 20 C. G.

Brass and oxidised brass; U-shaped foot; pillar to glass-covered stage; jointed arm to sleeve for lens system.

Coarse focus is by double knob rack and pinion (not now working); below the dissecting stage is an arm for a rotating plane mirror, with a white disc on the reverse, but this is now detached.

Appears to be the same as microscope 302 in Turner 1989,275, dated to the first quarter of 20 C.

4402 NBG005 MICROSCOPE - DISSECTING

16440 Carl Zeiss Jena No 115 Dublin Museum (Botany)

[On case] C. BAKER, 243 & 244, HIGH HOLBORN, LONDON 16440

Fo 137x89; MnH 137; Sa 132x101; C 231x188x179.

c1890. G.

Brass and oxidised brass; Y-shaped foot; pillar to stage; jointed arm to sleeve for lens; fitted case.

Coarse focus is by double knob rack and pinion; below the dissecting stage is an arm for a rotating plane mirror, with a white disc on the reverse; one stage cover is a metal sheet; another has a central hole with a lever to locate below the hole a black or white background, or another hole to allow light from the mirror below; the lens arm can be extended; there is only one compound lens, but this does not fit into the sleeve on the arm above the stage; it does however fit into one of the three holes for lenses in the door of the case, and this hole has been specially modified to take it; inside the fitted mahogany case, which has a handle on top, are two tapering mahogany sheets with hinged additions at both shorter ends; these have little metal brackets to fit onto the sides of the stage, and presumably are arm rests (see Turner 1989,190-1).

Both serial number and Baker address suggest a date around 1890.

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NEWBRIDGE HOUSE
Donabate
Co. Dublin
Telephone (01) 843-6534

2974 NEW004 BALANCE - ROBERVAL

J. NEWMAN. DUBLIN. (Weight) J. NEWMAN DUBLIN

B 492x219; PvH 143. Late 19 early 20 C. G.

Roberval shop scales; white ceramic rectangular base (one side broken); brass and white-painted metal fittings.

A Roberval balance is one with an equal arm beam, having the pans above the beam, stabilised by a leg and stay underneath the beam, and named after the French mathematician Gilles Personne de Roberval, who devised the principle in 1669, although his ideas were not used on scales until the early nineteenth century (Crawforth 1984,19).

With the scales are brass disc weights, most by "AVERY LTD", but one (2lbs) is signed: "J. NEWMAN DUBLIN".

J. Newman was known at 156 Capel Street from around 1840 until the firm was taken over by W & T Avery Ltd in 1914 (Crawforth-Hitchins 1994,1288).

Two other reported balances (*loc. cit.* p1828) are signed by Newman: a butcher's scales with a brass lattice beam by W & T Avery included a transfer print "J. Newman, 156 Capel Street, Dublin, Repairers"; and a postal steelyard by Simcox & Pemberton of Birmingham (1818-1842) had the beam stamped "Newman, Dublin", and the letter plate "Newman, Capel Street, Dublin".

Newman is also known from weights 1987 SAL009.

The collection includes other weights; a wood and a brass scales; several mortars and pestles, including a very large mortar (OD 506) with a wood dumb-bell pestle; several copper jug measures, including: "WHISKEY 2 GALLONS" and "5 GALLONS".

2973 NEW003 INHALER

DR. NELSON'S IMPROVED INHALER LYNCH & Co., LIMITED LONDON

BD 99; MxD 150; JaH 190; H 265. Late 19 C. G.

White porcelain; pear shape; with breathing tube.

The porcelain has a blue vein pattern; on top is a cork bung with a glass breathing tube; from the top side of the main vessel rises a (damaged) bent pipe.

The instructions read: "DIRECTIONS FOR USE REMOVE MOUTHPIECE - HALF FILL INHALER WITH BOILING WATER. DROP REMEDY ON SPONGE OF MOUTHPIECE - APPLY LIPS TO IT - BREATHE FREELY IN AND OUT AS IN ORDINARY FULL RESPIRATION - WHEN ONLY THE VAPOUR OF HOT WATER. OR ANY INFUSION IS DESIRED REMOVE THE SPONGE FROM THE MOUTHPIECE--".

Downing 1988,79 gives firm dates 1879-1900+.

2971 NEW001 LEVEL - TELESCOPIC

A. Adie Edinburgh

Sp 245; PvH 275; TuMnL 380, D 27. 1823-1834. F.

Brass; tripod cabriole legs; pillar to pivot; rectangular base plate with two tube supports.

The folding cabriole legs and pillar to pivot support do not appear to be original, being of a brass of different colour, and with a superior finish; a tapering wood screw below the pillar would allow permanent fixing instead of the use of the legs; one tube support incorporates a hinge, and the other is in the form of a screw thread and a turned knurled knob to adjust the height; focus is by rack and pinion eyepiece adjustment; the erecting optics incorporate crossed wires (one broken).

The instrument is very similar to the level illustrated in Clarke 1989,65, made by J. Miller, Edinburgh, previously a partner of Alexander Adie, which has a push focus rather than the rack and pinion; this instrument also is missing a spirit level, but there are screw holes on the tube support brackets, which would have held a suspended level below the tube, as in the Miller example.

Dates from Bryden 1972,43.

3876 NEW006 MATERIA MEDICA CABINET

CABINET OF MATERIA MEDICA AND PHARMACEUTICAL PREPARATIONS BY EVANS, LESCHER & WEBB, 60, BARTHOLOMEW CLOSE, LONDON, E.C.

EVANS, SONS & CO., Liverpool.

EVANS, SONS & MASON, Limited, Montreal.

C 376x272x102. Late 19 early 20 C. G.

Mahogany case with three trays of samples.

The bottom tray, incorporated in the case, is damaged, but the broken parts are preserved; the upper two trays lift out; two (of three) printed sheets on mahogany boards identify the materials in the cabinet (it is possible that the third key is pasted on the back of one board, but the key for the display cabinet could not be found to check); one of the keys is for specimens 44-85, and includes such things as "GUMMI JUNIPERA", "VERATRIUM ALBUM", "SENNA INDICA", "ERGOTA"; the other sheet is for samples 86-128, mainly small tubes of chemicals, and includes: "OPIUM", "BORAX", "POTASSII BROMIDUM", giving also formulae and common names.

The signature is on a black and gold Trade Label.

2972 NEW002 MICROSCOPE - COMPOUND, GOULD

WEST, 17, Rufsell Court, Drury Lane.

H(-C) 282; TuL 151, D 34; C 221x171x58. 1822-1828. A.

Brass; cylinder and tapering tube held at objective by cross bar from stand in lid of mahogany case.

The stand rises from the inside centre of the lid of the case, which holds accessories; the double-ring stage is moved into focus by rack and pinion on the stand; at the bottom of the stand is a revolving plane and concave mirror; the case contains five objectives, an eyepiece, a lieberkuhn, a knife with a tapering ivory handle, a condensing mirror on a semi-circular mount, a sample clamp with counterweight, an ivory disc, black on one side and white on the other; four ivory slides with four microscope preparations in each; an ivory cylinder case, with screw cap, containing perspex slide cover discs; and a small tweezers.

This type of microscope was designed by Charles Gould, who published details in 1827; Gould worked for William Cary (1759-1825), and these microscopes are often called Cary-type - Turner 1989,75.

Dates of Francis West at this address from Clifton 1995,294.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3875 NEW005 STEAM HEATER

W.B. NICOLSON Scientific Instrument Maker

GLASGOW.

BD 117; CyH 202; H 266; TuD 30. Late 19 C. G.

Copper cylinder with angled down pipe at bottom; brass insert tube with angled bottom.

On top of the copper cylinder are two brass sleeves (D33&19,H28); the brass tube fits into the larger one in the centre; the tube has an ebonite ring on top, and its angled bottom fits the angle of the bottom of the inner tube in the centre of the cylinder, which leads out at the angled downpipe; the smaller sleeve at the side is presumably for exiting steam; thus something in the brass tube could be steam heated by boiling water in the cylinder, without actual contact with the steam; after heating, raising the inner tube would allow what was in it to slide out down the angled tube at the bottom.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

NORTH MONASTERY CHRISTIAN BROTHERS' SCHOOL - NMC

Our Lady's Mount
Cork
Telephone 021-301318

Note: This collection was sold in 1993. Some of the key instruments were acquired by the National Museum in Dublin, and the remainder sold to a London dealer. Those transferred to the National Museum are included also in its listing in this Inventory, and Irish-signed instruments sold to London are included also in the Out-of-Ireland listing.

An overview of the collection is given Mollan 1993.

3786 NMC187 AMMETER

GRAVITY AMMETER EVERSHED'S PATENT No 1080 DOBSONS & CURTIS BROS LTD DUBLIN
B 395x318x35; H 360; HsD 182&235. 1898-1901. F.
Mahogany base and vertical support for brass glazed cylinder housing; silvered scale face; arc scale 0-15.
There are two screw brass electric contacts below the cylinder housing.
Also an unsigned robust ammeter in a cylindrical metal casing with glass top.
Dates from Morrison-Low 1989,123.

3625 NMC121 AMMETER

HANDLEY & SHANKS ENGINEERS CORK AMPERES RD. NO. 184776
BD 200; CyD 166, W 61. 1891. RD.
Brass base plate and glazed cylinder housing; white double convex arc scale 0-100; inside of glass stained.
The needle extends from a pivot behind a brass half disc (D40) on top of the face; behind the housing are two brass screw pillar electric contacts; a paper label on the back reads: "(INSTRUMENT No.) In fixing up this Instrument the Positive lead is to be connected to the left hand Terminal looking at the front of the instrument, and the pointer should be set at 0, when no current is passing.189..."

3798 NMC199 AMMETER

SCHALL & SON LONDON No 1311A MILLIAMPS
CyHsD 156, W 73; SFrD 165; H 183. Early 20 C. G.
Glazed brass cylinder housing; silvered face with arc scale 5-0-5; ebonite cylinder and revolving knob.
The latter (D35) has marks 1,5,10,0; there are two brass screw electric contacts at the sides of the housing.
Schall & Son X-ray tube 2808 UCP261 is dated 24:11: 1913.

3626 NMC122 AMMETER

THOMSON AMMETER PATENTED MARCH 24, '91; JULY 16, '95; APRIL 2, 1901. NO.115128 TYPE H AMP.3
C.TRANS.10:1
B 215x150; H 193. 1901. S.
Blackened metal wedge-like housing; glazed arc scale.
The white scale reads 0-30; the "THOMSON AMMETER" is stamped on a metal ribbon on the housing; the rest of the legend is on the scale, which has blank entries for "VOLTS", "PH.", AND "P.TRANS."

3790 NMC191 AMMETER

WESTON AMMETER WESTON ELECTRICAL INSTRUMENT COMPANY NEWARK, N.J. U.S.A. No.7057
MADE FOR ELLIOTT BROTHERS, LONDON
BD 183; D 170; W 98. Patents listed for 1888-1898.
Black painted, somewhat rusted, metal cylinder housing.
Glazed arc for white scale 0-15; there are two screw electric contacts below the housing.

3393 NMC024 AMPERE GAUGE

LORD KELVIN'S PATENTS AMPERE GAUGE No1446 JAMES WHITE GLASGOW.
Hs 200x183x89. 1892-1900. R.
Brass glazed housing; coil outside on top; rod from centre of coil coupled to weighted device for needle.
The latter reads a white scale (non linear) from 0-120.
Kelvin was raised to the peerage in 1892, Smith 1989,799; the firm became Kelvin & James White in 1900, Bryden 1972,59.

3623 NMC119 ASPIRATOR - DOUBLE REVOLVING

Unsigned
Sp 327&295; MxH 915; VD 182&177. Late 19 C. G.
Iron trunnion frame to elliptical turning ring with sleeves top and bottom for two cylinder glass vessels.
In the centre of the ring is a glass joint with two pipes from the corks of each vessel, so that they can be connected or disconnected; at right-angles to the axis of this joint is a short bulbous tube with a stop-cock (cock missing), and rubber pipes extend from it through holes in the axis of the trunnions; on one side is a double handle, with turned wood right-angled ends, and a spring clip on the A cross of one trunnion.
A similar apparatus is illustrated in Ganot 1890,366, being used with a chemical hygrometer - that is an apparatus to determine the amount of moisture in air; the two glass vessels can in turn be used as aspirators, to draw air through the hygrometer; in use, the lower vessel is filled with water, and the upper with air; when rotated, the water falling into the lower vessel draws air through the hygrometer; by inverting again, the same volume is drawn through, and this can be repeated to draw through air in multiples of the volume of the vessels.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3578 NMC074 ATWOOD MACHINE

Unsigned

B 306x304x21; WhsD 131 & 94. Early to mid 20 C. G.

Top mechanism has wood base, iron brackets, two pairs of wheels and "frictionless" wheel; brass cylinder weights.

The brackets holding the two pairs of metal wheels have shamrock cut-out decoration, and each wheel has four circular holes (D28); on these sit the axis of the brass six-spoke "frictionless" wheel; this mechanism sits in a (broken) glazed frame above a vertical wood board (3025x22x20) and a vertical iron rod, but neither has a scale; the weights are brass cylinders (D53,H53) with hooks on top

A second similar machine may be slightly older; it has two pairs of four-spoke wheels on brackets with fan-shaped cut-out decoration, and a five-spoke central "frictionless" wheel.

There are two additional "frictionless" wheel mechanisms like the first (B 302x302x29; WhsD 130&93).

3794 NMC195 BALANCE - BERANGER

Unsigned

Hs413x161x97; MxH168; PasD185; WdD33.

Early 20 C. G.

Walnut[?] housing with white marble top; two removable brass pans on top; window at side for two moving arrows.

The tips of the arrows meet when the pans are in balance; the pans sit on cross-bars on four vertical moving bar supports to the mechanism inside.

The balance is illustrated in Maiben 1914,26, where the type is described: "Balances, Beranger's principle. French Scales, on stained walnut box, and marble top...", being offered in three pan sizes - diameter 6.25, 7, and 8" to weigh 1, 2 and 5 kilos.

The principle of the balance was patented by Joseph Beranger in 1849 (Crawforth 1984,20).

3535 NMC031 BALANCE - MAGNETIC

GRIFFIN LONDON

B 345x78x19; MxW 180; PrH 435; SD 160.

Early 20 C. G.

Black boxwood base; central groove and scale 0-100; pillar to scale 0-90-0-90-0; spring through glass tube.

The central groove is 18mm wide and has a linear boxwood scale at one side; from a side arm at the centre of the base rises the turned black wood pillar, on top of which is a right-angled wood bracket with a clamping screw, and the bracket supports a vertical black wood disc with the white paper scale on front; the pillar also supports a horizontal brass support for a vertical glass tube for a damaged spring which would have connected the axis of the scale disc to a bob at the bottom of the spring, and this, when attracted by the magnet, would have turned the scale, the amount depending on the strength of the magnet. Apparatus illustrated in Griffin 1910,691.

3785 NMC186 BALANCE - PRECISION

Patent F. SARTORIUS Göttingen No 8256

Sp 360&333; H 500; Hs 411x370x270; BmL 150.

Late 19 C. G.

Marble base on three legs (two levelling); glazed mahogany housing; brass pillar to short beam on knife edges.

There is a silvered scale 9-0-9 above the beam, and a bar on the frame allows riders to be placed on this scale; the silvered pans (D88) hang from double hooks on knife edges; a knob on front of the housing raises or lowers the beam; there is a plumb bob behind the pillar, and a pointer from the beam frame to an un-numbered signed scale at the bottom of the turned pillar.

Brachner 1985,148 records the foundation of the Sartorius workshop in 1870; they exhibited in 1878 and 1900.

3814 NMC215 BARLOW STELLAR WHEEL

Unsigned

B 165x100x18; H 110; WhD 97. Mid to late 19 C. G.

Mahogany base; turned brass pillar holds oxidised brass horizontal Y-bracket for 24-point copper star.

The star dips into a red painted mercury trough on the base; this is connected to a brass screw electric contact; there is another contact on the pillar.

3828 NMC229 BAROMETER - ANEROID

SHORT & MASON LONDON MADE IN ENGLAND No 2495

To 208x65x21; H 243; DID 120. Early 20 C. G.

Oak top and vertical support with ebony highlights for glazed brass ring over silvered scale 28-31.

Scale reads: "Stormy RAIN Changeable FAIR Very Dry"; there is a black iron housing behind for the hidden mechanism.

3617 NMC113 BAROMETER - ANEROID

Unsigned t/BO/-

D 385. Early 20 C. G.

Stained turned wood base with ring of nicks; glazed brass-bound ring dial with white scale 25-31".

On the face are the inscriptions: "STORMY FALL FOR S.W. S.E. S.W.", "RAIN WET OR MORE WIND", "CHANGE", "FAIR DRY OR LESS WIND", "VERY DRY RISE FOR N.E. N.W. N.E."; the mechanism is brass with a white metal evacuated chamber.

3601 NMC097 BAROMETER - DEMONSTRATION BANJO

Unsigned

Hs 933x248x50; DID 200. Late 19 C. G.

Banjo barometer with the usual housing replaced by a rectangular glazed frame to show the workings.

The silvered ring dial 28-31" has a brass frame; behind this is the glass J-tube with mercury, having the short arm open; this arm has a glass float, and it is connected, around a pulley wheel on the needle axis, to another tube, similar in size to the short arm of the main tube, containing a counterweight.

3619 NMC115 BAROMETER - STICK

WATSON & SON Opticians 313 HIGH HOLBORN

No measurements available. 1867-1882. F.

Oak; rounded top; glazed front over angled white scale plates 26-31"; thermometer and cistern cover gone.

The scale plate has two rack and pinion slides (one missing its white top) and key holes for the readings: "10 A.M. YESTERDAY" and "10 A.M. TO DAY"; other legends on the plates include: "ADD ONE TENTH FOR EACH NINETY FEET ABOVE THE SEA", "LONG FORETOLD LONG LAST SHORT NOTICE SOON PAST", "FAST RISE AFTER LOW FORETELLS STRONGER BLOW"; glass tube remains but mercury gone; a fine instrument now distressed.

Dates from Clarke 1989,87.

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3543 NMC039 BATTERY - BICHROMATE

Unsigned

BD 91; MxD 130; H 262; DiD 67. Mid to late 19 C. G.

Bulbous glass flask; cylinder neck to metal sleeve; on top, ebony disc to support graphite and zinc electrodes.

One of the two graphite electrodes is missing; between them is a brass rod leading to a replacement zinc plate at the bottom; the height of this plate can be altered using a brass sleeve with a screw clamp on top of the disc, which has two brass screw electric contacts, one to the zinc electrode and the other to the graphite electrodes.

3544 NMC040 BATTERY - FLOATING[?]

Unsigned

H 280; MxD 91. Mid to late 19 C. G.

Glass pear-shaped vessel with, on an extension, a mercury bulb; inside are copper and zinc electrodes.

The latter are descending rods, held by an ebonite disc (D36) which fits into a neck on top of the vessel; on top of the disc are two brass screw electric contacts attached to the electrodes; this appears to be a battery, and it is designed somewhat like a hydrometer, with its pear-shaped mercury weight below to hold it in a liquid

3797 NMC198 BATTERY - LECLANCHÉ

PILE LECLANCHE INDIA RUBBER CO SILVERTOWN

B 92x95-102x102; H 160-170. Late 19 C. G.

Collection of rectangular glass jars with circular tops, some with electrodes (several in a poor state).

Some are signed as above; one is signed "CARPORUS".

3780 NMC181 BATTERY - LECLANCHÉ

[Inside lid] Sole Manufacturers INDIA-RUBBER, GUTTA-PERCHA, & TELEGRAPH WORKS CO., Limited, SILVERTOWN, ESSEX. London Warehouse-100 Cannon Street. E.C." ESSEX.

[Plaque on housing] HANDLEY & SHANKS, ELECTRICIANS, CORK

Hs 231x190x190. 23:1:1901. S.

Hinged mahogany housing for 20 pitch-topped cells.

There are three brass screw electric contacts on the front of the housing, and one each on the left and right hand sides; on top of the housing is a brass hinged handle; the electrodes are set solidly in pitch in the bank of 20 cells; inside the lid is hand-painted: "492 1901 23d 1 2532", and it is assumed the date is 23:1:1901; inside the lid is a paper label: "PATENT LECLANCHÉ MEDICAL BATT-ERY. DIRECTIONS FOR USE.....", with instructions; below this label are two indents, with brass hooks, for the missing electrodes.

3642 NMC138 BATTERY - ZINC/CARBON[?]

Unsigned

B 472x205x17; H 326; Hs 442x177x120.

Mid to late 19 C. G.

Blackened wood housing for three double rectangle ceramic vessels; graphite and zinc[?] electrodes hang from frame.

There are six sets of two graphite and one zinc electrodes; they hang from wooden bars supported by two parallel iron rods; the bars can be hung in one of three positions from hooks on two vertical iron bars at the sides of the housing, so that the electrodes can be immersed in the electrolyte to different heights.

3779 NMC180 BATTERY - ZINC/COPPER[?]

Unsigned

Ta 230x76x63; Fr 162x24x63. Mid to late 19 C. G.

Copper[?] tank with open top has an internal copper frame; wood supports hold a zinc[?] frame within tank.

The copper tank and zinc frame each have a brass screw electric contact; two wooden cross pieces hold the zinc frame on the internal copper frame.

3809 NMC210 BELL

Unsigned

BaD 112 ;H 373; W 361; SrsD 43&12; PrD 14.

Mid to late 19 C. G.

Brass; convex bell has sleeve above for glass pillar to sphere with crossed arms having eyes on their ends.

The sphere is on a sleeve on the other end of the glass pillar, and each of the four arms ends in a small sphere.

The use of the apparatus is uncertain; perhaps the bell is bowed, and pith balls tied with strings to the eyes show the positions of the nodes?

3777 NMC178 BELL - ELECTRIC

GPO 4011 [Label] 4011 22.6.95 Ex. C.A.A.[?]

B 164x122x30; Hs 135x135x107. 1895. S.

Mahogany shaped base and housing; frame on front for metal grid; brass clockwork and electromagnet mechanism.

The metal grid, a pattern of squares and circles, is in front of red fabric; there are two brass screw electric contacts on the sides of the housing; when the back is removed the mechanism is revealed.

There are three more similar bells in various states of distress - one marked "GPO 128".

3587 NMC083 BELLS - SET OF

TOWNSHEND & CO 45716

B 502x327; MxD 66-113. Late 19 C. G.

Elliptical oak base has curved pegs for leather thongs holding eight brass bells with fluted sides.

The bells have no knockers inside, but the base has a bracket for a missing hammer; the serial number is on a small plaque on the front of the base, and the "TOWNSHEND & CO" is stamped on the back.

3819 NMC220 BIOT APPARATUS

Unsigned

SrsD 102; H 178[x2]. Mid 19 C. G.

Pair of brass hemispheres; one has its original sleeve and narrow bulbous glass handle; the other has replacements.

Each hemisphere has a small arch cut out of its side; the central brass spherical conductor is missing.

3751 NMC152 BOILER - MARCET

P. HARRIS & Co. LD. BIRMINGHAM & DUBLIN

Sp 130&102; SrD 95; MxD 140; H 385. 1902-1911. F.

Iron; three bent legs to collar for bolted sphere, with stop-cock, thermometer, and central sleeve.

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The sphere has a collar which is bolted to that on the legs with 21 bolts; on top of the sphere, on one side, is a stop-cock to a curved output pipe; on the other side is a cut-away cylinder housing (D27) for a glass mercury thermometer on a signed scale 240-440°; in the centre is a sleeve for a missing barometer or pressure gauge.

Griffin 1910,470 notes that it is for showing the properties of high pressure steam.

"Marcet's apparatus" is described in a short article by Theodore C. Sterling in Rittenhouse, Issue 32, 1994. Francois Marcet (1803-1883) was born in England and worked in Geneva, where he invented his apparatus to illustrate the effect of pressure on the boiling point of water, probably shortly before 1826. The globe was filled half way with water floating on top of some mercury. With the stop-cock open, the water boiled at 212° F. When closed, the relation between increased temperature and pressure could be easily measured.

Dates from Morrison-Low 1989,126; instrument illustrated in Harris 1908,384.

3624 NMC120 BOILER - MARCET

YEATES & SON OPTICIANS DUBLIN

Sp 190; SrD 100; H 403. Mid to late 19 C. G.

Brass; three curved legs to heavy sphere in two parts held by 21 screws; stop-cock, opening and thermometer on top.

Vertically on top of the sphere is an opening which has a screw-in cubic base; to one side is a screw-in stop-cock, which has a screw thread on top as well; on the other side of the centre is an opening for a (broken) thermometer on a boxwood scale 200-410°; the central opening is for a missing barometer tube or pressure gauge.

Griffin 1910,470 describes this as: "Marcet's Boiler, for showing the properties of high pressure steam."

For more details, see 3751 NMC152.

3803 NMC204 BOW

Unsigned

L 699; MxW 74. Mid to late 19 C. G.

Mahogany and boxwood frame; black horsehair; mahogany tension adjust screw.

3554 NMC050 BRIDGE - WHEATSTONE

ELLIOTT BROS. LONDON No 1740 TEMP. 15°C.

P 202x133; H 125. Late 19 C. G.

Ebonite plate holds four segmented brass bars with 24 ebonite and brass keys plus two tappers; with coils below.

The usual mahogany casing is missing; there are six brass electric contacts with screws on top and at the side, four being labelled: "GALVR & LINE", "LINE COPPER FOR EARTH", "ZINC", AND "GALVR"; the holes on the top brass bar are marked: 1000 100 10 10 100 1000; holes on the other three bars are marked: 1 2 3 4 10 20 30 40 100 200 300 400 1000 2000 3000 4000, with "INFIN" between the single and treble bars.

Instrument No.2225 is illustrated in Elliott 1895,41, suggesting an earlier date for this.

3802 NMC203 BURNER - GAS(?)

Unsigned

B 178x170x27; H 255; CyD 63, H 126; T 68x68.

Mid 19 C. G.

Mahogany base; brass; four turned pillars to table; on this, cylinder around gas pipe from under the table.

The gas pipe has a horizontal input with a stop-cock, it then turns 90°, goes through the table, and juts out of the top of the cylinder; the top of the pipe has two arc cuts in a top disc (D13), which has a central spike.

3565 NMC061 BURNER - GOBLET

Unsigned

Sp 224; BD 181; H 342; CuD 220. Mid to late 19 C. G.

Metal; weighted base with three lion claw feet; pillar to cup with a gas pipe from below having three outlets.

The pillar is now split; running up its centre from a right-angled input with a stop-cock below the base is the pipe, and this splits into three inside the cup, whose interior is painted red; the burner nozzles at the sides are higher than the central one, and have curved centres with slits, which would give fan-shaped flames.

This is a rather elaborate piece, perhaps for some un-known special purpose.

3593 NMC089 BUZZER

Unsigned

L 181; D 22,32,39. Late 19 C. G.

Turned boxwood tube; tapering input at narrow end, and curved frame at other for (mostly gone) leather buzzer.

3744 NMC145 CHEMICAL FLASKS

Unsigned

H 245&260; MxD 103&103; MnD 53&53. Mid 19 C. G.

Two; heavy glass; curving cylinders with rounded bottoms and smaller open ends.

The shorter one has a bulbous bottom; the longer is ground on the outside of its opening.

4181 NMC251 CHEMICAL FLASKS - CONTAINERS FOR CHEMICALS

[Label on two jars] JAMES J. MURPHY & CO. LTD CORK; LADY'S WELL BREWERY HOPS PALE MALT

BD 120, H 242; BD 91, H 260; BD 83, 190 (x2).

Late 19 early 20 C. G.

One egg-shape on curved base; one large, two small cylinders with rounded tops, ground glass stoppers below.

The two large containers held sodium metal, which was destroyed for safety reasons; the other two still contain brewery samples; all sit on their stoppers - the egg shaped container would have had a cork or rubber stopper, the others have ground glass stoppers.

4179 NMC249 CHEMICAL FLASKS - CYLINDER SHAPED

Unsigned

BD 100, H 205; BD 99, ToD 72, H 220; BD 86, D 51, H

255. Mid 19 early 20 C. G.

Three with closed bottoms - top and bottom-side openings; wide open top; disc base, bent side arm at top.

4180 NMC250 CHEMICAL FLASKS - GAS COLLECTING JARS

Unsigned

H 155-305; D 70-92. Late 19 early 20 C. G.

Five; four tall cylinders, with strengthening rings at top and bottom; one has a tall bulbous shape with a top ring.

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All are closed at one end and open at the other; they are used by filling with water and upending above a beehive shelf in a trough part-filled with water - the gas is bubbled in under the shelf displacing water in the flask, which is then covered with a glass disc to retain the collected gas.

3645 NMC141 CHEMICAL FLASKS - ROUND BOTTOMED

Unsigned

MxD 143-205. Mid 19 C. G.

Collection of five large spherical glass flasks with a variety of inputs and outputs.

One (MxD205) has an input neck on top and a tapering pipe at the side; one (MxD143;H305) has a long thin cylinder neck ending in a lip, and two openings at the sides of the sphere; two (MxD173&180) have an input neck on top and a side opening with a lip; one (MxD151) has three openings of various sizes, two with lips.

3766 NMC167 CHEMICAL FLASKS - TEST TUBES

Unsigned

BD 49-76; H 124-236; D 19-69. Mid to late 19 C. G.

Eight; glass; on disc bases; five in the shape of cylinders, two with conical tops, one with a bell-shaped top.

All but one (the narrowest cylinder) have pouring spouts.

3771 NMC172 CHEMICAL GLASSWARE

Unsigned

Various sizes. Mid 19 C to early 20 C. G.

Variety includes spiral tubes, spheres with tapering arms; small round-bottomed flask; three bubble tubes.

The spirals are made from tubing of D9; the spheres with the tapering side arms have D80&83; the round-bottomed flask (D80) has openings at 12.00 and 2.30 o'clock, each with a lip; the bubble tubes (H124,D24) are in the shape of cylinders with two tubes, one at the top, and one extending to the bottom of the cylinder.

4178 NMC248 CHEMICAL RETORTS

PYREX MADE IN ENGLAND

L 315-345; W 140-150. Early to mid 20 C. G.

Nine; glass; all but one with an opening above the bulb; seven with a ground opening, one unground.

The four most modern are labelled 250ml, with the opening labelled 19/17; three have the opening labelled C.19; one, older and smaller, is also marked C 19.

3643 NMC139 CHEMICAL RETORTS

Unsigned

L 340,410,445,565; W 215,140,260,215. Mid 19 C. G.

Four; glass; two with vents above bulb, two without; one (L340) has a metal sleeve with a screw thread on the end of its tube.

4172 NMC242 CHEMICALS - SET

Unsigned

C 240x103x45. Late 19 C. G.

Leather-covered case with tray, lined with purple velvet, holds 42 glass vials containing chemical elements.

A few of the vials are now empty; the labels read: Argent Pulv, Argentum Fus, Aurum Fus, Aurum Pulv, Barium, Bismuth, Borium, Cadmium, Calcium, Cerium, Chromium Fus, Chrom Pulv, Cobalt, Cuprum Fus, Cuprum Red, Erbium, Ferr Hyd Red, Hydrargyr, Iridium, Iridium Fus, Iridium Pulv, Lanthan, Magnes Pulv, Mangan Fus, Osmium, Pallad Fus, Pallad Pulv, Platin Pulv, Plumb, Rhodium Pulv, Rhodium Fus, Rubidium, Ruthenium, Selenium, Stibium, Tantal, Thallium, Thorium, Titan, Uranium, Vabadium, Wolfram.

4176 NMC246 CHEMICAL TEST PLATES

SILEX MADE IN ENGLAND (on larger plate)

80x80x5; 119x93x10. Early 20 C. G.

Eight small and one larger porcelain test plates, the smaller with nine depressions, the larger with twelve.

3630 NMC126 CHLADNI PLATE

Unsigned

BD 65&64; H 182&170; PD 115&115x114.

Mid 19 C. G.

Pair; cast-iron layered foot and slightly tapering pillar to plate; black stem to square plate, red to disc.

3629 NMC125 CHLADNI PLATE

Unsigned

MxBD 113; H 190; P 228x225. Mid 19 C. G.

Red painted cast-iron decorated foot and slightly tapering pillar to white-metal plate, now rusted.

The foot decoration has curved lines and triangles, with four five-branch foliate designs rising to stems at the sides of the central mound.

3540 NMC036 CHLADNI PLATE

Unsigned

Sp 245; H 245; D 307. Mid to late 19 C. G.

Elaborate red painted iron scroll-pattern four-part foot holds a central pillar to a horizontal oxidised brass disc.

The most elegant Chladni plate discovered to date!

3555 NMC051 CLOCK ESCAPEMENT

Unsigned

Pls 181x133. Mid to late 19 C. G.

Brass; two vertical plates held by four turned pillars; two cogged weight wheels, rocking escapement, pendulum bar.

The weight wheels have red string for the missing weights; the escapement is of the "anchor recoil" type (see Clutton 1982,77); the cog-wheel mechanism incorporates a two plate revolving governor; the bar for the pendulum is located on the side of one of the plates, but the pendulum is missing; the apparatus is on a crude wood base.

3801 NMC202 COIL - INDUCTION

Unsigned

BD 145; H 160; CoHsD 79. Late 19 early 20 C. G.

Mahogany base and caps for vertical coil; base has 16 brass screw contacts.

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3805 NMC206 COIL - INDUCTION, MEDICAL

MANUFACTURED BY H.H. SHERWOOD'S SUCCESSORS 102 CHAMBER ST. NEW-YORK

B 226x50x16; H 63; CoD 29. Late 19 C. G.

Mahogany base for red leather-covered horizontal coil.

The base is on four brass sphere feet; the coil has brass caps at each end, and has a bundle of wires insert; there is a U-shaped electro-magnet at one end, wound in red-painted wire; there are two turned pillars for the (missing) interruptor mechanism; the base has four brass screw electric contacts; its bottom is painted red.

3633 NMC129 COIL - INDUCTION, MEDICAL

Unsigned

B 275x232x47; H 255; CoHsD 125. Mid 19 C. G.

Mahogany base; upright coil, interruptor on top; two "pistons" at side; two pivoted five-point switches on base.

The interruptor mechanism has two adjustment screws; at one side of the coil are two vertical glass cylinders (D22) between brass sleeves, into which run removable metal bars with ivory disc tops; each side of the base has three brass screw electric contacts, labelled "N N S" and "P P Z", with "Primary Current" inscribed between "P" and "P", and "Secondary Current" between "N" and "S"; the pivoted switches are of brass and wood; the top oak disc of the coil is broken; the coil is covered in leather with (damaged) silk outside.

This is a rather elegant and sophisticated instrument, though in somewhat distressed condition.

Simpler coil, c1845, illustrated in Hackmann 1989, 245.

3834 NMC235 COIL - INDUCTION, RUHMKORFF

W. WATSON & SONS 313, HIGH HOLBORN, LONDON

B 655x323x112; H 345; CoHsD 158, L 409.

Late 19 early 20 C. G.

Stained wood base and two vertical supports for ebonite ends of red fabric-covered coil; interruptor.

The interruptor mechanism is on a brass pillar with two double ebonite adjust knobs at one end.

3832 NMC233 COMPASS - SIGHTING

T. BENNETT * CORK *

HsD 98, H 102; H 193. Early to mid 19 C. G.

Brass; glazed silvered face with seven hatched compass points and fleur-de-lys; hinged sight; cylinder housing.

The scale on the face reads 10-80°[x4]; around this is a vertical scale ring 0-31; the needle and needle clamp are detached; a right-angled bracket at one side of the face holds a line and window sight, which revolves on a ring around a scale 0-31; screw holes remain, presumably for a fixed sight; the compass is on top of a cylinder housing, and inside is a suspended disc weight arrangement.

Burnett & Morrison-Low 1989, 144-5 give dates 1810-1867 for Thomas Bennett.

This instrument could not be found when the collection was being sold.

3787 NMC188 CONDUCTOR - CYLINDRICAL

Unsigned

B 291x152; H 438; CyL 303, D 77; PrD 32-29.

Mid to late 19 C. G.

Mahogany base; hinged metal bracket for glass pillar to gold-painted wood cylinder; black fibre pad added.

The base has one end rounded, and the ends of the cylinder conductor are rounded as well; two rusted metal strips screwed to the cylinder hold a black fibre pad and a torn black curtain; probably a model of the rubber of an electrostatic generator.

4177 NMC247 CRUCIBLE WITH PIERCED BASE

Unsigned

H c45; MxD c25. Early 20 C. G.

Conical porcelain crucible with holes in its base - for analytical use, filtering, drying, and weighing.

3379 NMC010 CUP OF TANTALUS

Unsigned

BD 107; H 190; MxD 140. Late 19 C. G.

Glass; concave disc base with neck above to bell goblet; in this, metal pipe bent in two right-angles.

One end of the pipe goes through a cork in the neck of the vessel, and the other ends at the bottom of the goblet.

3600 NMC096 DIAL - HORIZONTAL PEDESTAL

Unsigned - ONLY COUNT YOUR SUNNY HOURS 1661

D 129; H 65. Early to mid 20 C. G.

Brass; hours IIII-XII-VIII around edge, then legend, then sun decoration; open gnomon, with angle 55°.

Clearly not dated to 1661 - possibly by Pearson Page of Birmingham, and dating to around the 1930s, see article by Denys Vaughan, of the London Science Museum in Bull.SIS No.3,1984,10-11.

3813 NMC214 DIP CIRCLE

Yeates & Son Dublin

B 225x149x33; H 280; RiOD 240. Mid to late 19 C. G.

Mahogany base with bevelled edge; two vertical supports to needle reading brass divided ring 0-90-0-90-0°.

The ring is held on the base between the bottom of the two narrow triangular needle supports.

3824 NMC225 DIP NEEDLE

Unsigned

B 229x227x66; H 235; DoD 204. Mid 19 C. G.

Mahogany base has a gold-painted concave depression with a silvered scale for a double needle; glass dome.

The silvered scale running from the edges of the depression to the centre reads 0-170[x2]; in the middle of the depression is a brass spike with two removable sleeves to hold the double needle (L190); on top is a brass-bound glass dome with a revolving scale 0-80 outside, and -30-80 inside.

3816 NMC217 DISC SPINNER

[On disc] YEATES & SON OPTICIANS DUBLIN

Sp 178; AxH 316; WhD 158; DiD 261.

Late 19 early 20 C. G.

Blue-painted iron tripod foot and vertical support for large pulley wheel and axis of coloured disc.

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The disc axis has a brass screw clamp and a small pulley wheel (D17) connected to the large five-spoke wheel below, which is revolved using a turned wood handle; the disc itself is of cardboard, with a black circle (D97) at the centre and coloured radial areas; the disc may well belong to spinner 3815 NMC216, as it appears to be earlier than this spinner.

3815 NMC216 DISC SPINNER

[On wheel] YEATES & SON, DUBLIN.

[On stand] BAIRD & TATLOCK LONDON

Sp 119; AxH 272; WhD 100; DiD 305. Late 19 C. G.

Cast iron tripod foot and support; pulley wheel system.

The support to the axis, and for the larger lower five-spoke pulley wheel, has an X cross-section; the wheel is revolved using a horizontal turned wood handle; a thong connects the wheel to the small pulley wheel (D22) at the axis of the disc, which is held on with brass disc clamps (D36); the present disc is of poorly cut copper, and is probably not original; the rest is, indicating Yeates & Son as Baird & Tatlock retailers.

3609 NMC105 DISCHARGE TUBE

ETABLISSEMENTS H. PILON ASNIERES SEINE TYPE CL 16518

L 405; SrD 146. Early 20 C. G.

Glass; central sphere; and parallel side arms for concave disc and conical electrodes; side regulator.

The latter is at right-angles to a glass tube from the sphere, at right-angles to the other arms, and it holds two disc electrodes meeting at its centre; the tube is on an open wood frame, secured by pivoted clamping pieces; the signature also contains a monogram, with an "H" and a "P" on each side of a central line, looking like a large "I".

3616 NMC112 DISCHARGE TUBE

Unsigned

L 940; D 63,180,93. Late 19 C. G.

Glass; ellipse with neck to large centre ellipse, then neck to squashed sphere; two point electrodes.

The electrode in the small ellipse points along the axis of the instrument; the other is at right-angles to it from the edge of the sphere.

3628 NMC124 DISCHARGE TUBE - AURORA

Unsigned

L 1000; D 32. Mid 19 C. G.

Green glass tube has brass sleeves at each end, one with a stop-cock, and internal pointed conductors.

The stop-cock is screw-in, and has a screw thread on its outer end also; the other end has a screw-in brass plug, having a solid square end (13x13x9).

3602 NMC098 DISCHARGE TUBE - GEISSLER

Unsigned

L 320-190; D 20-69. Mid to late 19 C. G.

Collection of eight complete tubes, and three broken; clear and green glass, with spirals, zig-zags, and other shapes.

One of the broken tubes is much longer than the others (L685); three bulbous tubes contain a cross, a leaf pattern, and a crown with an angel on top; another tube contains a vase; the others have spirals and twists, some within cylinders.

3603 NMC099 DISCHARGE TUBE - OSCILLOSCOPE

Unsigned

L 220; D 28. Late 19 C. G.

Glass cylinder with white metal ends connected to wire electrodes almost meeting in the middle of the tube.

Baird 1924,586 notes: "This instrument is useful in the detection of inverse current and to indicate the direction of unidirectional current. In the latter case a glow appears on that wire connected to the negative pole of the generator, i.e. that pole to which the cathode of a pole should be connected. When no inverse is present, only the extreme tip of the other wire will show any glow, and that on the end only, not on the side, any glow on which indicates current in the wrong direction. In many cases it is difficult to tell by inspection if a Collidge tube is connected up the right way; an oscilloscope in the circuit indicates this at once."

3821 NMC222 DISCHARGER - JOINTED

Unsigned

L 469; SrsD 19; HaMxD 30. Mid 19 C. G.

Narrow bulbous glass handle fits into a brass sleeve with a pivot for two bent brass rods ending in spheres.

3572 NMC068 DISCHARGER - UNIVERSAL

Unsigned

B 232x119x27; H 200; PrsD 13; SrsD20.

Mid to late 19 C. G.

Mahogany base; brass sleeves for two glass pillars to revolving conductor brackets; central brass pillar.

The brackets have horizontal brass sleeves for the sliding conductor bars, which have adjustable brass screw electric contacts and spheres at one side and (replacement) plastic handles at the other; the central brass pillar is missing its disc table, whose height would have been adjustable, clamped by a screw on top of the pillar.

3392 NMC023 DISCHARGER - UNIVERSAL

Unsigned

B 360x139x40; H 434; TD 84. Mid 19 C. G.

Mahogany base on four feet; two ebonite pillars to brass pivoted conductors; central adjustable mahogany table.

The conductors have rings (D30) on their ends, and spheres (D15) above the table; the height of the latter, which is on a vertical peg, is adjusted in a turned mahogany central pillar using a clamping screw; the ebonite pillars are between brass sleeves.

3371 NMC002 ELECTRIC EGG

Unsigned

H 555; EgH 235, W 155. Mid to late 19 C. G.

Ebonite disc, red coil, brass sleeve, elliptical glass egg with inner coil; brass sleeve and stop-cock on top.

The vertical coil inside the egg rises from the lower brass sleeve; there is a sphere electrode descending from the upper sleeve; there are brass screw electric contacts below the lower sleeve and on the stop-cock; at the bottom are two spikes, which now fit into a modern wood base to hold the instrument erect.

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3542 NMC038 ELECTRIC LATHE

Unsigned

B 377x187x43; MnH 198. Mid to late 19 C. G.

Mahogany base; three fixed vertical U electromagnets and three revolving straight electromagnets for lathe axis.

As well as supporting the U magnets, which have black windings, the base has vertical supports to the axis of the straight magnets, which have red windings; one end of this axis has a brass split disc commutator with brushes and wheels on top of two brass pillars from the base, which has also two brass screw electric contacts; the item to be turned is held between another support from the base and the end of the axis away from the commutator; below is a clampable chisel guide on a horizontal bar.

This instrument, being sold with many other instruments to a London dealer, was illustrated in the Bull SIS "Market Place", p.35, as offered for sale at the Scientific Instrument Fair on 9.5.1993.

3558 NMC054 ELECTRIC MOTOR

Unsigned

B 221x136x13; H 188; WhD 104. Mid to late 19 C. G.

Mahogany base; two vertical electromagnets; above these, six-spoke wheel with eight bars crossing the magnet poles.

The base has five brass screw electric contacts (with two of these missing their screws); on the axis of the wheel, beyond one of the supports, is a small pulley wheel; below the base is a hand-written label with the initials: "C.S.B."

3539 NMC035 ELECTRIC MOTOR

Unsigned

B 256x204x25; H 445; WhD 325. Mid to late 19 C. G.

Wood base holds iron frame for armature under two vertical coils; iron bracket on top to axis of wheel.

The horizontal armature has a lengthwise central coil; the vertical electromagnetic coils (L123W39H90) on top of this have red-coloured windings; the right-angled iron bracket rises to the axis of the six-spoke wheel which has an iron rod near the edge, presumably for a missing turned wood handle; a groove around the rim of the wheel would have been joined by a thong to a pulley wheel (D39) on the axis of the armature; the other end of the armature axis has a split brass cylinder commutator with two brushes; there are two brass screw electric contacts attached to the brushes, and two more on the base (one with its screw missing) attached to the coil winding ends.

3538 NMC034 ELECTRICAL MACHINE

Unsigned, Armature "D.336 G3580", Screws "K", Magnets "W5"

Sp 175&112; H 302; WhD 180; P 127x88x15.

Late 19 C. G.

Four legs to horizontal iron plate; on this sit two sets of six vertical magnets; wheel and handle turn armature.

A turned wood and metal handle revolve a brass six-spoke wheel with inclined cogs at its edge to revolve the armature, which turns between the cut out top ends of the magnets (204x35x7); the horizontal armature has a lengthwise central green wire coil; brass brackets at the sides of the plate support the wheel and armature; the machine is on a modern wood base which is excluded in the measurements.

3394 NMC025 ELECTRO DYNAMOMETER

SIEMENS BROS. & CO. LONDON. 3 1216.

B 208x181x48; H 320; SD 103. Late 19 early 20 C. G.

Mahogany base and support for fixed coil; on top, brass knob and white scale to adjust tension of moving coil.

The fixed coil is covered in black insulating material; the single turn moving coil is of copper, with a needle attached to read the scale 0-350°; there are three brass screw electrical contacts, and three brass level screws on the base.

3531 NMC027 ELECTROMAGNETIC ENGINE

Unsigned - with a monogram T or J in an X with D & B?

B 205x115x26; H 189; WhD 101. Mid to late 19 C. G.

Mahogany base; tribach supports to axis of brass wheel coupled to oscillating bars across electromagnet poles.

The shaft for the oscillating bars extends from the edge of a disc on the axis of the six-spoke wheel; this is coupled to a rocking bar with the oscillating bars at right-angles at its ends; a small cog (D6) at the other end of the axis connects to a larger cog (D17) with a small screw bracket which probably held a (now missing) wire into a metal reservoir below (D19) - this has a channel to a larger metal reservoir on the base (OD69); there are two brass screw electric contacts on the base, one connected to a wire on the axis of the larger cog-wheel, and the other to the coil.

3381 NMC012 ELECTROMAGNETIC ENGINE

Unsigned

B 361x178x35; H 278; WhD 177. Mid to late 19 C. G.

Mahogany base; six-spoke brass flywheel, connected by two crank mechanisms to two pairs of electromagnetic coils.

The flywheel is held between two pairs of turned iron pillars; its axis is attached at each side to a bar, pivoted to a rod whose bottom is in a groove at the end of a horizontal bar, whose other end is pivoted to one of the two turned brass pillars rising from the base at the end away from the flywheel; on the latter bar is a plate which meets and breaks away from one pair of vertical electromagnets with mahogany tops; the same crank arrangement connects the other side of the flywheel axis to the other turned brass pillar passing over the other pair of electromagnets, such that when one plate meets its electromagnets, the other is at the maximum distance from the other pair; there are two brass screw electric contacts on the base.

3636 NMC132 ELECTROMAGNETIC ROTATION APPARATUS

Unsigned

BD 87; H 37; ML 88, MxD 24. Mid 19 C. G.

Boxwood cylinder cup; U-magnet around this and up sides; central pivot holds rotating electromagnet.

The wire ends of the red painted electromagnet dip into the cup, which has a shallow diameter partition at the bottom, and six shallow jetty projections from the centre, three on each side; holes on the top edge of the cup extend down, one into each side of the cup; the base is cracked.

If a shallow pool of mercury were placed on each side of the bottom of the cup, reversal of the potential would reverse the magnet?

3532 NMC028 ELECTROMETER

ROBT. W. PAUL. 68, HIGH HOLBORN LONDON, W.C.

Sp 201; BD 138; CyHsD 119, H 24. 1903-1919. FA.

Brass; cylinder housing on three legs with window and hinged magnifier; inside disc and arcs on broken glass pillars.

The legs have level screws; the window (Fr 62x31) is on top of the housing; the broken innards include a brass disc table (D50) and three brass rectangular arcs, all of which were on glass insulating pillars; also a lead tank with a bent tube into it from below the base; underneath the base also is a large central knob below leading inside to one of the glass pillars, another

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knob to another glass pillar, and two brass screw electric contacts; another of the loose pieces inside is a rectangular silvered brass scale 0-5-10.

Dates from Anderson 1990,63 and Cattermole 1987,98-104.

3820 NMC221 ELECTROMETER - GOLD LEAF

Unsigned

BD 144; H 287; DiD 159. Mid 19 C. G.

A glass bell jar has a brass sleeve and a disc on top; from this, through the sleeve, descends the rod for the leaves.

On top of the sleeve (D55) is a turned brass boss for the disc; the rod from this ends in a T-bar for the missing leaves; tin foil has been added around most of the lower half of the bell jar.

3569 NMC065 ELECTROMETER - QUADRANT

GRIFFIN, GARRICK ST. LONDON.

Sp 335; BD 308; H 482; CyH 70, D 66. 1868-1895. A.

Mahogany base; brass; sleeves and four glass pillars to quadrants; vane suspended from brass crook; glass dome.

The base has three brass level screws; underneath the base is metal foil, and a brass screw knob (not now working) to move one of the quadrants; also under the base are two dumb-bell brass conductors (L132,SrD19) rotating from one of the spheres, and a turned ebonite and brass handle to move a brass arc extending above a glass cylinder, with foil cover, above the centre of the base; the vane has corrugated white metal wings.

Dates from Anderson 1990,33-4 and Crawforth 1988,8.

3591 NMC087 ELECTROMETER - QUADRANT

Unsigned

Sp 202; BD 138; H 369. Late 19 early 20 C. G.

Brass; three legs to disc base; brass quadrants on glass pillars; suspension pillar with two lead buckets; dome.

Each leg has a level screw; a screw below the base adjusts the position of a white metal half-disc along a bent horse-shoe magnet above the housing for the mirror, on top of the aluminium vane in the quadrants; the suspension pillar has two rings on top for the lead buckets (H22,MxD23); below the vane is a glass cylinder vessel (H38,D32) with a siphon pipe to beneath the base disc; underneath, and at the side of the base, are knobs to adjust the position of one quadrant, and to alter a brass and glass conductor system; the glass globe is partly covered with metal foil.

3373 NMC004 ELECTROMETER - TORSION, COULOMB

YEATES & SON DUBLIN

BD 234; H 480; CyD 227; TuD25. Mid to late 19 C. G.

Mahogany base; glass cylinder body; mahogany-bound glass disc above; on top, glass tube to fibre support.

The latter is of brass and has a divided disc 0-90; the glass cylinder body has cracked off from the base, which sits on three turned mahogany feet; a scale around the glass reads 90-0-90; the original indicator is gone; on top of the glass disc are two holes, one occupied with a turned wood knob and an iron rod descending into the cylinder.

3386 NMC017 ELECTROSTATIC GENERATOR

F.E. BECKER & CO. 34, MAIDEN LANE COVENT GARDEN LONDON.

B 495x310x57; W 650; PsD 310&355. 1882-1889. A.

Elliptical mahogany base; wood pillar support to axis of plates; pulley drive on base extension; conductors.

On the side away from the pillar, that is the side of the smaller plate, there are two pairs of combs on bars from the axis, one pair connect via couplings to two cylinder Leyden jars (H160,D30), and to ebonite and brass spark-gap conductors; a pillar on the extension piece to the base supports the axis of the pulley wheel, whose handle is missing, and this would have been used to turn the small plate; the large plate is now detached from the axis; it has two arc paper strips on it, and sits in two small vertical bosses on the base, with another horizontal support from the large pillar; both glass plates are cracked, and are resin covered.

Dates from Crawforth 1988,4.

3395 NMC026 ELECTROSTATIC GENERATOR

Unsigned

PD 610 (24"); HID 25. Mid to late 19 C. G.

Glass plate with central hole; the only remains of what must have been a substantial plate machine.

3391 NMC022 ELECTROSTATIC GENERATOR - NAIRNE

* I. NEWMAN ** LONDON *

JaD 160; H 333; CyH 113,D 80. 1816-1860. F.

A glass bell jar with a handle on top holds a mahogany frame for a turning glass cylinder; conductor at side.

The turned wood and metal handle revolves the cylinder against a leather pad inside the bell jar; at the other side of the jar is an outside metal disc with a horizontal rod to a spherical conductor (D23), and this is connected inside to a brass comb against the cylinder.

A globe electrostatic generator in a bell jar on a vacuum pump is included in the collection of the Boerhaave Museum (Boerhaave 1991,58-9); it is dated c.1775 and the catalogue entry records: "Whereas in the 18th century research into the vacuum was extremely popular with those interested in science, later on it was electricity which received all the attention. The combination illustrated here made it possible to produce both phenomena and study them in combination."

Dates from Turner 1983,24.

3383 NMC014 ELECTROSTATIC GENERATOR - NARINE

Unsigned

B 400x350x26; H 592; CyD 270, W 250; WhD 320.

Early to mid 19 C. G.

Mahogany base and vertical supports to axis of glass cylinder; inside one support is a large pulley wheel.

The cylinder has chipping red resin inside; a ribbon from the large pulley wheel to a small pulley wheel on the axis of the cylinder would have turned it; the rubbing material to generate the charge, and the conductors, are gone; but there is a small bracket on the base for a missing pillar.

3384 NMC015 ELECTROSTATIC GENERATOR - NAIRNE

Unsigned

B 612x405x20; H 560; CyD 270, W 375; WhsD 303 &

110. Early to mid 19 C. G.

Shaped mahogany base and vertical supports to axis of glass cylinder; large and small wheels outside support.

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A handle turns the lower pulley wheel (D303), which has three grooves on its tapering circumference, to connect a (missing) thong to grooves on the smaller pulley wheel (D110) on the axis of the cylinder, which has a light red deposit inside; the rubbing material to generate the charge, and the conductors, are gone, but a sliding bracket remains in the base.

3385 NMC016 ELECTROSTATIC GENERATOR - NAIRNE

Unsigned

CyD 190, W 335. Early to mid 19 C. G.

Glass cylinder and handle only; wood sleeves at axis, one attached to the wood handle via a glass rod insulator.

A right-angled wooden bracket on the axis holds the glass rod; another at right-angles holds the turned wood handle.

This instrument differs from the previous two in that the cylinder is turned directly with the handle, rather than via a pulley system.

3370 NMC001 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned

B 735x305x30; H 820; PsD 584. Late 19 C. G.

Mahogany base and bridge for axis of two glass plates with silver foil lozenges, counter-rotated with pulleys.

An iron and turned wood handle revolves the pulley wheels to turn the plates via thongs; two turned mahogany pillars hold glass-insulated copper combs (one now detached) around the edges of the plates, and brass rods to brushes for the foil lozenges; there is a bracket on one of the vertical supports for a missing part, presumably a conductor or Leyden jar system.

3764 NMC165 EUDIOMETER - CAVENDISH

BAIRD & TATLOCK LONDON & GLASGOW

BD 152; H 502; MxD 96. Late 19 C. G.

Weighted mahogany base; brass stop-cock to glass pear-shaped vessel with stop-cock; clamped stopper on top.

The brass stop-cock fitting screws into the base, and has a brass sleeve above into which fits the long glass stem below the heavy glass stop-cock; above this is the pear-shaped vessel; there are two brass screw electric contacts on the brass stopper clamp.

3765 NMC166 EUDIOMETER - CAVENDISH

Unsigned

H 255; MxD 79. Mid 19 C. G.

Brass sleeve with stop-cock and screw thread, holds glass pear-shaped vessel, with clamped stopper.

The glass vessel also has a stop-cock; the glass stopper is chipped and is held in place with brass clamps.

3610 NMC106 EXPANSION APPARATUS - BAR BREAKER

GRIFFIN LONDON

B 254x102x10; MnH 88; RdSe 16x16.

Late 19 early 20 C. G.

Cast iron; base and two supports for a rod with a screw thread and wing nut at one end, and a ring at the other.

The rod would be heated and set in the supports, with a bar through the hole against one of the supports; when the rod cooled it would break the bar.

Illustrated in Griffin 1910,416 - price 6s6d.

3618 NMC114 EXPANSION APPARATUS - BAR BREAKER

YEATES & SON DUBLIN

B 409x82x27; H 84. Mid to late 19 C. G.

Cast iron base and strengthened vertical supports for (missing) rod and bar.

As for the bar breaker 3610 NMC106, the rod would have had a ring at one end and a tightening screw at the other; on cooling the heated rod, the bar would break.

3788 NMC189 EXPANSION APPARATUS - PULLINGER

TOWNSON & MERCER 34, CAMOMILE ST. & 89, BISHOPSGATE ST. WITHIN LONDON, E.C. REGD No 411742

B 253x148x16; H 676; TuD 25. 1903. RD.

Mahogany base and support for metal tube jacket and bar.

The tube jacket has input and output pipes (one broken off) and two arms with corks for thermometers; a metal disc (D73) with a hole in the centre can be raised or lowered by means of a clamp to a vertical bar on the mahogany support; a spherometer (missing) is used to measure the expansion, and contact seems to be established by electric current with contacts on the disc support and at the bottom of the jacket.

Name of similar apparatus (without electric contact) given in Townson 1909,14.

3793 NMC194 EYE MODEL

Bock-Steger Lips

B 188x179x30; H 162; EyD 128. Mid to late 19 C. G.

Plaster; black base; two half spheres for the eye showing rods and cones, optic nerve, etc, inside.

It also shows anatomical features outside; there is a hole (D60) in the side for the missing iris and lens.

There is also a collection of anatomical models, including the brain, heart, tongue, ear, and lungs.

3753 NMC154 FLUID TRANSMISSIBILITY APPARATUS

Unsigned (but on a GRIFFIN LONDON retort stand)

MxD 265; H 732; NeOD D51-64. Mid to late 19 C. G.

Glass; spherical vessel with long neck on top, a vent on the bottom and vents on two sides, with glass tubes.

The vent on the bottom has a glass tube through a cork, which bends twice through 90° and rises parallel to the neck of the sphere; one of the side vents (broken) has similar tube, bent through 90°.

Harris 1908,648 illustrates the apparatus, with a similar tube out of the other side vent, and with a piston in the long neck, which is described as apparatus to demonstrate the transmissibility of fluid pressure.

3622 NMC118 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS LONDON

B 255x205x16; H 605; Hs 184x144x136-174.

Mid to late 19 C. G.

Mahogany base and glazed arched housing with pillar and arc magnet; double coil with central mirror in housing.

The double coil is in an oxidised brass frame; there are two brass screw contacts on the base; the glazed housing lifts off, and there is no direct contact between the pillar (D13), rising from a brass plate, and the coil; the arc magnet (288x25x10) can be moved up or down the pillar.

This is a very attractive instrument in excellent condition.

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3589 NMC085 GALVANOMETER - ASTATIC, NOBILI

BRETON Frères A PARIS.

BD 179; H 450; SD 101; Fr 93x34, W42. Late 19 C. G.

Turned mahogany base and three feet; rectangular wood frame for green coil; silvered ring scale 0-90-0; dome.

The horizontal wood frame is painted white; a brass pillar, bent through 90°, suspends the double needle above and inside the coil; the top needle reads the scale; a groove around the base holds the tall glass dome; outside the dome on the base are two brass screw electric contacts.

This is a fine, elegant instrument.

Firm not listed in Payen 1985, nor Brieux 1980.

3568 NMC064 GALVANOMETER - ASTATIC, NOBILI

GRIFFIN & SONS CHEMICAL INST. MAKERS GARRICK ST. & LONG ACRE LONDON G. PERCIVAL. CORK.

BD 291; H 395; SD 185-215. 1881-1883. F.

Mahogany base; conical silver ring scale 90-0-90; dome.

The base has three brass level screws, two brass screw electric contacts, and a groove for the tall rounded cylinder glass dome; the needle is suspended from a brass crook support and is attached to the double bars inside and on top of the split coil, which is in a mahogany housing; there are also two wire wings above the needle, which extends to read the scale, held slightly above the base.

Burnett & Morrison-Low 1989, 154 give 1881-3 for Perci-val; Crawforth 1988, 8 gives 1894-5 for the pair of Griffin addresses.

3590 NMC086 GALVANOMETER - ASTATIC, NOBILI

SIEMENS BROTHERS LONDON

Sp 190; BD 200; DiD 167; H 228. Early 20 C. G.

Laminated mahogany base; ebonite disc 130-0-130 above; brass and glass housing for coil, scale and needles.

The base has three brass level screws; there is a horizontal circular coil on the base, below the disc; the glass cylinder housing above this (H100, D103) contains the double coil and needle suspension with a white scale 0-90-0-90-0°, and an adjusting screw on top of the brass-bound top; attached to the horizontal coil on the base is a brass segmented arrangement, with parts numbered I-V, each with a screw knob on front, and an ebonite and brass key between segments III and IV, with a taper between II and V; on one side of the ebonite disc, which has one side labelled "A" and the other "B", is a brass four-part resistance arc with three ebonite and brass keys - two of the parts are labelled "100"; the scale above the two coils on the disc is a white square with the corners cut off.

3556 NMC052 GALVANOMETER - D'ARSONVAL

Unsigned

Sp126; BD128; H278; HsD88; WdD42.

Late 19 early 20 C. G.

Brass; cylinder housing with circular window; black laminated (21 plate) ring magnet and moving coil.

There are three level screws below the base, and two screw electric contacts at the side of the base; the suspended coil is wound on a wood bobbin, and has a mirror above.

3599 NMC095 GALVANOMETER - DETECTOR

A. KERSHAW & SON LTD. No 3228 1914

Hs 88x86x55; DiHsD 73. 1914. S.

Mahogany housing; glazed silvered dial 70-0-70; blue metal needle; on top, three brass screw electric contacts.

The latter have "I" and "Q" (intensity and quantity) between them, and the top also has a brass ring handle; inside the housing is an elliptical coil, covered in black cloth, between ivory plates; the back of the housing slides out, and is secured by a screw. Similar to the instrument illustrated in Elliott 1895, 1.

3588 NMC084 GALVANOMETER - DETECTOR

Unsigned

Hs 105x97x68; SD 59. Mid to late 19 C. G.

Hinged mahogany housing; mechanism with two elliptical coils; brass fittings; silvered glazed scale 90-0-90°.

The housing had a lock which is now missing; the two green-covered coils are between ivory plates; there are two brass screw electric contacts, and a ring handle, on top of the housing.

3823 NMC224 GALVANOMETER - TANGENT

GRIFFIN SARDINIA ST LONDON

Sp 231; BD 205; CoHsOD 203; MaD 104, W 20.

1899. D.

Mahogany base on three brass level screws; vertical mahogany coil housing; central brass magnetometer.

The glazed magnetometer sits on a turned brass pillar above a black bracket around the coil from the base; the magnetometer silver ring scale reads 0-90-0-90-0°, with a central parallax mirror; there are three brass screw electric contacts on the base; a label below the base reads: "Galvanometer No. 3744 Resistance of thin wire = 16.07 ohms. Resistance of thick wire = 0.034 ohm J.Q. 19/10/99".

3547 NMC043 GALVANOMETER - TANGENT

JOHN J. GRIFFIN & SONS, Ltd. 20-26, SARDINIA STREET, W.C.

Sp 232; BD 200; H 262; CoHsD 202. 1900. D.

Mahogany base and vertical ring coil housing; turned brass pillar for magnetometer; three brass level screws.

The pillar sits on a metal bracket holding the coil housing to the base; the magnetometer is missing; the signature disc is gone, but a label is attached to the underside of the base: "GALVANOMETER NO. 3744 Resistance of fine wire = 15.77 ohms. Resistance of thick wire = .023 ohms. Date of Test 7 Mar 1900 Signed H.P." with the J.J. Griffin address above; the base has three brass screw electric contacts.

The firm had this address from 1899-1905, Anderson 1990, 34.

3375 NMC006 GALVANOMETER - TANGENT

G. PERCIVAL CORK

Sp 197; BSD 148; H 200; CoHsOD 153, ID 100.

1881-1883. F.

Brass; divided base scale 0-90-0-90-0 with three level screws; brass disc in this holds ebony housed coil.

One of the level feet is bent; the brass disc turns within the base scale, and the coil housing rises vertically from the disc; the coil wire is covered in white and green insulating material; rising from the bottom of the coil housing is a short brass pillar to a table with a spike for the missing magnetometer.

Dates from Burnett & Morrison-Low 1989, 154.

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3817 NMC218 GALVANOMETER - TANGENT

W.G. PYE & CO LTD CAMBRIDGE ENGLAND

Sp 223; H 440; CoHsOD 307; MaD 122.

Late 19 early 20 C. G.

Brass cabriole tripod foot to turned pillar holding the mahogany coil ring, and an ebony magnetometer.

The foot has three level screws; the ring is supported by a boss on the pillar above the foot; and the top of the pillar holds the glazed magnetometer, which has a silver scale 0-90-0-90-0° with a central parallax mirror; there are two brass screw electric contacts on the bottom of the coil housing on ebonite blocks.

This is an elegant galvanometer, not in the 1914 catalogue, and is probably an early Pye instrument.

3632 NMC128 GALVANOMETER - TANGENT

Unsigned

T 184x164, H 195; CoHsOD 293,298, ID 215.

Late 19 C. G.

Mahogany table and ring housings (110mm apart) for two coils; magnetometer from central table missing.

There are two pairs of brass screw electric contacts on each coil housing ring, labelled 10, 20, and 20, 50; one coil housing is damaged and loose.

3564 NMC060 GALVANOMETER - UPRIGHT

YEATES & SON, DUBLIN

B 220x144x33; H 250; W 317. Mid to late 19 C. G.

Mahogany base and vertical support for fan-shaped yellow scale 40-0-40; two brass screw electric contacts on base.

The rest of the apparatus was missing, but the brass-bound housing for the green wire coil was found.

3566 NMC062 GALVANOMETER - UPRIGHT

Unsigned

B 465x258x58; H 290; AcD 286. Late 19 early 20 C. G.

Blackened wood base with rounded ends; horizontal double coil; semicircular brass scale 80-.-80; dome.

The base has four turned feet, and a groove around its edge for the glass dome; the white coils are separated by a boxwood sheet with rounded ends, and there are identical sheets above and below; the moving magnet between the coils is attached to the needle which reads the semicircular brass ring scale; there are four brass screw electric contacts on the base; the instrument may be locally, but very well, made.

3763 NMC164 GALVANOMETER LAMP HOUSING & SCALE

NALDER BROS & Co. No 15,435 WESTMINSTER

PHILIP HARRIS & Co. LTD BIRMINGHAM AND DUBLIN

B 610x178x22; H 383; Schs 509x77x16. Early 20 C. F.

Mahogany base and scale frame; black tin lamp housing.

The lamp housing at one side has a vertical tin shield with a U-cross-section (H333,W100-111), and a horizontal brass tube (D26) at height 146mm above the base held with three brass screws; at the back of the base are two vertical pillars with sliding sleeves and clamps to hold a horizontal metal bar; clipped to this is the frame for the glass and paper scale 350-0-350, with a metal pointer sliding on the bar; the Nalder Bros and Philip Harris signatures are on the base, while the scale is signed "NALDER BROS. & Co. LONDON".

Morrison-Low 1989,126 gives Philip Harris dates in Dublin 1902-1911.

3648 NMC144 GAS GENERATOR

Unsigned

BD 86; H 150&280; D 113&115. Mid 19 C. G.

Disc base; bulbous spherical lower vessel with rimmed neck; in this, spherical upper vessel with pipe below.

The upper vessel has a curved neck and opening (D43) which is not ground; its bottom is ground and fits into the ground top of the lower vessel, which has a lip (D48); a pipe extends from the centre of the upper vessel to the bottom of the lower vessel, which has an output pipe at its top side.

The apparatus is clearly a precursor of the Kipps apparatus, e.g. 3647 NMC143.

3745 NMC146 GAS GENERATOR - KIPPS

Unsigned

BD 172; VsMxD 103&130; H 388. Mid to late 19 C. G.

Glass; flat bottom for arched lower vessel integrated with sphere middle vessel; large sphere upper vessel.

The middle vessel has an angled side arm, and a large ground glass opening on top, into which fits the ground glass joint of the upper vessel which has a central pipe descending into the bottom vessel; the upper vessel has an unground opening on top.

There are also five upper vessels (MxD137-150) for missing Kipps apparatus; all are spherical with top openings, and ground glass joints below with central pipes.

3647 NMC143 GAS GENERATOR - KIPPS

Unsigned

BD 107; H 370; D 107,93,98. Mid to late 19 C. G.

Glass; the lowest vessel is cylindrical with an arched top; then there are two pear-shaped vessels on top.

The topmost vessel has an opening with a lip (D40) on top, and a pipe below reaching to the bottom of the lowest vessel; it is connected by a ground glass joint to the middle vessel, which has an opening with a lip on its top side; the lowest vessel is missing its bottom, and has a horizontal output with a lip, and a stuck stopper, low down on its side; the bottom two vessels are blown as a unit.

3755 NMC156 GAS HOLDER

J.J. GRIFFIN & SONS 22, GARRICK ST LONDON. W.C.

CyBD 258, H 462; H 1102; FnMxD 230. 1867-1890. F.

Metal cylinder has outlet pipe at bottom, stop-cock on rounded cover, and funnel on vertical tube on top.

The cylinder has a vertical glass tube between sleeves on the side (with a screw cap) to show the water level inside.

The apparatus is illustrated in Griffin 1915, 154, and described as "Gas-Holder, Griffin's school pattern, japanned zinc body, 18 x 10½ in., capacity 1500 cubic in., ungraduated..£3 3s 0d".

Dates at this address from Downing 1988,53; the holder presumably dates to the end of the 1867-90 period.

3756 NMC157 GAS HOLDER

Unsigned

CyBD 221, H 270; H 598; FnMxD 82. Late 19 C. G.

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Metal cylinder has stop-cocks on pipes at bottom, on rounded cover, and on vertical tube to funnel on top. The cylinder, which is painted green (chipped), has white and red highlights, and has a vertical glass tube between sleeves at the side to show the level of water inside. This apparatus is similar to, though smaller than, 3755 NMC156, but has a smaller funnel, and has stop-cocks at the bottom output, and on the vertical tube below the funnel.

3644 NMC140 GAS MIXING APPARATUS

Unsigned

BD 192; H 328; SrsD 95&91. Mid 19 C. G.

Mahogany base; pillar to T brass support pipe for right-angled sleeve to two stop-cocks and glass spheres.

Each glass sphere flask has a flat bottom, and they are held vertically in metal sleeves, leading to the stop-cocks, the other sides of which fit into the sleeve held by the T support pipe; the other end of the pipe has a right-angled down turn.

The apparatus was used to demonstrate that, when communication is opened between two closed vessels containing gases, they will at once begin to form a homogeneous mixture.

A similar apparatus is illustrated, and the gas mixing laws detailed in Ganot 1890,165.

3637 NMC133 GLASS BELL

Unsigned

BD 96; H 120; SD 115. Mid 19 C. G.

The bell has a brass sleeve around its bottom, with a raised scale ring 0-31; the bottom disc comes off.

The latter has a raised edge (H11) and is held to the brass sleeve on the bell with four side clips; on top of the bell is a brass pipe going into the jar, with a knurled top; into this fits a split brass pipe with one fixed knurled knob on top and, below this, another knob on a screw thread.

The instrument is possibly some type of electrometer?

3778 NMC179 GLASS BELL JARS

Unsigned

BD 79-192; H 120-275. Mid to late 19 C. G.

Six; largest with closed top and knob; others with vent on top; three cylinder shape; one bell; one tulip.

The largest three have ground glass rims at their bases.

3574 NMC070 GLASS GOBLET ON METAL BASE

Unsigned

BD 217; H 442; GoMxD 199. Mid to late 19 C. G.

Turned iron base; sleeve, with right-angled brass pipe with stop-cock, below upside-down tulip-shaped goblet.

The top rim of the goblet is ground and has some small chips; the side pipe has a stop-cock closed using a knurled brass knob; further out it has a sleeve for a missing part, and it ends in a ribbed sleeve for a rubber tube; the pipe leads into the bottom of the goblet.

As the rim of the goblet is ground, this apparatus was presumably used in vacuum experiments, perhaps to illustrate fountain effects?

3767 NMC168 GLASS TRAY

Unsigned

BD 106; TyD 184, H 112; EdH 32. Mid 19 C. G.

Glass; disc base and stem to shallow tray with raised edges.

There is also a small glass saucer (D101,H22).

3596 NMC092 GLASS VESSEL

Unsigned

H 520; MxD 280. Mid 19 C. G.

Pear-shaped vessel; brass sleeves at each end; one has a screw thread in the centre, the other a stop-cock.

The latter can unscrew from the sleeve.

For weighing air?

3827 NMC228 GRATING - DIFFRACTION

Unsigned - but attributed to Thorp.

51x38; C 63x50x19. Late 19 early 2 C. G.

Glass plate with thin transparent grating (now almost gone) in hinged black case lined with blue velvet.

Labels on the plate read: "The surface of the grating must not be touched." and "Transparent Replica from Rowland, Metal Diffraction Grating, approximately 15,000 lines to the inch."

This grating is similar to others signed by Thorp - e.g. 0692 UDP020.

3768 NMC169 HEMPEL FLASK

Unsigned

BD 100; SrD 70; H 268. Late 19 C. G.

Turned black wood stand ends in egg-cup holding glass sphere; pipes above and below lead into the sphere.

The glass pipe on top rises vertically; that below enters the wood stand, bends, and exits from the turned wood pillar above the disc base.

The flask is illustrated in Maiben 1914 as part of "Hempel's Explosion Pipette" (p57) and as part of "Hemple's Estimation of Flour Apparatus" (p266), and also in Baird 1914,846 as part of "Hempel's Explosion Pipette".

3769 NMC170 HEMPEL FLASK

Unsigned

BD 74; SrD 69; H 216. Late 19 C. G.

Rusted iron stand ends in egg-cup holding glass sphere; pipes above and below lead into the sphere.

The glass pipe on top rises vertically; that on the bottom enters the stand, turns, and exits from the side of the pillar; the apparatus is similar to 3768 NMC169, except that the stand is of iron, and the flask cannot in this case be removed from the stand

The name comes from Maiben 1914,57, and from Baird 1914,846.

3772 NMC173 HEMPEL GAS ABSORPTION BULBS

Unsigned

B 290x95x22; H 297; SrsD 70,64,64,64. Late 19 C. G.

Blackened wood base and vertical support for four inter-connected glass spheres ending in a bent capillary tube.

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The spheres are joined by glass tubes bent through 180°; the right sphere has a pipe extending vertically from the top; the left sphere is larger than the others and has a white-backed capillary tube leading from its top, bent in two right-angles and through 180° such that the vertical end rises above the support; two of the spheres are at a higher level than the other two, and all contain water.

The apparatus is described as "Hempel's Gas Absorption Bulbs" in Baird 1914,845, and as "Hempel's Explosion Pipette" in Maiben 1914,58.

3640 NMC136 HYDROMETER

Areometer from 0,700 to 1,000.[& 1000-2000] Temp.15°C.

L 330-335; BuD 17-20; Sfd 9-11. Late 19 early 20 C. G.

Six; glass; elliptical mercury weights; cylinder bulbs; paper roll scales in shafts.

Four have scales "0,700 to 1,000" and two have scales "1,000 to 2,000".

3774 NMC175 HYDROMETER - NICHOLSON

Unsigned

L 325&335; CyD 51&52; TD 51&52. Mid to late 19 C. G.

Two; tin; central cylinder with conical ends; below are arms to conical weight; above is a concave table.

3773 NMC174 HYGROMETER - DANIELL

Unsigned

BD 113; H 217; SrsD 35. Mid to late 19 C. G.

Turned wood base and pillar to hold horizontal glass tube with and pendant spheres; and thermometers.

One of the glass mercury thermometers, scale -20-120° "Fahrenh", is on the pillar; the other is in the stem leading to the lower sphere, with the mercury reservoir extending into the sphere; its paper scale is from 0-120° "Fahren-heit"; the apparatus contains colourless liquid.

4174 NMC244 KEY

J.G. MERNE.

W 81, H 58; HaD 13. Mid to late 19 C. G.

T-shape; cylindrical wood handle with rounded ends; tapering metal arm, rectangular insert in sleeve on end.

The key is designed to turn a rod ending in a solid rectangle, reminiscent of a Hook's joint rod.

While not a spectacular "instrument", this is significant as only the second occurrence of Merne's signature, the other being the Woulff bottle (4173 NMC243), thus the key widens his repertoire of instruments, presumably being part of a much larger artefact.

3559 NMC055 LAMP - CARBON ARC

Unsigned

BD 140; MnH 262. Mid to late 19 C. G.

Cast iron base; pillar with metal sleeve for brass bracket holding pivoted arms; separation adjust rod.

The horizontal rod to adjust the separation of the carbons ends with a knurled ebonite knob; a wire at each carbon clamping bracket allows the carbons to be rotated; the carbons themselves are missing.

3634 NMC130 LAMP - ELECTRIC

SUNBEAM LAMP

H 280; D 126; DiD 75. Late 19 early 20 C. G.

Glass pear-shape; U-shaped filament; held by four brass clips in ceramic layered disc base - two brass contacts on the bottom of the ceramic base.

3752 NMC153 LAMP - GAS

Schott & Gen[?] Jena

BD 205; H 833; GD 106. Late 19 C. F.

Turned mahogany base; metal gas inlet with stop-cock; pillar narrows and splits for two decorated globe holders.

The globes are of white glass in the shape of ellipses with collars below having vent holes, and sleeves below this to fit into the decorated metal holders on top of the vertical arms of the inlet tubes; these turn around 90° and join to a single narrow vertical pipe extending above the wider pillar from the base.

A second lamp is incomplete.

Brachner 1985,149 lists the workshop of Schott & Gebo-ssen from 1884; they exhibited from 1893-1900.

3762 NMC163 LAMP - GAS

Unsigned

MnW 200; H 300; DisD 200; CyD 120.

Mid to late 19 C. G.

Rusted tin; cylinder between slightly curved discs; crown-like flue; two V-supports to axis of mirror frame.

The gas input enters the cylinder opposite the flue; the glass mirror has a frame (94x83) attached to a bar which is held on the apex of the V-supports on one of the discs; there is a hole in the disc below the mirror, but it is below the frame rather than the mirror itself.

3598 NMC094 LENS - BICONVEX

Unsigned

BD 67; MnH 190; FrD 110. Mid to late 19 C. G.

Brass base, tapering pillar, and semicircle support for rotating glass lens in a brass ring frame.

3833 NMC234 LENS - CONVEX

J.H. Dallmeyer No 1 LONDON Rectilinear PATENT No.62857

CyHsD 45, H 22; RiD 65. 1915. P.

Brass fixing ring and cylinder housing for convex lens, with oxidised brass wheel of apertures.

The apertures are marked: "40 60 75 130 200 225"; the lens is now mounted on a wood block.

3799 NMC200 LENS HOLDER

Unsigned

BD 91&105; MnH 417&453; RiD 111&126.

Mid to late 19 C. G.

Two; brass base to expanding pillar with ring clamp; on top, vertical oxidised brass ring with three rods.

The radial rods have V-brackets at the ends to hold the lens; the larger holder has a pivot below the ring and has springs on the radial arms; it also has a weighted base, which the smaller does not have.

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3562 NMC058 LENS SYSTEM

6in J W ESTABLISHED 1816 RD. NO. 519324 & 230577
L 101; ScD 61; TuD 52. RD 1894 & 1908. S.

Brass bound; screw-thread sleeve moved by double knob rack and pinion; lens flap with two side raising bars.

The rack and pinion oxidised brass housing has the RD No. 519324; the lens flap is also of oxidised brass RD No. 230577, and has several markings, some of which are difficult to read, but have been interpreted with reference to the lantern 0443 RDS068; there is a J (above) and W (below) in an X monogram, with the words "TRADE MARK" on wings at the side, and "LONDON MADE" below; behind the lens flap is a gap (for stops?).

The same Trade Mark is on a brass cylinder RD No 507736 (1907) (D71,L198), which has four long, evenly spaced, rectangular gaps (118x12) on its side, and a removable cylindrical cap; at the other end from the cap is a screw-on metal disc with a sleeve and a wing nut clamp, perhaps to allow the apparatus to be held on a stand; the purpose of this cylinder is unknown.

3812 NMC213 LENS SYSTEM ON STAND

Unsigned

Sp 211; PvH 329; HsMnL 217, D 61. Mid to late 19 C. G.

Iron cabriole tripod foot; brass expanding pillar to pivot holding brass cylinder lens system housing.

The latter has a hole for a missing lens cap, and a gap for stops in front of the objective; near this is a (broken) double knob rack and pinion focus; at the other end is an oxidised brass circular bracket now holding a modern electric bulb

3548 NMC044 LEVEL - SPIRIT

Unsigned

L 194; D 19. Late 19 C. G.

Blackened brass cylinder holds glass level tube with colourless liquid; brass screws at each end.

The latter presumably attached the level to some larger piece of apparatus.

3631 NMC127 LEYDEN JAR

Unsigned

D168,163,133; H310,313,280; Ne105,110,101.

Mid 19 C. G.

Three glass cylinder jars with necks, having the remains of metal foil inside and out.

Nearly all the foil is gone from the smallest.

3822 NMC223 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned

BD 86&81; MxD 121&116; H 121&195. Mid 19 C. G.

Brass tapering bucket with open top; glass insert gone; central brass bucket with curved top and plastic handle (a modern replacement).

3749 NMC150 LIFTING FRAME FOR BATTERIES[?]

Unsigned

B 610x180x21; MxH 490. Mid to late 19 C. G.

Mahogany base and frame for cells; two vertical supports and cross bar; handle for metal rod with pulley wheels.

The base has been attacked by acid, and one bar of the support frame for the cells is missing; part of a narrower frame at a higher level is also gone; the cross bar supports the metal rod, which has wooden pulley wheels (D45) at each end, and has a turned wood and metal handle, with a sprung ratchet allowing turns of 1/8 of a revolution, at one side; missing strings from the pulley wheels would have raised or lowered the upper narrower frame, presumably to raise or lower electrodes into the cells on the base; the mahogany cross bar has six hooks below it.

3776 NMC177 MAGNET

Unsigned

L 279 (+Ha 300); MxW 151; H 46. Mid to late 19 C. G.

Five horse-shoe magnets together with (chipped) red paint; the central one has a small ring at the apex.

3638 NMC134 MAGNETIC NEEDLE - PIVOTED

Unsigned

BD 62; H 129; NL 145, MxW 9; PrD 5.

Mid to late 19 C. G.

Brass base holds a brass pillar ending in a pin; on this rotates the double-pointed horizontal needle.

3826 NMC227 MAGNETOMETER - VIBRATION

Unsigned

Hs 176x72x69; H 283; M 78x7x7. Mid to late 19 C. G.

Mahogany base and frame with gliding glass sides; on top, turned wood boss for glass tube to suspend magnet.

The magnet is suspended in a copper wire cradle above a mirror on the bottom of the housing; the mirror is in an oxidised brass frame (127x45) and has an engraved line along its centre; the instrument had a signature disc, but this is now missing. Name from Maiben 1914,326.

3557 NMC053 MANOMETER

Unsigned

CyD 93, H 92; H 208; TuD 17. Mid to late 19 C. G.

Brass; base cylinder with side sleeve for vertical glass tube, side scale 0-3½; inlet tube and stop-cock.

The inlet tube, which runs vertically into the centre of the cylinder, has the stop-cock above a right-angled side arm.

3577 NMC073 MANOMETERS

THE GERALD GRIFFIN TECHNICAL SCHOOL OUR LADY'S MOUNT CORK Wm COOCH 1915 Wm O'Sullivan 1915

B 177x106x25; H 465; TusD 7. 1915. S.

Two; wood base and support for two vertical glass tubes.

The tubes are bent through 90° on top; behind each is a paper on wood sliding scale; one is in inches from 2-15, and has the hand-written name Wm COOCH 1915, the other is in centimetres from 6-37, and has the name Wm O'Sullivan 1915; the Gerald Griffin legend is on a school stamp used three times on the base and support.

3534 NMC030 MANOMETRIC FLAME APPARATUS - CAPSULE

Unsigned

BD 96; H 396; PrD 10; CaMxD 51. Mid to late 19 C. G.

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Green painted cast-iron fluted base; oxidised brass pillar; sliding metal sleeve holds turned mahogany capsule. The latter, which has a central brass tube (D14) is incomplete, with the whole of its back missing, and the remainder showing signs of burning.

3374 NMC005 MECHANICAL MODEL - ARCHIMEDES' SCREW

Unsigned

B 376x207x73; H 255; ScD 80; TuD 14.

Mid to late 19 C. G.

Tin reservoir with supports for upper chamber; between these is a glass tube spiral turned by a handle.

The upper chamber (171x70x25) has a spout at the bottom returning the liquid in it to the lower chamber; the handle, missing its end, turns an iron rod support down the centre of the spiral, to which the spiral is attached by metal brackets at both ends; the glass tube of the spiral has been broken and repaired at one place.

Very similar to Screw illustrated in Griffin 1910,300.

4019 NMC237 MECHANICAL MODEL - CLOCK ESCAPEMENT

BOOTH BROTHERS 63 UPPER STEPHEN ST DUBLIN

B 460x200; WhR 151. Late 19 C. G.

Mahogany base; brass; ratchet wheel; long rod pivoted at centre with pivoted arm to click catch; refurbished.

A restraint near the bottom of the long arm limits its movement, allowing the catch to engage or disengage; a short pivoted arm with another click catch lies opposite that attached to the long rod.

4022 NMC240 MECHANICAL MODEL - LIFT PUMP

Unsigned - attributed to P. Cahill, Coalquay

Ta 360x235x215; H 580. Mid to late 19 C. G.

Green tin tank; two pillars inside hold sprocket wheels above and below to lift discs vertically through a tube.

The tank is on four claw feet, has a tap at one end, and has two glass sides (one now missing); the wheels, above and below, each have six pairs of parallel sprockets to move the discs (D43) which are joined by a chain (now broken); these would lift water from the tank to the top of the tube, which has a run off lip, returning the water to the tank; the tube was once part of a brass telescope.

This model has similarities to the water wheel model 4020 NMC238, signed by P. Cahill, 8 Coal Qual.

3613 NMC109 MECHANICAL MODEL - PISTON ENGINE

PRESENTED BY JAMES BENNETT

B 715x212x90; H 311; WhD 309. Mid to late 19 C. G.

A six-spoke wheel at one side with U-indent on its axis drives a pivoted horizontal piston rod.

The piston barrel is of brass-bound coopered oak; an off-set ring and wheel coupling from the axis drives the valve rod; the large wheel has a pulley groove and, at the other end of its axis, there is another ring (D61,W39) with a slightly curved edge - which could be used for a flat ribbon. The model was transferred to The Steam Museum at Straffan in March 1995, via Charles Mollan.

3612 NMC108 MECHANICAL MODEL - PISTON ENGINE

Unsigned

B 243x239x22; H 560; WhD 390. Mid 19 C. G.

Cast iron; two gothic window type trunnions to axis of a heavy grooved wheel; double U coupling for piston rod.

Much of the model is painted green; the wheel has four curved spokes; its axis is bent in a large U, with its centre coupled to the double U which raises and lowers the rod into the piston; the far end of the axis has a small disc (D40) with an off-centre coupling to raise and lower a valve rod at the pipe outlet; above the trunnions is a double arc support for a two-ball governor (SrsD 17); this does not now turn, but probably did using a small pulley wheel on its axis, and two other pulley wheels at the side of the double arc support, via a pulley thong.

This is a particularly attractive model.

3611 NMC107 MECHANICAL MODEL - PISTON ENGINE

Unsigned

B 203x202x46; H 365; WhD 227. Mid 19 C. G.

Mahogany base; trunnions to axis of four-spoke wheel whose axis has a U-indent for the pivoted piston rod.

The base sits on four turned mahogany feet; the model is painted black and red; at one side is a handle which raises and lowers a rod into a side valve having a bent metal pipe extending from its middle; there is no pulley groove on the wheel, but there was probably originally a handle on the other end of its axis.

4020 NMC238 MECHANICAL MODEL - WATER WHEEL

P. CAHILL 8 COAL QUAY

Ta 528x273x180; H 410; WhOD 305. Mid to late 19 C. G.

Blue painted tin tank with claw feet and two glass sides; wheel has 24 vanes on one side and 12 buckets on other.

One of the four claw feet is missing; the wheel is held by a bridge in the centre of the tank, which has an output tap at one side; the rectangular tapered hanging buckets are painted in different colours; there is a run-off chute and tube below the axis of the wheel.

Morrison-Low 1989,121 lists Patrick Cahill at Wellington Quay, Dublin, from 1876-1922, but not at Coal Quay.

3748 NMC149 MECHANICAL MODEL - WATER WHEEL

P. CAHILL COALQUAY

B 620x319x26-49; WhD 309, W 80. Mid to Late 19 C. G.

Tin; angled low wall tank base; two vertical supports for wheel, which has 26 horizontal curved vanes.

The base is raised on one side with two feet, and there is an outflow guide on the other side; the wheel has two sets of four spokes, offset from each other; a raised curved piece on the floor of the tank in front of the wheel is presumably to adjust the water flow; the axis has a pulley wheel (D18) on an extension of the axis.

Morrison-Low 1989,121 lists Patrick Cahill at Wellington Quay, Dublin, from 1876-1922, but not at Coalquay.

3604 NMC100 MERCURY SHOWER TUBE

Unsigned

BD 105; H 631; TuD 35. Mid 19 C. G.

Iron base unscrews from brass stop-cock with iron sleeve to vertical glass tube ending in iron sleeve.

The upper sleeve has a screw-on tapering ring holding a leather(?) membrane across the top of the tube; a resinous material has been pasted over a crack at the lower sleeve.

If mercury is placed in the upper sleeve, and a vacuum applied, a mercury shower will be seen in the tube.

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3781 NMC182 MERCURY TROUGH

KPM

L 213; H 72; MxW 122. Late 19 early 20 C. G.

White ceramic; pear-shaped with pouring lip at narrow end; parallel raised platforms (H32) inside wider end.

3782 NMC183 MERCURY TROUGH

Unsigned

L 222; H 51; MxW 78. Mid to late 19 C. G.

Light brown ceramic; long narrow trough on three feet with wider and deeper part at one end near a raised table.

The latter is attached to the outside walls of the trough, but is open inside, and has a hole in it.

3750 NMC151 METAL PLATE - ENAMELLED

Unsigned

332x332. Mid to late 19 C. G.

Tin; outside edge gold, then white border, then black square, then white border, then central yellow square.

The outside measurements of the white borders are 235x235 and 114x114; the black square is size 213x213, and the central yellow square is 93x93; there is a hinged ring support on top of the plate.

The plate could have been used as a target, or for optical experiments.

3746 NMC147 METAL TANK

GRIFFIN SARDINIA STREET LONDON. W.C.

616x115x101; HlsD 29. Early 20 C. G.

Black painted (rusted) tin tank with open top; fixed shelf at height 27mm inside with six holes.

Apparatus not illustrated in Griffin 1910.

3760 NMC161 METAL TANK

Unsigned

315x112x102; H 247. Mid to late 19 C. G.

Rusted rectangular tin; on three pairs of tin legs; below the tank are two brass stop-cocks on bent out-pipes.

Possibly used to drive a water-wheel by pressure of the jet of water from the pipe?

3757 NMC158 METAL TANK

Unsigned

W 155; De 165; VH 315, W 53. Mid to late 19 C. G.

Rusted tin; the vertical tank has a U-shaped cross-section, a stop-cock below, and a screw cap on top.

The stop-cock and cap are brass; the purpose of the apparatus is unknown - it could possibly be a water jacket for something, or be used to demonstrate the effect of shape of the vessel on the outflow of water?

3806 NMC207 METRONOME

METRONOME MAELZEL PARIS FRANCE AMERIQUE BELGIQUE HOLLANDE ANGLETERRE

B 110x110; H 215. Mid to late 19 C. G.

Mahogany pyramid housing; brass pendulum; paper scale.

The narrow pyramid housing has a hinged door about one third of the way up; within this is the paper scale: "PRESTO ALLEGRO ANDANTE ADAGIO LARGHETTO LARGO" with numbers 208-40 and 200-42; there is a lead weight at the bottom of the pendulum, which is driven by a brass clockwork mechanism in the base; the pendulum is divided, but the slider is gone; the metronome gives a very loud tick.

3560 NMC056 MICROSCOPE - COMPOUND

Unsigned

Sp 210&165; MnH 305; SaD 111; TuD 40.

Mid to late 19 C. G.

Brass; Y-foot; two curved brackets to rectangular limb; boxed mirror; sprung rack and pinion focus; optics gone.

The limb holds a bar of semi-circular section which is moved by double knob rack and pinion, and which has a right-angled bracket on top for the tube for the missing optical system; an arc rises from the limb at the side of the stage, and the mirror housing, consisting of an angled six-sided mirror in a boxed housing with an open circular front and a condensing lens under the stage, can be moved along this arc to alter the direction of the under-stage illumination; a bracket on the limb has a central angled groove for a (stuck) rack and pinion adjust to vary the distance of the condensing lens from the stage; the stage is circular with a small central hole, and with a double hinged spring clip on top; the microscope is in an unfitted boxwood case (408x278x272) which has a label: "U.S. CUSTOMS SERIAL 256 [CA]/SE 532".

This is an unusual instrument, which has some similarities with the Thomas Grubb microscope in the Museum of the History of Science in Oxford (Ex0058) - particularly the boxed mirror and the arc to vary its position - see the illustration in Burnett 1989,102.

3791 NMC192 MINERALS - COLLECTION OF

Unsigned

Various sizes. Mid to late 19 C. G.

Collection of about 105 rock, crystal, and coral specimens in glazed case.

Items include: "GOLD ORE FROM A QUARTZ VEIN"; "COPPER PYRITES"; "IRON ORE PYRITIES"; "CHALCOPYRITE WITH TETRAHEBRITE AND PEARL SPAR"; "Lava (Trachyte)"; "LEAD AND SILVER ORE"; "CHALCEDONY".

3553 NMC049 MINERAL SPECIMENS - POLISHED

Unsigned

156x103 (6); 156x108 (2); 103x102 (1). Late 19 C. G.

Nine plates showing the coloured graining of minerals such as spar, malachite, and serpentine.

All but the smallest yellowish plate ("?ienna") and one which is all black ("Black"), have two mineral specimens; others are labelled: "Red Spar", "Pyrenus Spar", "Merlins Green", "Blue Belge", "Green Sumachille(?)"; "Griotte", "Plymouth Black", "Alpine Green", "Malachite", "Brocatella", "Green Serpentine", "Red Serpentine"; some labels are missing.

3597 NMC093 MIRROR - ANGLED

Unsigned

181x181; Hs 396x226x152. Mid to late 19 C. G.

Mahogany housing with open top and the bottom of the front cut away for 45° mirror; silvering deteriorated.

4171 NMC241 MIRRORS - ANGLED

Unsigned

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Frs 475x372x22. Late 19 early 20 C. G.
Two black-painted wood frames, hinged together, for two plane mirrors

3576 NMC072 MIRROR - CONCAVE

Unsigned
HsD 230. Late 19 C. G.
Two glass mirrors in tin convex housings; one sits on a wood trapeze, the other on an iron pillar rising from a wood base.

3536 NMC032 MIRROR - CONCAVE

Unsigned
D 540. Late 19 early 20 C. G.
Silvered copper parabolic mirror; two brass pipes at back sides; central slit with rounded wider ends.
The pipes at the back (D22L100) are presumably for pivoting the mirror on a missing support; the central slit (L424,W30&65) runs along a diameter and could be for a missing sliding element.

3830 NMC231 MIRROR - CONVEX

Unsigned
Sp 111; H 520; D 508. Mid to late 19 C. G.
Two; iron tripod foot for pivoting bracket and wing nut to silvered copper reflectors.

3550 NMC046 MIRROR - ROCKING

Unsigned - attributed to Yeates & Son
Sp 194; H 408; WhD 128; DiD 133. Mid to late 19 C. G.
Iron tripod base and tapering pillar support five-spoke wheel and small pulley wheel; on top, rocking disc.
The five-spoke pulley wheel, just above the foot, is revolved by a turned wood handle; a thong from this would revolve the upper pulley wheel (D32); the axis of this, through the top of the tapering pillar, turns a small wheel (D20) with a coupling to a ring around a brass pipe on top of the pillar such that, when the pulley wheel is revolved, the ring rocks the pillar and an angled metal disc on top; the angle of the disc can be altered a little by means of a screw adjust on a bracket behind.
The tripod foot is very reminiscent of Yeates & Son apparatus, and the apparatus seems likely to be the "Rocking or Vibrating Mirror" listed in Yeates 1880,5, although there is now no mirror on the disc.

3627 NMC123 MIRROR - ROTATING CUBIC

PHILIP HARRIS & CO LTD BIRMINGHAM AND DUBLIN
Sp 215&160; H 427; MiHs 160x126x126. 1902-1911. F.
Iron base plate on two cross feet holds support for brass wheel to turn mirrors via inclined bung on axis.
The brass support from the base rises to the axis of a brass handle (without its right-angled end) and the four-spoke wheel; the edge of the wheel is inclined, and it rubs against the inclined side of the bung to rotate the iron pillar (D12) axis, with a brass sleeve and clamping screw on top, holding the black wood housing for the four mirrors.
Dates from Morrison-Low 1989,126.

4021 NMC239 MODEL - DOMESTIC WATER SYSTEM

Unsigned - attributed to P. Cahill, Coalquay
B 494x228x45; H 675. Mid to late 19 C. G.
Wood base; metal; cut-out stove on base; pillar and rod frame hold bath below dual-chamber water tank.
The deep tapered round-ended bath (292x137x95) sits on four claw feet on a rectangle of horizontal bars held by the four vertical pillars from the base; at one side, above the bath, is the water tank, which has glass sides; pipes rise from the kitchen stove to the larger compartment in the tank, and a pipe leads from the smaller to a tap above the bath; there is also a drain below the bath.
A second model, with some similarities, shows the working of a ball cock cistern, having two tanks with cocks on a pipe frame, with a tap between them.
Similar to models by P. Cahill - see entries for Mechanical Model - Water Wheel 3748 and 4020.

4175 NMC245 MORTAR & PESTLE

Unsigned
BD 58&65; ToD 86&93; H 50&70; Pestle L182, MxD 30.
Late 19 early 20 C. G.
Two circular glass mortars with lips, and one turned wood and ceramic pestle.

3795 NMC196 MUSIC BOX

Unsigned
Hs 587x247x244. Late 19 C. G.
Mahogany case with bird and foliage decoration on top; glass cover for brass drum, pins, and comb mechanism.
The framed glass cover is hinged, and covers the mechanism, with gaps at the sides, in one of which is the handle for turning the drum; quite a few of the sounding teeth on the comb are broken off, and the mechanism is not now working properly; there is a shadow inside the lid where there presumably were instructions or a trade label, now gone.

3561 NMC057 NEWTON RINGS APPARATUS[?]

YEATES & SON DUBLIN
HsH 22, D 65; DiD 52. Mid to late 19 C. G.
Flat glass disc in brass shallow cylinder housing with central hole and with screw-on oxidised brass ring.
Likely to be the remains of a Newton rings apparatus, with the screw-thread hole in the cylinder housing to hold the missing pressure adjust screw.

3641 NMC137 NOOTH APPARATUS

Unsigned
BD 261; H 745. Mid 19 C. G.
Glass; flat bottomed lowest vessel; bulbous middle vessel; pear-shaped top vessel with bent pipe below.
The lowest vessel is shaped like a bell, with a ground glass opening and lip on top; into this fits the large bulbous central vessel (MxD201), which has a side vent at its bottom, just above the joint; it also has a ground glass opening and lip on top, into which fits the top pear-shaped vessel (MxD130); this has a tapering vent on top, and a pipe descending from its bottom curving into the large middle vessel.
There is also the flat-bottomed part of a second Nooth apparatus (BD271;H185), but the rest is missing.
The apparatus is Dr Nooth's for impregnating water with 'fixed air' (carbon dioxide) to prepare medicinal waters; it was originally described by John Mervin Nooth M.D., F.R.S. (1737-1828) in a paper read to the Royal Society on December 15, 1774; in the complete apparatus, the neck between the bottom two vessels would have held an ivory valve mounted in a

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cork; this would have allowed the carbon dioxide through, but prevented the water above it from escaping into the bottom vessel, which would have held the reacting chemicals generating the carbon dioxide (e.g. chalk and sulphuric acid); the upper vessel with the bent pipe dipping into the water in the middle vessel would have received water being displaced by the carbon dioxide, giving also a seal and producing a pressure in the middle vessel, in which water would become carbonated and could be run off through a tap on the side arm; by trial and error, the amount of chemicals needed to generate enough carbon dioxide, but insufficient to cause the upper vessel to overflow, would be found.

A similar apparatus in the Science Museum, London, (1927-1198) has a card which records that it was supplied by William Parker from his glass manufactory in Fleet Street; by 1800 Schwepps had introduced a better method of producing carbonated water.

See Turner 1983,207; D. Zuck, British Journal of Anaesthesia 50, 1978, 393-405.

3792 NMC193 OCTANT

KIDD DUNDEE

R 248 (10"); L 298; W 247. 1853-1856. R.

Ebony frame with a π -shaped insert; reinforced brass index arm with window vernier; ivory scale 0-110.

The vernier reads 0-20, and the arm has tangent and clamping screws; there are four square shade frames (green, red, dark red, empty) for the index mirror, and three circular shade frames (green, dark red, empty) for the horizon mirror; there is no half horizon mirror; there is a telescopic eyepiece, but this has no optics; underneath are three feet and a horizontal shaped mahogany handle.

Dates from Bryden 1972,51.

4018 NMC236 OCTANT

Unsigned (Signature plaque missing)

R 409 (16"); L 460; W 384. Late 18 C. G.

Mahogany with curved T insert; index arm bound with brass; ivory scale 0-95; window vernier 20-0.

Clamping screw under vernier on index arm; missing index and horizon glasses, filters and sighting hole.

3573 NMC069 OPTICAL BENCH

G. PERCIVAL (Maker) CORK.

B 899x162x16; H 487; LeHssD 223; PrsD 13.

1881-1883. F.

Mahogany base holds four brass pillars to brass ring housings for glass plates to make hollow lenses.

The ring housings have varying widths (19-77), and have signed ("G. PERCIVAL CORK") caps on top; two plates are added to each to make a biconvex, a biconcave, a plano-convex, and a plano-concave lens when filled with liquid; the biconcave (the widest) has been repaired with wax, presumably to stop a leak.

Dates from Burnett & Morrison-Low 1989,154.

3800 NMC201 OPTICAL ELEMENT

Unsigned

BD 98; MnH 303; RiHsD 103; HoD 26.

Mid to late 19 C. G.

Brass base and expanding pillar with clamping screw for oxidised brass ring holding a copper disc with a hole.

The base has white ceramic weighting, and this has a groove with a pointer, so the element was perhaps part of a set for an optical bench.

3533 NMC029 OPTICAL STAND

YEATES & SON DUBLIN

Bd 126; MnH 408; PrD 20. Mid to late 19 C. G.

Green painted cast-iron fluted base; expanding brass pillar, with screw clamp, ending in pivot with a screw thread.

The pillar has a central strengthening ring; the height is increased by means of a brass tube sliding inside the pillar; the signature is cast into the base around the foot of the pillar.

The stand is assumed to be for a missing optical element.

3585 NMC081 ORGAN PIPE - REED

YEATES & SON OPTICIANS DUBLIN

Hs 247x58x58; Wds 80x32. Mid to late 19 C. G.

Boxwood with ebony top and frames for four glass windows on top sides; inside, rectangular frame for brass reed.

One of the windows is cracked; there is a mahogany tapering input tube below; the ebony top has a hole into which the sound tube, 3586 NMC082, fits.

3583 NMC079 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN C4 G3 E3 C3

Hs 608x73x63 - 295x51x46. Mid to late 19 C. G.

Four; boxwood with mahogany lip and tapering input below; single turned wood capsule; E3 and C3 with slides on top.

The two largest, E3 and C3, have parallel mahogany rods on the top front of the housing, and a sliding mahogany panel in these, with a window above a rounded rectangular hole in the boxwood; the capsules have two short pipes, one sticking vertically up from the centre of the dome, and the other at its side.

3584 NMC080 ORGAN PIPE WITH MANOMETRIC CAPSULES

YEATES & SON OPTICIANS DUBLIN

Hs 702x79x76. Mid to late 19 C. G.

Boxwood with mahogany lip and tapering input below; glass back; oxidised brass pipe splits into three to three capsules.

The pipe runs across the front of the housing and turns in a right-angle around the corner, where it splits into three arms, each leading to a turned wood capsule.

3796 NMC197 PHONOGRAPH

Thomas A. Edison TRADE MARK MANUFACTURED UNDER THE PATENTS OF THOMAS A. EDISON AT ORANGE N.J.U.S.A. C3813

Hs 500x250x160; H 385; DrD 110.

Patents from 1888-1898.

Oak housing; black enamelled top; white metal drum.

Bettini diaphragm: "BETTINI'S MICRO-PHONOGRAPH ATTACHMENT" on hinge above the drum; brake lever to horizontal pulley wheel connected to a two-balls governor; the position of the drum frame can be adjusted a little by a drawer on top of the housing; a drawer in the housing contains another diaphragm: "TYPE D PATENTED AUG. 1889 DEC. 1892 BETTINI

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NEW YORK" with a catalogue: "BETTINI MICRO REPRODUCERS RECORDERS PHONOGRAPHS GRAMOPHONES AND SUPPLIES. Bettini Phonograph Laboratory 110 FIFTH AVENUE, NEW YORK CITY" (undated, but post 1887). There are also three large cylinder card cases (D153, H124), two from "EDISON RECORDS NATIONAL PHONOGRAPH CO. NEW YORK USA", and one from "Columbia Phonograph Co.", but only one cylinder (D126,H108) is complete: "LITTLE ALABAMA COON SONG BY ARTHUR COLLINS"; one cylinder has a horizontal crack: "607 SANTIAGO WALTZ EDISON SYMPHONY ORCHESTRA"; the Columbia cylinder is in fragments: "GILMORE'S BAND Loin de...Waltz alone[?]". There are also six slim cylinders (D59,L156) in card sleeves for a different player.

3818 NMC219 PITH BALL STAND[?]

Unsigned

Sp 122; H 410; RdD 7. Mid 19 C. G.

Black-painted cast iron tripod foot and boss holds glass rod bent through 90° on top, ending in a neck and knob.

It is assumed that this is an insulated stand to suspend a pith ball for electrical experiments.

There is a second example, but the glass rod is broken; it is surprising that this one has survived since it appears to be original, yet is delicate and vulnerable.

3784 NMC185 PNEUMATIC SHELF

GRIFFIN. GARRICK ST.. LONDON.

D 127; H 51; HD 31. 1867-1898. F.

Unglazed white ceramic; shaped like a pulley wheel with a central hole on top, but with none at the side.

Also a brown glazed beehive pneumatic shelf - a cylinder with an open bottom, a hole in the top, and a hole in the side (with a complete rim on the bottom) signed: "GRIFFIN LONDON".

3783 NMC184 PNEUMATIC SHELF - BEEHIVE

P. HARRIS & Co., LTD. DUBLIN.

D 67; H 41. 1902-1911. F.

Ceramic cylinder with open bottom and closed top except for central hole, and a side arch; for gas collection.

Used in a pneumatic trough.

There are several others, one (D75,H41) signed: "PORT DUNDEE[?] GLASGOW POTTERY CO"; and another (D110,H70), which looks older, and which has a complete rim around the open bottom, with a long curved hole in the side rather than an arch rising from the bottom.

Name given in Harris 1908,104.

3620 NMC116 POLEMSCOPE

Unsigned

B 578x182x115; H 330; TwS 215x122x122. Mid 19 C. G.

Hollow boxwood base with two towers and mirrors such that light is bent down through the base and up again.

Each tower has a horizontal square-section viewing tube on its outside, and an equivalent tube on the inside, but the light is blocked from going straight through; instead, four 45° mirrors bend it around so that the line of sight appears to go through any impediment placed between the two inner tubes, and allows the view beyond the further tower to be seen; the wood housing is attractively decorated with stars, flowers, and peacock tail decorations, looking like marquetry; one side of the base is hinged to allow the light path and two of the angled mirrors to be seen; one of the mirrors is missing, and there is some damage to the woodwork, but the instrument could easily be restored to produce an exceptionally interesting and pretty piece.

John Millburn, writing (19:9:88) about the "Jealousy Glass" polemoscope 1676 MAY163, notes that this ancient term applies to any telescope incorporating means for displacing the line of sight from the direct axis.

Gerard Turner 1983,306 illustrated a metal equivalent of this same apparatus, which he calls a "divided telescope", and reproduces an engraving to show a rose apparently being seen through a stone.

This instrument was illustrated in Bull SIS, No.35, December 1992,p.25.

3775 NMC176 POTASH BULBS - MOHR

Unsigned

H 108&117; W 90&103; VsD 20-40,22-38.

Mid to late 19 C. G.

Two; glass; five pear-shaped vessels, three small below, one middle-size and one large above, joined by tubes.

The three small vessels have the tubes extending to their bottoms; the largest has an input pipe above, and a pipe from its bottom into one of the small vessels; the middle-size vessel has an output pipe on top, and its bottom is connected to the upper side of one of the small vessels; thus gas would go through the largest vessel, bubble through the three small vessels and emerge through the middle-size vessel.

Name from Maiben 1914,385.

3380 NMC011 PRESSURE GLOBE

Unsigned

BD 81; H 283; GH 105, D 94. Early to mid 19 C. G.

Brass; disc base; neck to elliptical globe; above, stop-cock; on top, universal ball joint for pipe.

The base disc unscrews, as does the pipework above the globe, including the stop-cock and moving pipe; a thin pipe extends into the globe from below the stop-cock.

The precise purpose of this globe is unclear, but it would appear to be for pneumatic or hydrostatic demonstrations.

3810 NMC211 PRISMS

Unsigned

L 138-97; Sis 24-28. From mid 19 C. G.

Four; one has two brass triangular holders with rods to ivory wings; one has a circular brass bracket at one end.

The latter has a glass knob at the other end, and the other two prisms have glass knobs at each end.

There is also a collection of other prisms, lenses, cubes, and other glass optical elements.

3537 NMC033 PRISM - HOLLOW

Unsigned

BD105; MnH308; PmL111,Sis50,50,49.

Mid to late 19 C. G.

Weighted brass base and expanding pillar to pivot for right-angled frame to three-compartment glass prism.

The frame, and the pivoted bracket in which it can turn, are of oxidised brass; the equilateral prism has three holes on one side, one for each of the three compartments, which could thus be filled with different liquids.

While several prisms made up of different types of solid glass have been found in Irish collections, this is the first with more than one hollow compartment.

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3808 NMC209 PRISM ON STAND

YEATES & SON DUBLIN

BD 105; PvMnH 290; PrH 37; Sis 35. Mid to late 19 C. G.

Weighted brass base and expanding pillar to pivot for oxidised brass arm to housing for equilateral prism.

The latter is in the form of a brass triangular plate with sides, on top of a brass rod through a sleeve in the oxidised brass arm; the prism can thus be turned by means of the pivot and revolved in the sleeve; the pillar has a ring clamp.

3807 NMC208 PRISM ON STAND

Unsigned

BD 126; MnH 310; PrHsW 51, MxD 19.

Mid to late 19 C. G.

Cast iron base with leaf decoration; expanding brass pillar to oxidised brass hinged housing for two prisms.

The prisms are narrow, with apex angles c20° and c10°; the stand has a screw clamp.

3549 NMC045 PUMP - APPOLD'S CENTRIFUGAL

Unsigned

B 245x202x35; H 210; WhD 153. Mid 19 C. G.

Wheel only; mahogany base and two turned pillars to axis of metal wheel - disc and two rings with curved flanges.

The base is diamond-shaped with concave sides, and rests on four turned feet; the pillars are elaborately turned (one has a repaired crack on top and is loose); the wheel has a central disc attached to the axis, a ring at each side, with six sets of curved flanges between the disc and each ring; the rings are painted green and black, and the flanges white.

The pump was used to raise water from one level to a higher level.

Griffin 1910,301, gives a diagram of the apparatus as a whole, in which the wheel cannot be seen, but also offers a model of the wheel, which, it records, at six inches diameter, is half the diameter of the acting wheel of the large pump shown at the Great Exhibition in London in 1851.

3563 NMC059 PUMP - FIRE ENGINE

Unsigned - attributed to Griffin London

B 448x279x127; H 440; W 584; CysD 115&50.

Late 19 early 20 C. G.

Mahogany base holds tin tank; a plank on this holds three glass pump cylinders with oxidised brass fittings.

The central cylinder is largest; pivoted above it is a handle with arc ends, and this raises pistons alternately in the smaller cylinders at the sides as the handle is rocked; this raises water from the tank into the cylinder on the upstroke, and it is then forced into the central cylinder on the down stroke; the water in turn is forced through a pipe on top of the central cylinder, which has a stop-cock.

Appears to be identical to pump illustrated in Griffin 1910,299, price £5.0.0.

3545 NMC041 PUMP - FORCE

Unsigned

L 473; CysD 37; TuD 13. Mid to late 19 C. G.

Glass cylinder with piston in brass sleeves; glass tube below lower sleeve; side cylinder with outlet.

The piston (whose leathers are stuck in the cylinder) is driven by a piston rod with a turned wood handle at right-angles to the rod; under the (hidden) valve and lower sleeve is a brass screw thread around the glass tube, for the missing reservoir vessel; from the side of the lower sleeve is a brass pipe bent through 90° to the lower brass sleeve of a parallel glass cylinder with a brass sleeve and outlet pipe above.

Similar to pump illustrated in Griffin 1910,298.

3546 NMC042 PUMP - LIFT

Unsigned

MnH 190; CyD 64, H 69. Mid to late 19 C. G.

Brass; cylinder with red interior has a bracket at the side for a pivoted curved handle for the piston rod.

The piston rod extends through the cylinder and a sleeve below, and ends in another pivot for a bracket with two holes; the rest of the pump is missing; it would have consisted of a glass cylinder in the sleeve, with the piston leathers and valve attached to the rod bracket, and a lower valve and reservoir vessel underneath; the upper cylinder has a bent outlet pipe at the bottom.

Similar to pump illustrated in Griffin 1910,298.

3552 NMC048 RELAY

Unsigned

B 195x126x11; H 81. Mid to late 19 C. G.

Mahogany base; brass and iron fittings; two vertical electromagnetic coils and pivoted mechanism; sprung key.

The vertical coils (H34,D27) are wound on wood bobbins and there is a cross plate over their upper poles, on a pivoted brass bar on an iron support; one end of the bar has screws to adjust the extent it can move, and the other would have had a spring, now missing; at the side of the base is a sprung pivoted key or tapper, which incorporates a curved brass pivoted switch which can connect or disconnect a brass flange.

3387 NMC018 SAVART DISC MACHINE

YEATES & SON DUBLIN

Sp 222&883; H 490; L 978; WhD 445.

Mid to late 19 C. G.

Mahogany frame on three legs for heavy iron pulley wheel; this drives a spindle to turn four brass Savart discs.

The pulley spindle (D27) is on the axis of the toothed discs (D100,73,60,50), and there is an endless screw on the axis to a double disc (D41,72) counter, with scale 0-90 on the smaller, and 0-9 on the larger; a shaped boxwood plate runs along the edge of the discs to help hold the vibrator; the pulley wheel has five spokes and is turned by a brass and turned wood handle.

3390 NMC021 SINGING FLAMES APPARATUS

YEATES & SON Dublin

Sp 198; H 451. Mid to late 19 C. G.

Green iron tripod foot; brass plate with two stop-cocks to tapering burners; on top, frame for (missing) glass tubes.

Gas input at the back of the foot.

3376 NMC007 SIREN - CAGNIARD

Made by Yeates & Son, Dublin.

H 205; CyD 75; H 34. Mid to late 19 C. G.

Brass; input pipe to cylinder; on this, revolving disc with 25 oblique holes; endless screw to scale plate.

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The watch hands are missing which would have read the scales 0-90 and 0-20 on the silver plate, which is supported by two turned pillars from the cylinder.

3377 NMC008 SIREN - HELMHOLTZ DOUBLE

Signature plate gone. [Reminiscent of Koenig/Yeates.]

B 450x250x46; H 450; CysD 84. Late 19 C. G.

Mahogany base; iron frame for double brass cylinders; rotating disc with endless screw mechanism to scales.

The disc, on top of the lower cylinder, has four circles of oblique holes; watch hands (one replaced) read the silvered scales, 10-100 and 5-25, below the upper cylinder; below the lower cylinder and above the upper cylinder are right-angled pipes, connected with tubes to a Y-piece on a turned mahogany pillar from the base; this, in turn, leads to another Y-piece, and one arm to yet another in whose arms are black and red fibre-covered pipes ending in turned wood cups - one like a mouth piece, and the other with an internal screw thread.

The instrument is very much the same as those in other collections, signed by Rudolf Koenig of Paris, or by Yeates & Son of Dublin.

3831 NMC232 SONOMETER

Unsigned

Sp 185&985; H 262; Bx 1218x118x69.

Mid to late 19 C. G.

Mahogany; two legs with horizontal bar between; sound box with wood scale 5-95; metal pegs, pulley, brackets.

The sound box has three holes (D18) on each side; at one side on top are two pegs; at the other are a peg and a brass pulley wheel; from the sides of the box at the pulley end are two bent brass brackets.

3586 NMC082 SOUND TUBE

YEATES & SON OPTICIANS DUBLIN

HsL 302, Se 70x68 - 29x27. Mid to late 19 C. G.

Boxwood cone with square section, having a circular input boss below, and an open top.

The tube fits into the top of the reed organ pipe, 3585 NMC081, and would amplify the sound from it.

3372 NMC003 SPANGLED GLASS GLOBE

Unsigned

BD 59; H 450; MxD 192. Mid 19 C. G.

White-metal disc base and brass sleeve hold tear-shaped resin-covered glass globe with a spiral of foil kites.

The tear drop is upside down - with the elongated narrowing stem below; on the rounded top is a brass concave disc leading to a neck and a brass sphere conductor (D39).

3829 NMC230 SPECTROSCOPE - TABLE

John Browning London

Sp 187; TH 245; ScH 210, D 148; TeL 334; CIL 318.

Mid to late 19 C. G.

Brass; iron tripod base; tapering pillar to scale disc 100-0-100; prism table (D73&49); telescope; collimator.

The iron base is on three brass feet; the prism table sits on two (of three) short turned pillars, and has an outer fixed disc and an inner revolving disc; the collimator is fixed, with a screw-adjust slit; the telescope moves, has a vernier to the scale, and has push focus.

3541 NMC037 STANDARD VOLUMES - IMPERIAL

MUNSTER IRON CO. CORK 94 NORTH MAIN STREET

BD 162-51; H 300-75. Mid 19 C. G.

Pewter; seven jugs with handles at sides and tapering lips on top; sizes from gallon to half-noggin.

The jugs are inscribed: "1 GALLON", "½ GALLON", "1 QUART", "1 PINT", "1 HALF PINT", "1 GILL", "½ NOGGIN"; the four largest jugs have a lion above a crown in the middle of the signature mark; the others just have a crown above an "X" with no signatures.

A similar set of jugs, 3527 SAL050, has one signed as these, but the others are signed: "AUSTEN & SON CORK IMPERIAL 94 NORTH MAIN STREET".

3614 NMC110 TELEGRAPH - ALPHABETICAL

BREGUET 37518 No 6035(?) PO 12 R 310

B 219x137x26; H 177; WdD 115. Mid to late 19 C. R.

Mahogany base and glazed housing for brass clockwork and two electromagnet mechanism; white face A-Z and 1-25.

The clockwork is held between two rectangular brass plates (103x20); the coils lie horizontally on the base; the housing lifts off to reveal the mechanism; the No 6035 (which is not very clear) is on a plaque on front; the 37518 is on the mechanism; the PO 12 and R 310 are stamped on the base; the needle indicator is gone; the base sits on four turned feet.

Anderson 1990,13 lists catalogues from 1873-83.

3615 NMC111 TELEGRAPH - ALPHABETICAL

BREGUET 50 116

B 220x144x28; H 202; WdD 110. Mid to late 19 C. R.

Mahogany base and glazed housing for brass clockwork and two electromagnet mechanism; white face A-Z and 1-25.

The instrument is similar to 3614 NMC110, but the clockwork mechanism is held behind the top of the face between two brass discs (D79); the needle is present, as is a small adjust key to an external disc (D24) divided 0-40, attached behind to a pulley wheel and spring to the interruptor at the poles of the coils; this is missing from 3614 NMC110, as are two brass screw electric contacts on the base of this one.

Anderson 1990,13 lists catalogues from 1873-83.

3570 NMC066 TELEGRAPH - ALPHABETICAL

BREGUET No 43785

B 202x201x33; DiD 151. Mid to late 19 C. R.

Mahogany base on four turned feet; on this, horizontal brass disc with letters and numbers, and 26 nicks outside.

The whole alphabet is inscribed on the disc, with numbers 1-0 and 11-25 outside the letters; above the disc is a pivoted brass and bone handle (now bent a little), which can be raised and turned to fit into different nicks; a switch and oscillating spring which were on the base are now gone (see 3579 NMC075 below); there are three brass screw electric contacts on the base.

Anderson 1990,13 lists catalogues from 1873-83.

3579 NMC075 TELEGRAPH - ALPHABETICAL

BREGUET No50361

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B 203x202x33; H 125; DiD 152. Mid to late 19 C. R.

Mahogany base on four turned feet; on this, horizontal brass disc with letters and numbers, and 26 nicks outside.

The whole alphabet is inscribed on the disc, with numbers 1-0 and 11-25 outside the letters; above the disc is a pivoted brass and bone handle with a window, which can be raised and turned to fit into different nicks; the disc has a grooved skirt underneath hiding the mechanism; when the handle is turned a spring oscillates between two electric contacts on the base, which also holds a two-point switch.

Anderson 1990,13 lists catalogues from 1873-83.

3594 NMC090 TELEGRAPH - MORSE

(Two stamped) GPO; shamrock, thistle, rose design

B 101x80x15; H 100; DiFrD 69. Late 19 C. G.

Seven; mahogany base and angled arc housing for glazed brass frame over green-backed morse needle indicator.

The blue-metal double-pointed needle is constrained by two ivory stops; there are two screw brass electric contacts on the sides of the housing; marks on the individual instruments are: "3", "24", "40", "41", "B30", "GPO 2919", "GPO 4046"; some of the instruments are damaged.

3595 NMC091 TELEGRAPH - MORSE

(One stamped) GPO shamrock, thistle, rose design

B 113x98x19; H 120; DiFrD 80. Late 19 C. G.

Two; mahogany base and angled arc housing for glazed brass frame over green-backed morse needle indicator.

The blue-metal double-pointed needle is constrained by two ivory stops; there are two screw brass electric contacts on the sides of the housing; marks on the individual instruments are: "R40", "GPO 592"; these are larger versions of the telegraphs 3594 NMC090.

3592 NMC088 TELEGRAPH - MORSE, WITH INTERRUPTOR

Unsigned - shamrock, thistle, rose decoration.

B 159x106x24; H 173; CyHsD 76, W 38. Late 19 C. G.

Mahogany base; double coil electromagnetic interruptor with an angled glazed brass cylinder for the needle.

The angled needle housing is held up from the base by two brass supports; the double-pointed magnetic needle is held above a green background, and is constrained by two ivory stops; there are four brass screw electric contacts on the base (with one screw gone); the apparatus is now attached to a modern wood base, and connected to an electric siren[?].

3378 NMC009 TELEGRAPH PRINTER

L. BRASSEUR et S. DE SUSSEX No[blank] CH DE VOS CONSTRUCTEUR BRUXELLES

B 312x173x48; H 164. Late 19 C. G.

Mahogany base; brass housing for clockwork; two vertical electromagnets for pivoted mechanism to mark tape.

Base has four turned feet; the apparatus sits on a brass plate on this; the coils of the electromagnets are between wood rings; the tape holder is missing, but the tape would have gone through two rollers beyond the marking arm; there are nine brass screw electric contacts on the base.

3551 NMC047 TELEGRAPH PRINTER

Unsigned

B 240x147x27; H 227; WhD 107. Mid to late 19 C. G.

Mahogany base; brass; clockwork mechanism with cog-wheels and rollers; tape spool; two electromagnets.

The base retains three of four feet; the six-spoke tape spool is on a turned pillar above the mechanism; the vertical electromagnets (H41,D25) are at one side of the base and have a hinged rocking metal plate joining their upper poles; two pins at one side of the base, and three holes at the other, suggest a missing part, perhaps a cover.

3761 NMC162 TEST-TUBE RACK

Unsigned

B 610x126x20; H 132; HIsD 19[x2], 25[x4]. Late 19 C. G.

Mahogany; base has four supports to table with six holes; small holes in base (D12) correspond to the upper holes.

3639 NMC135 THERMO-HYDROMETER

Alroin Engelhardt in Leipzig

L 300; BuD 25; Sfd 10. Late 19 C. G.

Glass; pear-shaped mercury weight below thermometer mercury reservoir; spherical bulb; scales 60-0 & 0-80°.

The scale is in the form of a paper roll inside the shaft, divided 60-0 "Baumé Tp. 14° Rr", and 0-80° "Réaumur".

3388 NMC019 THERMOMETER - METALLIC, APPOLIT

Appolit's Metallic Thermometer YEATES & SON DUBLIN

BD 145; H 595; W 310. Mid to late 19 C. G.

Turned mahogany base; two brass pillars to pivot for long metal needle to read arc scale 30-90 on support.

The latter has a standard glass mercury thermometer, with an ivory scale 40-80°; the long needle has an adjusting screw at its point, and two more at right-angles at its base, and is pivoted from its centre.

3811 NMC212 THERMOPILE

F.E. BECKER & Co LONDON No 8995

BD 87; Pvh 210; L 183. Late 19 early 20 C. G.

Brass; weighted base and expanding pillar to pivot; on this, circular housing for pile, with cap and cone.

The pile has 12 elements on one side and 15 on the other; a cap covers one side, and the other has a cylinder leading to a cone (MxD68); on the base are two insulated brass screw electric contacts holding spirals of copper wire to two more screw contacts on the sides of the pile housing.

3571 NMC067 THERMOPILE

Made by Yeates & Son Dublin

B 107x107x10; H 200; FnMxD 64. Mid to late 19 C. G.

Brass; shaped base with concave sides; pillar to thermopile at right-angles with single conical funnel.

Covered copper wires extend from two ivory rings (D6) at the sides of the pile housing, and these were probably originally connected to the two screw electric contacts on the base.

3382 NMC013 TRANSIT INSTRUMENT

Unsigned

B 950x288x25; TuL 875, D 68; W(-St) 650, SD230.

Late 19 C. G.

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Mahogany base; stone-coloured wood pillars to pivots (H450) for conical supports holding the telescope tube. The supports, and the tube at right-angles to them, are of oxidised brass; on one support is the silvered scale ring 0-120-50-0-120, with a window vernier, and a spirit level above; there is a lens at one end of one support with a pivoted brass frame for a missing glass in the spherical centre of the instrument; the eyepiece optics of the telescope are gone, but the objective is present, with two lens flaps.

3621 NMC117 TUNING FORK - ELECTROMAGNETIC

Yeates & Son Dublin

B 805x150x47; H 206; FkL 739. Mid to late 19 C. G.

Mahogany base; horizontal iron fork with electro-magnetic coil (D64) between the ends of the prongs.

The coil is mounted on a plate (100x60) on top of two turned brass pillars; a brass spring on the base contacts an adjustable pin on the lower prong when the fork vibrates; there are two brass screw electric contacts on the base.

The Yeates & Son catalogue (Yeates 1877,53) calls this an: "Electro-Magnetic Tuning Fork, for illustrating vibratory motion of strings...£4 4 0".

3580 NMC076 TUNING FORK ON RESONANCE BOX

RUDOLPH KOENIG A PARIS YEATES & SON OPTICIANS DUBLIN

Bx 310x118x66; H 287. 1858-1901. F.

Boxwood box with one end open, and mahogany veneer on four sides; metal fork "UT3" on turned wood boss on top.

The veneer has some chipping, but covers the top and the edge joints of the box underneath.

The Yeates & Son stamp is rather indistinct, and is mixed up with the Koenig stamp on the box; the box and fork are both stamped "UT3", with the fork also having the Koenig "K" monogram, and "512 V".

Koenig dates from Payen 1986,160.

3581 NMC077 TUNING FORK ON RESONANCE BOX

K [i.e. Rudolph Koenig] YEATES & SON OPTICIANS DUBLIN

Bx 308x115x64; H 270. 1858-1901. F.

Boxwood box with one end open, and mahogany veneer on three sides; metal fork "UT3" on turned wood boss on top.

The box differs from that of 3580 NMC076 in that it retains its boxwood top, and the mahogany veneer on the sides shows the dove tail joints - thus the sides were presumably made with veneered boxwood, rather than having the veneer added after making the box, as in 3580 NMC 076; there appears to be no Koenig stamp on the box in this case, but the fork has the Koenig "K" monogram, and is also stamped "512V".

Another box of the same dimensions and Yeates & Son signature stamp is also stamped "C3" and has a turned mahogany boss for its missing fork. Koenig dates from Payen 1986,160.

3759 NMC160 UNKNOWN

Unsigned

BD 155; H 452; CyH 39. Mid to late 19 C. G.

Rusted tin; shallow cylinder has rounded top leading to a conical support; from the edges rises an arch.

The top of the arch strip (W29) has a central hole, as has the conical support (D10-103); perhaps something which could rotate was held between these two?; the apparatus is clearly another version of 3758 NMC159.

3758 NMC159 UNKNOWN

Unsigned

BD 297; MxD 358; H 327. Mid to late 19 C. G.

Rusted tin; tray has conical rim (H52); an arch rises from the tray; in the centre is a conical support.

The top of the arch strip (W31) has a central hole, as has the conical support (H53,D76-20); perhaps something which could rotate was held between these two?; the apparatus is clearly another version of 3759 NMC160.

3770 NMC171 UNKNOWN GLASS APPARATUS

Unsigned

BD80; H225; SrD76; CyD48; ToD53. Mid to late 19 C. G.

A cylinder on disc base has a ground glass joint into which fits a sphere with a cap; a tube is held inside.

The cylinder has a chipped pouring indent at the side of its ground glass joint; stuck into this joint is the ground glass joint under the squashed sphere; the sphere has a wide ground glass opening on top with a ground glass stopper cap; cotton[?] holds a cylinder test tube (Dc14,Lc100) within the lower joint such that the open top is in the sphere, and the trunk in the cylinder; the joints are now stuck.

3389 NMC020 VIBRATING ROD FOR LISSAJOUS FIGURES

Yeates & Son Dublin

BD 128; MnH 345; TH 142. Mid to late 19 C. G.

Cast iron fluted base; support rises to small brass table with screw clamp, which holds vibrating rod.

This is in the form of two pointers fused at right-angles in the centre; see also the entry for the Kaleidophone, 0803 UDP069.

3635 NMC131 VOLTAMETER

Unsigned

BD 174; H 104; CuMxD 107. Late 19 early 20 C. G.

Turned mahogany base; central conical glass cup; two foil electrodes embedded in wax below; two contacts.

The brass screw contacts are on the base, and are connected to the foil contacts rising into the cup.

3567 NMC063 VOLTMETER

EGAN & TATLOW DUBLIN VOLTS

B 281x278x31; H 312; CyHsD 168. Late 19 early 20 C. G.

Mahogany base and vertical support for glazed brass cylinder housing; silvered face and arc scale 0-10.

The base has three brass level screws, and the vertical support has two brass screw electric contacts; the needle extends from behind a brass semi-circular plate towards the top of the face.

Makers not listed in Burnett & Morrison-Low 1989.

3789 NMC190 VOLTMETER

WESTON VOLTMETER WESTON ELECTRICAL INSTRUMENT COMPANY, NEWARK, N.J.U.S.A. No. 6609 MADE FOR ELLIOTT BROTHERS, LONDON

BD 183; D 170; W 98. Patents listed from 1888-1898.

Black painted, somewhat rusted, metal cylinder housing.

Glazed arc for white scale 0-30; there are two screw electric contacts below the housing.

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3754 NMC155 VOLUMETRIC APPARATUS

Unsigned

Sp 181; H 330; MxW 270; TuD 16. Mid to late 19 C. G.

Iron stand, with three cabriole legs, for a brass boss and sphere for, and bent wires and supports for, a glass c58° angled V-tube.

One end of the tube is broken, and both are at a similar height.

The apparatus is described in Maiben 1914,501 as: "Volumetric Apparatus, for the electrolysis of Hydrochloric Acid, water, and Ammonia. Consisting of a V shaped tube, closed at one end, with two platinum electrodes, mounted on stand...0 15 6"; the platinum electrodes are now missing from this apparatus.

3825 NMC226 WAVE DEMONSTRATION APPARATUS

G. Wheatstone Invr.. [Wave forms] YEATES & SON DUBLIN

B 710x200x35&24; H 150; Hs 378x108x82.

Mid to late 19 C. G.

Mahogany two-step base; oxidised brass housing for three sets of wire and white glass bead waves; 12 wave forms.

The three sets of 81 wire and bead indicators are on the top and at the sides of the housing; a pair of parallel mahogany bars, bound at their ends with oxidised brass, push mahogany wave forms into the housing, making moving waves on the indicators; there are five pairs of wave forms, plus two more matching, but with the waves displaced one from the other; in a blackened boxwood case with a handle.

3646 NMC142 WEATHER GLASS

Unsigned

L 285; MxW 101. Mid 19 C. G.

Pear-shaped with a flat side; at one end is a glass knob, and at the other a long pipe bent through 180°.

The bend on the pipe is at its end; the side arm, which should be connected to this pipe, has been broken off; the shape of the glass is rather like a male bed-bottle, though the neck is narrower.

The instrument appears to be a weather glass, donderglas, or baromètre liègeois; it would have been part filled with coloured water, and hung vertically from the knob; they were produced in Liège in the 17th Century.

A different model is illustrated in Turner 1983, opposite page 256, from which details are taken.

3804 NMC205 WHISTLE

Unsigned

MnL 237; Hs 210x27x25. Mid to late 19 C. G.

Mahogany housing coming to a point beyond the lip; mahogany plunger at other end with scale of notes C-C.

The scale is inscribed by hand on light wood on the plunger, which has a cork and leather end.

3582 NMC078 WIND CHEST

Made by Yeates & Son Dublin

Sp 262 & 162; Hs 203x105x64; H 134.

Mid to late 19 C. G.

Cast iron base and four feet; mahogany box with two turned bosses above; brass input and output tubes; two stops.

The stops, in front of the box, have turned mahogany knobs and brass rods; behind the box are large and small oxidised brass tubes (D17&8) on a right-angled bracket over the top edge of the box, where there are two small stop-cocks.

3747 NMC148 WOODEN FRAME

Unsigned

B 519x101; PIH 55; H 445. Late 19 C. G.

Mahogany base; horizontal black wood platform and three vertical bars with grooves to fit two sliding plates[?].

The base has shaped sides; the inner bar has grooves on both sides, while the left and right bars have grooves only on the inner side; thus two vertical plates of size about 388x151mm could slide into or out of the grooves.

4173 NMC243 WOULFE BOTTLE

IMPROVED. WOULFFS[sic]. BOTTLE DESIGNED. BY JOHN. G. MERNE CORK

BD 86; H 200. Mid to late 19 C. G.

Glass cylindrical bottle with ground-glass top; in this, lid with two vertical ground glass chimney vents.

The lid is stuck in the bottle.

Merne is not listed in Burnett & Morrison-Low 1989.

3575 NMC071 WOULFE BOTTLES

Unsigned

H c130, BD c70; H 170, BD 100. Mid to late 19 C. G.

Ten small and one large glass bottles, each with two chimney vents on top (ground glass in two cases).

The large bottle has a brown (Ferrous?) residue.

3608 NMC104 X-RAY TUBE

REMADE BY NEWTON & WRIGHT LTD. LONDON N.

L 580; SrD 201; SrD 98. Early to mid 20 C. G.

Glass; central sphere; four side arms, one with a metal sphere on the end; concave disc and angled electrodes.

The long side arm, ending in a metal cap, holds the concave disc electrode; on the opposite side of the sphere is a metal cap, which holds the copper-coloured angled housing for the other electrode, with a ring on a wire beyond it; a neck from the cap leads to a metal sphere with two screw caps on short angled side arms; a spiral wire joins the neck to a sleeve at the end of the third glass side arm containing a disc electrode; near this is the fourth side arm, which bends in approximately a right-angle, and contains a wire electrode.

3605 NMC101 X-RAY TUBE

MAKERS NEWTON & WRIGHT LTD LONDON N.

L 590; SrD 174. Early 20 C. G.

Glass; central sphere; two long side arms; short conical arm; right-angled arm; copper colour angled electrode.

The two long side arms extend in a line either side of the sphere and contain the disc and angled electrodes; the latter has a central white metal disc in the angled copper housing, with a metal ring on an arm beyond the housing; the conical side arm has a disc electrode, and the right-angled arm, near the conical arm, has a wire electrode parallel to, and connected to, the terminal for the main disc electrode.

3607 NMC103 X-RAY TUBE

ORIGINAL MULLER RÖNTGENROHRE 239192 C 31293 DDLM SIEDERÖHRE WOLFRAM DIAGNOSTIK

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L 690; SrD 195; VD 101. Early to mid 20 C. G.

Glass; central sphere; three arms; metal pear vessel.

The longest arm, which ends in a metal cap, holds the main concave disc electrode; the arm on the opposite side, which holds the angled electrode, ends in a metal pear-shaped vessel, which has a side curved pipe running from top to bottom; there is a third side arm, at right-angles to the other two, which has a pipe at right-angles to it, and a wider pipe at right-angles to that again, for a regulator.

3606 NMC102 X-RAY TUBE - COOLIDGE

COOLIDGE X-RAY TUBE BTH REGD. TRADE MARK A 2082

L 585; SrD 174. Early 20 C. G.

Glass; central sphere; two long side arms; electrodes - angled silver metal ellipse and disc with short cylinder.

No side arms apart from the two main arms; there is a screw thread on one of the arms, with an ebonite and white metal screw fitting; the monogram has the "B" above the "T H".

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NATIONAL MUSEUM, DUBLIN - NMD

Kildare Street

Dublin 2

Telephone (01) 661-8811

Note: During the period of the compiling of the National Inventory, the collection at the National Museum has been dramatically increased and improved, most notably by the acquisition of the collection of instruments built up by Paul (who died in 1995) and Edith Egestorff. The improvement in the collection has also been assisted through a scheme set up by the Royal Dublin Society, by means of which commercial organisations sponsored the purchase of important Irish instruments; by the receipt of instruments from the collection of North Monastery School, Cork; and by the purchase or donation of instruments discovered during the Inventory work. The Egestorff acquisitions, the sponsored items, and the "North Mon" instruments, are identified in the relevant entries.

The collection is to be located in Collins Barracks, near the Phoenix Park.

2201 NMD215 AIR PUMP - DOUBLE BARREL

W. FRASER LONDON

W 413; H 485; LaBeJaH 287, D 220. Mid 19 C. G.

Mahogany base and four turned pillars to table; circular brass base for jar; handle and two ratchets for pistons.

Accessories include wide and narrow bell jars, plus an intermediate-size bell jar with a brass sleeve on top, magdeburg hemispheres, small plate on mahogany base, brass cylinder vessel with stop-cock on top, and brass vessel with brass stop-cock.

From the Egestorff Collection.

0914 NMD025 AIR PUMP - DOUBLE BARREL

ROBINSON & SONS DUBLIN

B 510x354x50; FrH 344; PD 255. 1885-1903. F.

Mahogany base; heavy brass plate, central screw knob; two brass pillars and two brass barrels; on top, mahogany frame.

Urn-shaped decorated tops above pillars; two ratchets raised or lowered into barrels with brass and wood handle; copper base to barrels; stop-cock between this and plate; screw knob to outside of copper barrel base; signature on brass plaque on base.

Dates from Morrison-Low 1989,133.

The instrument came to the Museum via Charles Mollan.

2464 NMD212 ALIDADE

CARY, LONDON

L c460; CL c490. Mid to late 19 C. G.

Brass; plane table; with double line and window sights; circle bubble level; variation compass; mahogany case.

From the Egestorff Collection.

3786 NMD181 AMMETER

GRAVITY AMMETER EVERSHED'S PATENT No 1080 DOBSONS & CURTIS BROS LTD DUBLIN

B 395x318x35; H 360; HsD 182&235. 1898-1901. F.

Mahogany base and vertical support for brass glazed cylinder housing; silvered scale face; arc scale 0-15.

There are two screw brass electric contacts below the cylinder housing.

Also an unsigned robust ammeter in a cylindrical metal casing with a glass top.

From the North Monastery Cork collection.

Dates from Morrison-Low 1989,123.

3625 NMD174 AMMETER

HANDLEY & SHANKS ENGINEERS CORK AMPERES RD. NO. 184776

BD 200; CyD 166, W 61. 1891. RD.

Brass base plate and glazed cylinder housing; white double convex arc scale 0-100; inside of glass stained.

The needle extends from a pivot behind a brass half disc (D40) on top of the face; behind the housing are two brass screw pillar electric contacts; a paper label on the back reads: "(INSTRUMENT No.) In fixing up this Instrument the Positive lead is to be connected to the left hand Terminal looking at the front of the instrument, and the pointer should be set at 0, when no current is passing.189..."

From the North Monastery Cork collection.

3626 NMD176 AMMETER

THOMSON AMMETER PATENTED MARCH 24, '91; JULY 16, '95; APRIL 2, 1901. NO.115128 TYPE H AMP.3 C.TRANS.10:1

B 215x150; H 193. 1901. S.

Blackened metal wedge-like housing; glazed arc scale.

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The white scale reads 0-30; the "THOMSON AMMETER" is stamped on a metal ribbon on the housing; the rest of the legend is on the scale, which has blank entries for "VOLTS", "PH.", AND "P.TRANS."
From the North Monastery Cork collection.

3393 NMD311 AMPERE GAUGE

LORD KELVIN'S PATENTS AMPERE GAUGE No1446 JAMES WHITE GLASGOW.

Hs 200x183x89. 1892-1900. R.

Brass glazed housing; coil outside on top; rod from centre of coil coupled to weighted device for needle.

The latter reads a white scale (non linear) from 0-120.

From the North Monastery Cork collection.

Kelvin was raised to peerage in 1892, Smith 1989,799; the firm became Kelvin & James White in 1900, Bryden 1972,59.

0624 NMD264 APOGRAPH

Invented & Made by W. & A. Smith. No 143 Sold by Mason Parliament St. Dublin

L 549. 1838-1840. W.

Brass; two arms and crossbar; in hinged mahogany case.

The case has a trade label: "From THOMAS MASON, OPTICIAN, (ESTABLISHED 1780), 5 DAME STREET, LATE 21 PARLIAMENT STREET, DUBLIN.", indicating that the instrument was sold again by Mason at the beginning of the 20th Century.

The instrument appears to be identical to one in the Royal Museum of Scotland, which is described there as an apograph, an instrument different from a pantograph or an eidograph, devised by Ayrshire inventor Andrew Smith in 1821.

From the Egestorff Collection.

Smith dates from Crawforth 1988,15.

0647 NMD243 ARMILLARY SPHERE

Lynch & Son, Dublin

D 445. 1808-1825. F.

Three mahogany bow legs on castors; brass; rings for horizon, Capricorn, Cancer, Arctic and Antarctic circles; blue centre-pivoted plate.

This fine instrument is basically a hollow representation of the Earth, showing the Equator (with a scale of hours), Tropics of Capricorn and Cancer, Arctic and Antarctic Circles, together with a horizon ring, all within a meridian ring (divided in degrees). In the middle is a pivoted blue-painted circular plate with compass directions. The angle of the whole sphere can be adjusted by sliding the meridian ring around its support above the tripod.

The instrument, as well as being a representation of the Earth, could also be considered a superior sundial, since it can demonstrate how different types of dial operate. It can, for example, illustrate the tilt of the earth (which is 23.5° from its plane of orbit around the sun) and what is meant by the equatorial alignment of the hour scale of an equinoctial dial, with its gnomon aligned to the Earth's axis.

From the Egestorff Collection.

Dates from Morrison-Low 1989,129; illustrated in Morrison-Low 1989,34.

3623 NMD175 ASPIRATOR - DOUBLE REVOLVING

Unsigned

Sp 327&295; MxH 915; VD 182&177. Late 19 C. G.

Iron trunnion frame to elliptical turning ring with sleeves top and bottom for two cylinder glass vessels.

In the centre of the ring is a glass joint with two pipes from the corks of each vessel, so that they can be connected or disconnected; at right-angles to the axis of this join is a short bulbous tube with a stopcock (cock missing), and rubber pipes extend from it through holes in the axis of the trunnions; on one side is a double handle, with turned wood right-angled ends, and a spring clip on the A cross of one trunnion.

A similar apparatus is illustrated in Ganot 1890,366, being used with a chemical hygrometer - that is an apparatus to determine the amount of moisture in air; the two glass vessels can in turn be used as aspirators, to draw air through the hygrometer; in use, the lower vessel is filled with water, and the upper with air; when rotated, the water falling into the lower vessel draws air through the hygrometer; by inverting again, the same volume is drawn through, and this can be repeated to draw through air in multiples of the volume of the vessels.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

1397 NMD047 ASTROLABE

Erasmus Habermel D. Francisci de Padoanis

W 180; L(+Ha) 240; PsD 146. 1582-1606. R.

Gilt bronze; octagonal; three plates; made for Dr Francis de Padoanis, Physician to Austrian Emperor Rudolph II.

Openwork rete incorporating three rings; inscription on back of disc under hanging ring: "D. Francisci de Padoanis Foroliuensis Medicinæ"; alidade with folding sights has screw at centre for wing nut on top of rule; latter extends to both sides of mater limb; the inscription was unclear in places but was deciphered with the help of the information on the Habermel dial illustrated in Christie 27:9:90,58-61.

Writing about the visit of the Scientific Instrument Society to Dublin in May 1990, Howard Dawes, Bull SIS 26,1990, 5, records: "...it was here [in the National Museum] that we were to discover perhaps the finest instrument of the visit: an eight inches diameter octagonal astrolabe signed Erasmus Habermelis on both sides. On the inside of the mater was engraved a Quadratus Nauticus. I was in-formed that this astrolabe is similar to one in Dieppe. This magnificent gilded instrument has been constructed with the spandrels of the octagon secured to a circular cast mater with a number of brass pegs, but it was so well made that even after some 400 years these were barely visible. There were three latitude plates, and the equinoctial point indicated that the instrument should be dated after 1582."

Christie 27:9:90,61 records: "From 1593, Erasmus Habermel held the appointment of Astronomical and Geometrical Instrument Maker to the Holy Roman Emperor, Rudolf II (1552-1612), at the Court in Prague. For many years before this Habermel had been making superb instruments in Prague, and with the supreme patronage he became one of the leading mathematical instrument makers of the age. His instruments are renowned for superb quality of workmanship, in particular the skills at engraving. Modern studies have shown that some 130 of his instruments are known - mostly being held in museums. Habermel died in 1606. Zinner [Astronomische Instrumente, Munich 1956, enlarged edition 1967] refers to 22 instruments made by Habermel that carry the name or coat of arms of the Italian physician, Franciscus de Padoanis (c.1542-after 1603). Several of these bear dates during the 1580s. An engraved portrait of Franciscus, dated 1603, was made by the Flemish artist, Aegidius Sadeler, who was appointed, in 1597, Imperial Engraver to the Court of Rudolf II.

This astrolabe is listed in Gunter 1932,Vol.2,454-6,Plate CXX, who had had received photographs of it from his friend Professor Henry. It was presumably then in private hands, as the National Museum is not credited: "The Face of the instrument shows all the features of the work of the master - the peculiar ornaments, the shaded degree division, the panelled bordering. The rim is graduated into the 24 hours numbered I-XII, I-XII and divided into quarters, within which is a circle of degrees numbered 0-90 in four quadrants." The rete is for 29 stars (which are listed). The outer Capricorn band, interrupted

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at two points, is present, and seven circles, or parts of circles, and two lateral S-shaped bands complete the design. The label is divided on one side for Declinatio Septentrionalis and Declinatio Meridionalis from the Equinoctial Circle. Museum records show that this instrument was transferred from the collections of the Royal Irish Academy in 1899. Zodiacal Gregorian calendar used gives post 1582 date; Habermal's dates were 1538-1606, Hambly 1988,21.

0611 NMD277 BACKSTAFF

Unsigned

R 30°; Ac 610; L c645. Early 18 C. PC.

Rosewood; boxwood arcs; eye vane and shadow vane replaced; graduated in degrees, 10 minutes, one minute.

60° arc 0° to 65° in degrees, 30° arc 0° to 25° in ten minutes, diagonal scale to one minute.

From the Egestorff Collection.

0707 NMD006 BALANCE - COIN

S. Gatchell Dublin

1791-1835. PC.

No further details; recorded in 1988; not found in return visit in 10:89.

Samuel Gatchell worked from 1791, and the firm became S. Gatchell & Sons in 1835 - Crawforth-Hitchins 1994, 1798

0672 NMD219 BALANCE - EQUAL ARM

GATCHELL & SONS DUBLIN

BmL 1190. 1835-1862. R.

Hardened knife-edge bearings; shackles and double hooks at ends; shears and pointer; pivoted arc and knob below.

From the Egestorff Collection.

Simon Gatchell's firm became S. Gatchell & Sons from 1835-1862, Crawforth-Hitchins 1994, 1798.

1408 NMD057 BALANCE - EQUAL ARM

[Trade label] Jas.. Pickering, No 73, Pill Lane Dublin. [See Trade Label entry 1407 NMD067]

C 255x117x32; BmsL 174&222; Pas 63&65.

1810-1834. R.

Pair; white metal beam; central pointer in shears; holding tassel; brass pans and weights; mahogany case.

Case with trade label inside lid; nine circular brass weights; four "APOTHECARIES WEIGHTS" 1 dram, 1 and 2 scruples, ½ scruple; two weights labelled "J*P" - "5 PWT*8 GRS" and "2 PWT*131/8 GRS"; one of other weights dated 1835 (may not belong); also nine rectangular weights, one heavy labelled "P:Wt.5"; strings hang from housed pivots, one set tangled.

There are several more metal beam scales (inc. L 294, 209 & 174), unsigned.

Dates from Crawforth-Hitchins 1994, 1831.

0719 NMD016 BAROMETER - BANJO

G. Bianchi, Cork

L 965; MxW 254; DID 198. Mid 19 C. G.

Mahogany; scroll top; silvered scales; hygrometer; thermometer; plain mirror; dial; spirit level.

Light wood border around mahogany frame; hygrometer disc 20-0-20; red spirit thermometer in glazed surround with round top, scale -20-120°; signature on brass disc around red spirit level at bottom.

4164 NMD137 BAROMETER - BANJO

W. GILBERT BELFAST.

H 1021; MxW 315. Mid 19 C. G.

Maple with scrolled ebony edging; rounded top and bottom; stem thermometer 0-130°; silvered dial 28-31".

The attractive grained maple contrasts with the ebony edging; the glazed mercury thermometer has a silvered scale and bowed glass; the glazed dial reads "Change FIAR SET FAIR Very Dry Stormy MUCH RAIN RAIN"; below the dial is a turned ivory knob; on the back is a hand-written note: "Send. Wm. G.M. Porter 10 Clare St. 29.12.37", and a trade card: "THOMAS H. MASON LABORATORY FURNISHERS 5 & 6 DAME STREET, DUBLIN."

Banfield 1991,91 lists William Gilbert & Son, clock and watch maker, Belfast, estimated dates 1830-60.

0716 NMD015 BAROMETER - BANJO

D. Milefsio, Dublin

L 930; MxW 257; DID 200. 1812-1825. R.

Mahogany; broken pediment top; silvered scales; red spirit thermometer 10-110°; barometer scale 28-31".

Marquetry decoration of flowers and shells; thermometer in glazed housing with round top; no hygrometer, mirror, nor spirit level.

Dates from Morrison-Low 1989,131.

0720 NMD017 BAROMETER - FITZROY

MASON ESSEX BRIDGE DUBLIN.

Hs 883x132x47. 1809-1883. A.

Mahogany glazed housing; J mercury tube; scales for rise/fall 26-31" X2; boxwood back thermometer 20-120°.

With printed instructions and remarks - e.g. "LONG FORETOLD LONG LAST, SHORT NOTICE SOON PAST." and "FIRST RISE AFTER LOW, FORETELLS STRONGER BLOW.", with "ADMIRAL FITZROY'S REMARKS".

Dates from Morrison-Low 1989,130-1.

0723 NMD020 BAROMETER - STICK

J. BUCKLEY DUBLIN

L 910; MxW 119. 1832-1859. F.

Mahogany; mother-of-pearl inlay; round top; glazed ivory scale 27-31"; thermometer; disc cistern cover.

Slide 1-10 along scale; key to move this gone; red spirit thermometer on stem with ivory scale 30-110° in glazed housing with round top.

Dates from Morrison-Low 1989,121.

4025 NMD133 BAROMETER - STICK

MADE BY J. McDONAGH, DEERPARK N.S., BOYLE. PATENTED 1912

H 988; MxW 128. 1912. P.

Oak base with mahogany frame; fluted ring top (replacement?); tube exposed; scale 1-11; cube cistern cover.

The fluted mahogany ring on top sits on the oak base and has a break at the bottom where the tube runs down to the cistern; a printed paper scale is pasted at the sides of the tube under the ring, with the curved heading "Improved Mod" (on one side) and "-el Barometer" (on the other) with numbers 11 (on top) to 1 (below) and the legend: "When the mercury stands high or rises, and especially when it continues to rise slowly for some days, good weather follows. When it is low or falls, bad weather

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ensues. A sudden fall indicates the approach of a storm."; the cistern is a wood cube (of side 40) with a printed paper signature label on the top and on one side; some of this is worn, so some of the patent number is missing but, from the British Patent lists, this can be completed as 734/12, referring to the application for a patent on the cistern arrangement on Jan 10, 1912 in Class 97(III); the Patent was accepted on Dec 19 1912.

The abbreviation of the Patent is as follows (referring to a diagram): "Barometric apparatus. - A cistern for mercury barometers consists of a block of wood having a cylindrical hole A therein provided with a bung B having two holes C, D therein. The barometer tube passes through the hole C, and the hole D, which is provided with a plug E, is used for filling the cistern and to allow escape of air. When the barometer is used as a weather glass, a hole H is provided to allow surplus mercury to escape and to give free access of air to the surface of the mercury in the reservoir." The complete specification was left on 17 June, 1912, The applicant was John McDonagh, National Teacher, Deer-park National School, Boyle, Co. Roscommon. Patent details supplied by Alison Morrison-Low.

This instrument came to the Museum via Charles Mollan.

0722 NMD019 BAROMETER - STICK

MASON ESSEX BRIDGE DUBLIN

L 935; MxW 115. 1809-1883. A.

Mahogany; round top; glazed ivory scale 27-31", thermometer on scale plate; hemispherical cistern cover.

Brass hemisphere support for top of tube; slide for scale 1-10 - adjust-knob from the side missing; knob below cistern housing to adjust mercury; glass/mercury thermometer - scales -10-130 and 10-40°.

Dates from Morrison-Low 1989,130-1.

0721 NMD018 BAROMETER - STICK

MASON, Essex Bridge, DUBLIN

L 985; MxW 120. 1809-1883. A.

Mahogany; tiered flat top; ivory scale 27-31", curved glass cover; stem thermometer; carved cistern cover.

Mercury glass thermometer with ivory scale 20-110° "FAHRENHEIT" and 0-30° "REAMUR" in glazed rect-angular housing - glass broken; wide flat cistern cover, with heart carved on top panel; slide 1-10 for scale, key to move this gone.

Dates from Morrison-Low 1989,130-1.

4157 NMD134 BAROMETER - STICK

Patent R. SPEAR, 27 COLLEGE GREEN Dublin

H 979; MxW 167. 1812-1837. A.

Mahogany veneer; ebony framing; flat top; silvered scale plate with glazed door; rectangle cistern cover.

The scale plate reads 27-31" and has a vernier slider with a brass knob and marker; it is labelled "Very dry Set Fair FAIR Changeable RAIN Mh.. Rain Stormy"; the flat top is wider than the scale plate and tapers to it; there is no thermometer on the shaft, which widens to the cistern cover; the casing tapers below the cistern cover.

The barometer was bought from Patrick Marney with funds from the Ulster Bank, via the RDS instruments sponsor-ship fund; previously, it had been sold at Sotheby's on 19:7:88, Lot 253.

Dates from Morrison-Low 1989,135 - and illustrated as the frontispiece to Burnett & Morrison-Low 1989,viii.

0913 NMD024 BAROMETER - STICK

Spencer & Son DUBLIN

L 945; MxW 99. 1864-1886. F.

Oak; round top with ivory scale 27-31"; red alcohol thermometer 20-120° and -10-+40° on scale plate.

Cistern cover missing; knob below cistern to adjust mercury.

Dates from Morrison-Low 1989,136.

This instrument came to the Museum via Charles Mollan.

3543 NMD146 BATTERY - BICHROMATE

Unsigned

BD 91; MxD 130; H 262; DiD 67. Mid to late 19 C. G.

Bulbous glass flask; cylinder neck to metal sleeve; on top, ebony disc to support graphite and zinc electrodes.

One of the two graphite electrodes is missing; between them is a brass rod leading to a replacement zinc plate at the bottom; the height of this plate can be altered using a brass sleeve with a screw clamp on top of the disc, which has two brass screw electric contacts, one to the zinc electrode and the other to the graphite electrodes.

From the North Monastery Cork collection.

1416 NMD065 CALENDAR - PERPETUAL

Kempson & Kindon, Birmingham 1808 (also 1799 & 1807)

D 39. 1808. S.

Four; bronze "nominal calendar medal"; grid with dates of Sundays on one side, new and full moon on other.

"Lent Mar 2 Easter day April 17 Holy Thursday May 26" information about eclipse, and much more; these details for 1808.

There are also calendars for 1799, 1807, with another whose date can't be seen as there is a hole on the medal at that point.

1415 NMD064 CALENDAR - PERPETUAL

John Powell, Birmingham 1769

D 39. 1769. S.

Gilt bronze "nominal calendar medal"; dates of Sundays on one side; new and full moon dates on other.

Much more information - e.g. "Kings Birthday June 4 Accef Oct 26 Coro Sep 22 Pr Wales Born Aug.12"; dates of Holy days; term dates "Hilary Term Ian 23 to Feb 12 Eatfer [sic] Apr 12 to May 8".

2960 NMD200 CALLIPER - ROPEWORK

BELFAST ROPEWORK COMPANY LD D1A

MnH 117; W 46. Early 20 C. G.

Brass bound boxwood; brass slide with arm divided 1-12 (1 div.=8mm) and 1-3 inches; various figures on boxwood.

Thirteen sets of figures include "CIRCUM", "SHROUD TARE HEMP COILS 120PM", "LAID MANILLA COILS 120PM", on one side, and "WIRE CIRCUM", "HEMP SIZE", AND "CHAIN" on other.

From the Egestorff Collection.

1413 NMD062 CAMERA LUCIDA

Unsigned (attributed to Mason)

MnL 424. Mid to late 19 C. G.

Brass; G-shaped table clamp; shaft and draw tube; prism system and hinged window in oxidised brass housing.

A card with the instrument attributes it to Mason, but the actual instrument is unsigned - perhaps it came in a case with a Mason label?;

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Historical Technology 106,1973,184 notes that the camera lucida was one of the optical fore-runners of the photographic era, and was used by an artist sketching in the field - he obtained an apparent projection of the image on a horizontally mounted paper, which could then be traced.

3744 NMD167 CHEMICAL FLASKS

Unsigned

H 245&260; MxD 103&103; MnD 53&53. Mid 19 C. G.

Pair; heavy glass; curving cylinders with rounded bottoms and smaller open ends.

The shorter one has a bulbous bottom; the longer is ground on the outside of its opening.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

4179 NMD140 CHEMICAL FLASKS - CYLINDER SHAPED

Unsigned

BD 100, H 205; BD 99, To D72, H 220; BD 86, D 51, H 255. Mid 19 early 20 C. G.

Three with closed bottoms - top and bottom-side openings; wide open top; disc base, bent side arm at top.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

4180 NMD139 CHEMICAL FLASKS - GAS COLLECTING JARS

Unsigned

H 155-305; D 70-92. Late 19 early 20 C. G.

Five; four tall cylinders, with strengthening rings at top and bottom; one is a tall bulbous shape with top ring.

All are closed at one end and open at the other; they are used by filling with water and upending above a beehive shelf in a trough part-filled with water - the gas is bubbled in under the shelf displacing water in the flask, which is then covered with a glass disc to retain the collected gas. From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3645 NMD169 CHEMICAL FLASKS - ROUND BOTTOMED

Unsigned

MxD 143-205. Mid 19 C. G.

Collection of five large spherical glass flasks with a variety of inputs and outputs.

One (MxD205) has an input neck on top and a tapering pipe at the side; one (MxD143;H305) has a long thin cylinder neck ending in a lip, and two openings at the sides of the sphere; two (MxD173&180) have an input neck on top and a side opening with a lip; one (MxD151) has three openings of various sizes, two with lips.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3766 NMD159 CHEMICAL FLASKS - TEST TUBES

Unsigned

BD 49-76; H 124-236; D 19-69. Mid to late 19 C. G.

Eight; glass; on disc bases; five in the shape of cylinders, two with conical tops, one with bell-shaped top.

All but one (the narrowest cylinder) have pouring spouts.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3771 NMD156 CHEMICAL GLASSWARE

Unsigned

Various sizes. Mid 19 C to early 20 C. G.

Variety includes spiral tubes, spheres with tapering arms; small round-bottomed flask; three bubble tubes.

The spirals are made from tubing of D9; the spheres with the tapering side arms have D80&83; the round-bottomed flask (D80) has openings at 12.00 and 2.30 o'clock, each with a lip; the bubble tubes (H124,D24) are in the shape of cylinders with two tubes, one at the top, and one extending to the bottom of the cylinder.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

4178 NMD141 CHEMICAL RETORTS

PYREX MADE IN ENGLAND

L 315-345; W 140-150. Early to mid 20 C. G.

Nine; glass; all but one with opening above bulb; seven with ground opening, one unground.

The four most modern are labelled 250ml, with the opening labelled 19/17; three have the opening labelled C.19; one, older and smaller, is also marked C 19.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3643 NMD171 CHEMICAL RETORTS

Unsigned

L 340,410,445,565; W 215,140,260,215. Mid 19 C. G.

Four; glass; two with vents above bulb, two without; one (L340) with a metal sleeve with a screw thread on the end of its tube.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

4172 NMD145 CHEMICALS - SET

Unsigned

C 240x103x45. Late 19 C. G.

Leather-covered case with tray, lined with purple velvet, holds 42 glass vials containing chemical elements.

A few of the vials are now empty; the labels read: Argent Pulv, Argentum Fus, Aurum Fus, Aurum Pulv, Barium, Bismuth, Borium, Cadmium, Calcium, Cerium, Chromium Fus, Chrom Pulv, Cobalt, Cuprum Fus, Cuprum Red, Erbium, Ferr Hyd Red, Hydrargyr, Indium, Iridium Fus, Iridium Pulv, Lanthan, Magnes Pulv, Mangan Fus, Osmium, Pallad Fus, Pallad Pulv, Platin Pulv, Plumb, Rhodium Pulv, Rhodium Fus, Rubidium, Ruthenium, Selenium, Stibium, Tantal, Thallium, Thorium, Titan, Uranium, Vabadium, Wolfram.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

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4176 NMD143 CHEMICAL TEST PLATES

SILEX MADE IN ENGLAND (on larger plate)

80x80x5; 119x93x10. Early 20 C. G.

Eight small and one larger porcelain test plates, the smaller with nine depressions, the larger with twelve.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

0708 NMD007 CHONDROMETER

(made &) Sold by R. SPEAR, 27, College-green, Dublin.

C 245x75x59; PaD 53, H(-Ha) 36. 1812-1837. A.

Grain balance; mahogany case; hinged support for brass scale arm, sliding weight; pivot; arm for pan support.

Scale 16-72 indicates weight of eight gallon bushel of grain; white metal arm ends in swan neck to which is attached semicircular handle for cylindrical grain pan; instructions pasted on inside of hinged lid; words "made &" added in handwriting before the rest of signature.

Dates from Morrison-Low 1989,135.

0616 NMD272 CHRONOMETER - MARINE

Richard Hornby, Liverpool, No. 734

FD 89. 1814-1851. W.

Brass-bound mahogany case; glazed brass housing in gimbal mount; Earnshaw spring detent escapement.

Up and down dial at XII, seconds dial at VI hours; two day movement.

From the Egestorff Collection.

Dates from Crawforth 1988,10.

3651 NMD116 CIRCUMFERENTOR

Alment Dublin Fecit.

L 196; D 136; SOD 131, ID 115. 1767-1788. F.

Brass; two side lugs, no sights; lower scale 10-80°(X4); upper ring scale 10-360°; needle gone; no glazing.

The circular base plate, incorporating the two lugs, numbered "6" (or "9") and "5", is screwed to the upper ring scale with six screws; the compass rose has seven marked star points, plus a fleur-de-lys; three holes on the base, the largest now soldered up, presumably originally held the needle clamp; the central needle spike is of thick iron (D5) and rises above the level of the top of the ring scale; the base plate is a little wider than the ring, and presumably held the missing ring support for a glass cover.

Purchased in 1990, via the Royal Dublin Society instruments fund, from Dominique Brieux, Paris, through donations from Allied Irish Banks and Tara Mines.

Dates from Morrison-Low 1989,120.

0715 NMD014 CIRCUMFERENTOR

BUCKLEY DUBLIN

L 217; HsD 162. 1832-1859. F.

Glazed brass housing; silvered scales 10-80-10-80-10 and (upper) 10-360°; two spirit levels; needle clamp; lid.

Lugs at sides of dial for missing sights; knob below for needle clamp; jewelled needle bearing; spirit levels at right-angles on face.

Joseph Buckley was at 14 Lower Sackville Street from 1832-1859 - Morrison-Low 1989,121.

1115 NMD314 CIRCUMFERENTOR

Tho: Cave Dublin Fecit

D 92. 1729-1749. FL.

Brass; compass only; glazed circular case with turned lid; "Eaft" and "Weft" reversed; scales 10-360°, 0-90-0-90-0°.

The compass has a fleur-de-lys at North and seven other points, with a central floral pattern; the two scales are at right-angles to each other, the upper, horizontal one being 10-360°; the needle has a point at one end and a small circle at the other; underneath the housing is a rectangular U-shaped indent for a missing slide-in component, pre-sumably the sights and the provision for tripod support.

This is much smaller than other circumferentor comp-asses found so far, and it never had a needle clamp; it is in a fine state of preservation, especially for its age.

It was presented to the National Museum by Captain Owen Deignan, Inspector of Lights for the Commissioners of Irish Lights, via Charles Mollan, in April 1995.

Dates from Morrison-Low 1989,122.

0912 NMD023 CIRCUMFERENTOR

Thos: Cave Dublin Fecit

D 142; L 205. 1729-1749. FL.

Brass face and scales; side lugs; agate bearing; knob at back for needle clamp; glass top; turned brass lid.

Vertical scale 0-90-0-90-0° and horizontal scale 10- 360° around compass face; the needle clamp has curled ends screwed to the face; there is no bracket underneath; the face was originally silvered, but only traces of the silver remain; seven compass points are marked "WEST SOUTH EAST" and "NW SW SE NE", with a fleur-de-lys at North; the sight lugs are inscribed "5" and "6".

Dates from Morrison-Low 1989,122.

0714 NMD013 CIRCUMFERENTOR

Mason No-6 Essex Bridge Dublin.

D 163; L 463. 1827-1844. A.

Brass; sighting arms; no sights; silvered face/scale; two spirit levels; agate bearing; glass top; no lid.

Lugs on instrument attached to sighting arm with two screws having curled U-shaped tops; two more of these are present for missing sights (one damaged); lower scale 10-80-10-80-10°; upper 10-360°; brass spirit levels at right-angles; knob underneath for brass spring clamping device to needle with curled ends screwed to face; screw holes below for stand bracket, but no bracket present.

Dates from Morrison-Low 1989,130.

2372 NMD077 CIRCUMFERENTOR

ALEX. MEGAREY New-York (C.G. King Trade Label)

L 352; DID 148; C 359x184x77. 1841-1858. F.

Brass; two spirit levels at right-angles; silvered compass face; horizontal scale only 0-90-0-90-0°; sights.

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Glazed; vertical double sights screw on to extensions at the sides of the dial; below is a sleeve with a clamping screw into which fits a lug from a universal ball joint which, in turn, would have been connected to a stand; in mahogany case with trade label for C[?] G. King of Boston.

Bought from Tesseract.

Alexander Megarey (1790-1850), Irish born, was listed in New York 1827-1850, Historical Technology 114,1977,200 Trade Label reads: "C.G. KING, No. 7 Broad, third Store from State Street, Boston, Importer and Manufacturer of Mathematical, Nautical, Surveying, AND GAUGING INSTRUMENTS, NAUTICAL BOOKS, CHARTS, &C. Personal attention paid to the Repairing of Instruments in the above branches. Dickinson Printing Establishment, 52 Washington St., Boston, Damrell & Moore."

Presumably he was the son of Gedney King (1777-1839) who had established a business in Boston by 1800, and advertised in 1822, Warner 1989,104.

Harvard University has a circumferentor by Mason, Essex Bridge, Dublin, with a similar Trade Label (5158).

Charles Gedney King (1808-1858) worked on his own in Boston 1841-1858, Tesseract 21,1988,34.

2371 NMD076 CIRCUMFERENTOR

Seward Dublin

L 209; DID 125. Early to mid 18 C. PC.

Brass; leaf decoration on rose centre; eight-point comp-ass; scales 0-90-0-90-0 & (upper)10-360°; incomplete.

Lugs (numbered 5 and 6) at sides of dial housing, but no sights; needle gone, but pin and clamp remain; first scale on vertical edge of dial, second on horizontal edge above this.

John Seward was apprenticed to Gabriel Stokes on 8:7: 1717 - W. Stuart, King's Hospital Archives.

0640 NMD249 CIRCUMFERENTOR

SPEAR. COLLEGE GREEN * DUBLIN * [Owner's name on case] C. Mulvanny C.E.

CpD 162; L 457; C 570x199x186. 1812-1837. F.

Brass; detachable slit and window sights on long arms; two scales, two spirit levels, and needle clamp, on face.

Parts held together with butterfly nuts; sleeve below for stand; silvered scales - lower 10-80(x4), upper 10-360°; seven point and fleur-de-lys compass on face; lid and tripod in brass-bound oak case.

A note with the instrument records that C. Mulvanny is listed in the Civil Engineer's Register as practising in Mary's Abbey 1841.

From the Egestorff Collection.

Dates from Morrison-Low 1989,135.

2640 NMD112 CIRCUMFERENTOR

Walker * Dublin 1797 R.F. Daly[?]

HsD 164. 1797. S.

Brass; two side lugs but no sights; silvered glazed face; lower scale 10-90-0-90-10°; upper scale 10-360°.

Seven compass points marked, plus fleur-de-lys; crossed spirit levels on face; needle clamp with curved ends, and a screw at the back; brass lid; a name, which may be "R.F. Daly" is inscribed, and hatched out, under the fleur-de-lys.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

2639 NMD113 CIRCUMFERENTOR

Walker & Son, 17. Temple Barr DUBLIN. William Stokes

HsD 143. 1805-1819. F.

Brass; two side lugs but no sights; silvered glazed face; lower scale 10-80-80-10-10-80-80-10°; upper 10-360°.

Seven point compass star, with "E", "S", and "N" marked, and fleur-de-lys, with "William Stokes" engraved in italics under it; crossed spirit levels on the face; needle clamp with curved ends, and a screw at the back; glass cracked; brass lid.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instrument fund (anonymous donation).

Dates from Morrison-Low 1989,138.

2638 NMD114 CIRCUMFERENTOR

Walker & Son No.17 Temple Barr DUBLIN 1802

HsD 143. 1802. S.

Brass; two side lugs but no arms; silvered glazed face; lower scale 10-90-0-90-10°; upper scale 10-360°.

Seven compass points marked, "EAST", "SOUTH" and "WEST" in full, plus fleur-de-lys; no spirit levels on face; needle clamp with curved ends, and screw at the back, but no needle; brass lid.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

2465 NMD115 CIRCUMFERENTOR

Walker & Son 16½ Temple Barr DUBLIN

CoHsD 141; W 466. 1805-1819. F.

Brass; alidade with double sights; silvered glazed face; mahogany tripod stand with universal ball-joint.

Alidade and sights secured with butterfly nuts; needle clamp with curved ends; lower scale 10-80(x4); upper scale 10-360°; no spirit levels on the face.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

Dates from Morrison-Low 1989,139.

1399 NMD049 CIRCUMFERENTOR

Walker. & Son. No.17. Temple Barr. DUBLIN.

L 460; D 160. 1805-1819. F.

Brass; attached to alidade divided 1-17 inches; worn silvered face; lid; glass cover and needle gone.

Lugs on sides of compass attached to alidade with one screw having U-shaped top (other missing); alidade in turn attached to sleeve for stand by similar screws; scales, lower 10-80-10-80-10°, higher 10-360°; needle clamp ending in curves screwed to face, knob at back; turned lid signed: "James Vaughan Land Surveyor Athboy".

Dates from Morrison-Low 1989,138.

0713 NMD012 CIRCUMFERENTOR

Walker: & Son. No. 17. Temple-Barr. DUBLIN. 1807.

D 141; L 459. 1807. S.

Brass; line and window sights; silvered face and scales; ruby bearing; glass top; lid; stand sleeve below.

"Hugh Robinson 1807" on face; "Andrew Robinson Fintona" scratched inside lid; sights attached to sighting arms with screws with curled U-shaped tops; lugs attached to sighting arm with normal screws; top scale 10-360°, bottom 10-80-10-80-10°; knob below for brass needle-clamping device ending in curves screwed to face; two more U-topped screws secure instrument to sleeve below for stand.

William Walker & Son were at 17 Temple Barr from 1805-1819, Morrison-Low 1989,138.

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0642 NMD247 CIRCUMFERENTOR

J. WHITE, 95, Buchanan St. GLASGOW

CpD 168; C 255x212x158. 1864-1868. A.

Brass; glazed compass; raised scale near rim 0-90-0-90 -0°; face scale 10-360°, vernier; hinged tube sights.

Circular bubble level on face; quadrant and extra sights for altitude readings; vernier divided 0-20 and 0-50 on radial arm from centre of face; sleeve with clamp below for stand; mahogany case. From the Egestorff Collection.

Dates from Bryden 1972,59.

0641 NMD248 CIRCUMFERENTOR

JAMES WHITE, GLASGOW

CpD 168; C 240x212x111. 1850-1900. F.

Brass; glazed; folding double line and window sights, one with quadrant and extra sights for altitude readings.

Two circular bubble levels on face; scale around rim 10-360°; scale on face 10-360° with vernier 10-60 on radial arm from centre of face; mahogany case has a trade label: "BY APPOINTMENT TO THE UNIVERSITY [crest] VIA VERITAS VITA KELVIN & JAMES WHITE, LTD.. Mining & Surveying Mathematical & Philosophical INSTRUMENT MAKERS ONLY ADDRESS [only address in red] 18 CAMBRIDGE STREET, GLASGOW."

From the Egestorff Collection.

Dates from Bryden 1972,59.

0643 NMD246 CLINOMETER

Newton & Co., 3 Fleet St., London

L 152. Late 19 early 20 C. G.

Boxwood and brass; scale of degrees at hinge; inset compass; pin-hole and cross hair sights; two spirit levels.

From the Egestorff Collection.

0644 NMD245 CLINOMETER

Watkins & Hill, Charing Cross

L 127; AR 51. 1805-1856. F.

Brass; open pin-hole sights; spirit level; quadrant arm with two inch radius; case with red velvet lining.

From the Egestorff Collection.

Dates from Turner 1989,226 and Chaldecott 1989,161.

3403 NMD111 COMPASS

PAT. No 1010[?]/15 DIXON & HEMPENSTALL STATE OPTICIANS 12, SUFFOLK STREET DUBLIN.

HsMxD 52, W 21. 1915. P.

Brass hinged cylinder housing; scales 1-35 & 20-360°.

The scale 1-35 is fixed to the housing under the glazing; the 20-360° scale is on the rotating indicator disc, which has an arrow at the "N" position, seven other compass points marked, and can be clamped with a slide knob at the side of the housing; the hinged brass top has a disc window (D21) with a diameter line, and the inscription: "CAPT. C.J. HUGHES 4TH..BN. THE CONNAUGHT RANGERS" on top.

2466 NMD211 COMPASS

J. Ronchetti, Optician, Manchester, [latter ", " sic]

Hs c155x150. 1817-1841. F.

Hinged mahogany case; glazed compass face; folding brass line and window sights plus a hole with cross wires.

Eight cardinal points marked; scale around circumference of white face 10-360°.

From the Egestorff Collection.

Goodison 1977,354 lists Joshua Ronchetti from 1817-41.

1403 NMD053 COMPASS

Unsigned (?)

D 45; H 22. Late 19 C - Acquired 1888.

Japanese chatelaine; brass and silver metal; glass top on compass at one side; rod gnomon in indent on other.

Gnomon at centre of curved circular dip; both sides engraved with characters; accession date 1888.

Similar instrument illustrated in Sotheby 14:4:1988.

1412 NMD061 COMPASS - GEOMANTIC

Unsigned(?)

D 287. 19 C. G.

Small central compass needle above silver disc; wood surround with Chinese characters; for divining use.

Glass in wood ring above compass needle cracked;

Historical Technology 133,1990,152 notes that a rather similar instrument was not intended for use as a compass - the north-south alignment was to place the user in the proper frame of mind for making predictions of events associated with the earth, such as erecting buildings, and planting.

1411 NMD060 COMPASS - GEOMANTIC

Unsigned(?)

D 145. Pre 1890. G.

Small central compass needle above ivory disc; wood surround with Chinese characters; for divining use.

Red line bisects ivory disc below needle; glass in brass ring on top; acquisition date 1890.

2961 NMD199 COMPASS - MARINE

Unsigned

HsH 41, D 59. Mid to late 19 C. G.

Miniature; brass cylinder housing with lid; bowl on two ring gimbal; black and white ivory disc rose, 32 points.

Scale around edge of rose 0-90-0-90-0°.

From the Egestorff Collection.

4162 NMD135 COMPASS - SURVEYING

* Lynch * Dublin

D 93; H 29. Late 18 early 19 C. G.

Brass; glazed case and lid on three turned legs; decorated face; scales 10-360° and 10-80°(x4); needle clamp.

The decoration consists of a fleur-de-lys plus seven decorated triangles; the vertical join between the upper and lower scales is divided to correspond with the divisions on the two scales; a knob at the back of the case works the needle clamp; the

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needle has an agate bearing; the turned lid has concentric circles.
Bought via the Royal Dublin Society instruments fund by Irish Shell in 1992.

0653 NMD237 COMPENDIUM

Unsigned

102x102. c1600. PC.

Brass; side one, equatorial plate with pig gnomon; two, simplified astrolabe; three, compass; four, index arm.

Side one includes a solar-lunar volvelle and aspectarium; side two astrolabe has rising, setting and twilight lines for latitudes 45° and 48°; side three compass has painted paper rose surrounded by four quadrants of 0-90° and twice 12; side four includes a quadrant scale and shadow square. From the Egestorff Collection.

4177 NMD142 CRUCIBLE WITH PIERCED BASE

Unsigned

H c45; MxD c25. Early 20 C. G.

Conical porcelain crucible with holes in its base - for analytical use, filtering, drying, and weighing.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

0401 NMD031 DIAL - ALTITUDE RING

Unsigned

D 53; W 11. Early 20 C. PC.

Reproduction; brass ring; hole on central slide on circumference; months on outside and hours on inside.

Hole can revolve 130°; divisions on outside JFMAMJ and JASOND; inside 1234567 and 567891011 with central 12; identified as an early 20 C reproduction (by Thomas Barker) of 18 C instrument - J. Collins (PC 5/90).

0659 NMD231 DIAL - ANALEMMATIC

Anton Thompson fecit

226x146. 1645-1665. R.

Brass; plate bears normal dial with inclined gnomon, and analemmatic dial with vertical gnomon over calendar.

The replaced vertical gnomon moves over a zodiac calendar scale - it is set to the date and the plate is then turned until the shadow on each chapter ring is indicating the same time.

Historical Technology 106, 1973,74 notes: "The analemmatic dial has a movable (vertical) gnomon attached to a cursor which slides along the minor axis of the horizontal elliptical plate and can readily be set for any date.

It is usual to see the analemmatic dial combined with a simple horizontal dial, and this double instrument is able to be correctly oriented to the Sun without recourse to exact knowledge of the position of the observer's meridian simply by turning the plate in the horizontal plane until the analemmatic dial and the horizontal dial each read the same hour."

From the Egestorff Collection.

For other dials see Christie 14:12:89 Lot 169, Bryden 1988, 41.

Dates of Anthony Thompson from Clifton 1995,276.

0668 NMD222 DIAL - CYLINDER

A PARIS, HENRY ROBERT, HOROLOGER, AU PALAIS-ROYAL NO 164.

H c120; D c30. 1830-1865. F.

Boxwood with a printed paper scale for a latitude of 48°; white metal gnomon at right-angles on top.

Dominique Brioux notes another wood pillar dial for latitude 47° signed "Henry Robert, Horologer au Palais Royale à Paris" (illustrated) c1840, Bull SIS 19,1988, 21.

From the Egestorff Collection.

Clutton 1982,583 gives Henri Robert (Bri), chronometer maker, 1830-1865.

0658 NMD232 DIAL - DIPTYCH

Two crowns (Mark of Reinmann or Lesel workshops)

114x76. 1579-1608. R.

Nuremberg; ivory; sides - compass rose, scale of days and list of latitudes, compass, solar-lunar volvelle.

The compass rose on side one has index and weather to be expected; side two has scale of the length of days and list of towns with their latitudes; the compass on side three has an easterly variation line surrounded by hour lines for five latitudes, and two scaphes for Italian and Babylonian hours; the solar-lunar conversion volvelle of side four is surrounded by Julian and Gregorian epochs.

Howard Dawes, Bull SIS No.26,1990,5 attributes the dial to Paul Reinmann c1600.

Penelope Gouk (1988,60&54) records that Hieronymus Reinmann (W1554-1566), Paul Reinmann (W1579-1608), and Michael Lesel (W1612-1629) all used the crown mark.

From the Egestorff Collection.

3686 NMD132 DIAL - EQUATORIAL

JOHN KNAPP CORK Anno Dom 1724

BD 397 (12"); AcsOD 211 & 230. 1724. S.

Bronze; base plate with compass rose; two arcs - half meridian circle with diagonal gnomon plus hours half circle.

The circular base plate has an inscribed compass rose (D213) from close to one edge, with eight points marked; below this is the inscription: "I Ftand amid ye Fvmme flowref To tell ye paffing of ye hovref" within a double scroll decoration; and below this again the date; the centre of the compass rose holds a half circle, corresponding to part of the meridian circle of an armillary sphere, and a rod across the ends of this, at an angle of c53° to the base, acts as a gnomon, whose shadow falls on another half circle at right-angles to the meridian circle, which has hours VI-XII-VI inscribed on its inside.

Allan Mills, in the British Sundial Society Bulletin, 92.2, p.21, describes this type of dial: "One of the simplest of sundials to understand is the equatorial dial, where a cylindrical surface co-axial with the pole-directed gnomon acts as the receiving surface for its shadow, and so gives rise to uniformly spaced hour markings at 15° intervals."

John Burnett (personal communication 26:2:92) reports that Knapp issued almanacs at Cork in 1723 and 1724, and subsequently at Dublin: he was still publishing mathematical books in the late 1730s. There is a Knapp's Square in Cork, just off the quays, which was laid out in the early 18th century, though none of the original buildings survive.

Unfortunately, this has been identified as a "RAGING FAKE" by Professor Gerard Turner (PC 6:7:95) - such a pity!

For details of armillary spheres, see Waugh 1973,178.

0725 NMD022 DIAL - HORIZONTAL BUTTERFIELD

Butterfield AParis

L 81; W 70; CpD 35. 1677-1724. FL.

Brass; elongated octagonal; inset compass; folding gnomon with bird beak indicator; red scale 30-50.

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Hours outer IIII-XII-VIII, inner V-XII-VII; also arabic numbers corresponding to roman hours; at end, numbers 52/49; glass cover on compass; on back, latitudes of European cities - not including Dublin.
Dates from Bennett 1987,76.

2368 NMD073 DIAL - HORIZONTAL COMPASS

J. BAUM & CO BIRMINGHAM PATENT BIRMINGHAM 1875

B 61x44; Dd 14; H 30. 1875. S.

Gilt brass; folding - central hinge; solid gnomon 45°; hours 5-12-4; small inset compass dial, eight points.

Example missing compass in Whipple Museum, Bryden 1988,9, dated 1875 - no British Patent has been found.

0664 NMD226 DIAL - HORIZONTAL COMPASS

Edwd Clarke, Lower Sackville St. Dublin

D 92. 1810-1821. A.

Brass; glazed cylinder case and lid; compass under silvered chapter ring and arc support for folding gnomon.

Latter open with S insert; for latitude of Dublin.

From the Egestorff Collection.

Dates from Morrison-Low 1989,122.

1402 NMD052 DIAL - HORIZONTAL COMPASS

Unsigned

D 57; H 18. Early 19 C. G.

Brass drum with screw lid; compass with hand-coloured rose and cracked glass; open work top; folding gnomon.

Compass scale 10-80-10-80-10; hours IIII-XII-VIII; gno-mon angle 47-48°, not adjustable; accession date 1891.

0665 NMD225 DIAL - HORIZONTAL COMPASS

Unsigned - French

76x70. 18 C. PC.

Brass; octagonal base; latitude 48°; folding gnomon; compass adjust for variation; in leather-covered case.

From the Egestorff Collection.

0652 NMD238 DIAL - HORIZONTAL COMPASS

Unsigned

146x130. c1750. PC.

Brass; semi-circular extension for compass; split gnomon adjustable for region of 50°; three level screws.

Rubricated chapters and border; diagonal divisions to one minute; needle replaced.

From the Egestorff Collection.

0663 NMD227 DIAL - HORIZONTAL COMPASS (MAGNETIC)

C. ESSEX & CO., London

D 70. 1824-1828. W.

Turned ebony housing with lid; gnomon on "floating card", with fixed ring for relative world times.

Hour lines for London on floating card.

From the Egestorff Collection.

Dates from Crawforth 1988,8.

2369 NMD074 DIAL - HORIZONTAL COMPASS (MAGNETIC)

Unsigned

HsD 50, H 29; DID 38. Mid to late 19 C. G.

Turned wood housing with lid; cardboard disc with hours IIII-XII-VIII and 16 compass points; gnomon 49.3°.

Latter of metal, with ability to pivot slightly away from vertical; printed paper inside lid with months giving "Slow" and "Fast" details for dates during each month of the year; "FAST" means the Clock should be Faster than the Dial. SLOW SLOWER"; the dial card does not rotate, but is secured to the bottom of the case; perhaps it is designed to float on water, when it would presumably orient itself?

2444 NMD093 DIAL - HORIZONTAL PEDESTAL

(for Call Bedig, Aug. 26th, 1812 John B-)

D 347; Sis 140; W 10. 1812. S.

Dark grey slate; octagonal; copper triangle gnomon; compass; hours IV-XII-VIII; (Reg.F1969:129, Daingen).

(Source: Townland Plakarauka; Parish Grean; Barony Coonagh; Co. Limerick); nine concentric inscribed circles (D322-32), with divisions from hours to five minutes; one band has ten minute sections labelled with Arabic numerals 10,20...60; central eight-point compass card arrangement; gnomon hollow, with S-shaped strut.

Note: brackets around signatures in the above and later entries mean that the signatures have not been seen.

4244 NMD193 DIAL - HORIZONTAL PEDESTAL

(PR)AY FOR TERRENCE BENNET 1748)

No measurements available. 1748. S.

Double circle; lines radiate from central hole; hours "5 a.m. to 8 p.m."; from Killbay, near Kells.

Recorded by Mrs Gatty (1900,85) as being in the "Dublin Museum".

2434 NMD084 DIAL - HORIZONTAL PEDESTAL

(CONSTRUCTED BY PAT COLLINS LAT 53 10 N)

MxD 266; W 5. Mid 19 C. G.

Blue slate; octagonal; gnomon gone; hours IV-XII-VIII; (Reg.F1961:45, Daingen).

(Source: Townland Cregduff; Parish Annaghdown; Barony Clare; Co. Galway); inscribed with four concentric bands, the outer having D220, with divisions into hours, halves, quarters and eighths.

1400 NMD050 DIAL - HORIZONTAL PEDESTAL

Lat. 52°-45' Revd Thoms Dawson 1745 Fecit

B 285x265; DI 265x251; H 200. 1745. S.

Mahogany base; brass; open-work gnomon with R-shape incorporated, angle c53°; hours IIII-XII-VIII.

"Fecit" scratched after signature in unfinished state; 12 divisions between hour marks on face.

If indeed Irish, it has been made for a location somewhat south of Dublin if the Dublin Latitude taken as 53°23' (established certainly by 1814 - Wayman 1987a,150).

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2441 NMD090 DIAL - HORIZONTAL PEDESTAL

(Ja Duffy)

300x300x10. Mid 19 C. G.

Dark grey slate; gnomon gone; hours 4-12-8; double line edging; (Reg.F1967:173, Daingen).

(Source: Townland Ballincara; Parish Kilcleagh; Barony Clonlunan; Co. Westmeath); outside lines 9mm apart; within this frame are four concentric circles (D267-210), with the hour numbers between the outer two, and the others divided into halves, quarters and twelfths; N E S W inscribed within the outer square lines; decorations at two corners.

2459 NMD086 DIAL - HORIZONTAL PEDESTAL

(EN) (or EH)

225x230x17. Mid 19 C. G.

Stone; octagonal; gnomon gone; hollow centre; seven incised circles; hours 4-12-8; (Reg.F1932:144, Daingen).

(Source: Townland Hacketstown; Barony Rathvilly; Co. Carlow); corner damaged; hours and minutes marked by radial lines across the seven concentric circles; two diameter straight lines have two central holes for missing gnomon; underside has letter "E" and lower part of either "N" or "H" inscribed.

2370 NMD075 DIAL - HORIZONTAL PEDESTAL

James Farrell Sculptor Longford. General Horizontal Sun Dial. North Latitude 53 Degrees 40 Minutes.

L 403; MxW 279. 1846 [MDCCCXLVI]. S.

Slate; gnomon gone; hours IIII-XII-VIII; inscriptions.

Central compass with eight points; outside this, towns inscribed around circle - including Galway, Tralee, Limerick, Bandon, Headford; outside this, degree scale 10-90-0-90-10; then decoration to hours scale, each hour with 20 divisions; on an extension is an extensive list of towns with time corrections - e.g. "At Rome half past 10. At Honduras half past 6."

The full list of Irish towns on the circle outside the compass is: "Lifford, Tory Isle, Sligo, Belclare, Killala, Foxford, Headford, Galway C, Galway B, Shannon At, Tralee, Limerick, Bandon, Corke, Youghal, Carrick, Waterford, Wexford, Carlow, London, Belfsington, Dublin, Whiteheart, Drogheda, Dundalk, Portpatrick, Antrim, Fairhead, Coleraine".

Purchased from Christie 29:6:89, Lot 157 (p.30)...

0702 NMD001 DIAL - HORIZONTAL PEDESTAL

Jno. Fawcett MAKER DUBLIN

170-170. 1775-1793. F.

Brass; octagonal; gnomon missing; hours IIII-XII-VII; eight compass points.

Dates of John Fawcett from Morrison-Low 1989, 124.

2440 NMD089 DIAL - HORIZONTAL PEDESTAL

(Constructed by Patt Fineran. May 6th 1846. N. Lat 53 23")

MxD c240. 6:5:1846. S.

Slate; octagonal; gnomon gone; central 16-point star; hours IV-XII-VIII; (Reg.F1964:134, Daingen).

(Source: Townland Cam; Parish Cam; Barony Athlone; Co. Roscommon); recessed circular band with cross hatching inside edge with series of segments of concentric circles and bands within this; divisions - hours to eighths; N E S W on four points of central star; signature above in space where circles are incomplete.

2442 NMD091 DIAL - HORIZONTAL PEDESTAL

(Ldi...for...by I. Fleming)

D 375; SiS 215; W 11. Mid 19 C. G.

Dark grey slate; hexagonal; triangular lead gnomon; hours 4-12-8; central star; (Reg.F1966:289, Daingen).

(Source: Townland Esker; Parish Lemanaghan; Barony Garrycastle; Co. Offaly); five concentric inscribed circles (D292-90); hours between the outer two circles; others divided from quarters to 22 dots; smallest circle decorated with star design; below this is another circle design with double lines and central star; E W S and floral design for N incised near edges.

2450 NMD099 DIAL - HORIZONTAL PEDESTAL

(M. Gibbons) [Most conspicuous name on back]

125x125x1; GnH 78, W 61. Mid 19 C. G.

Brass; square with corners off; triangle brass gnomon; hours IIII-XII-VIII; (Reg.F1955:107, Daingen).

(Source: Townland Lackaagh Beg; Parish Lackagh; Barony Clare; Co. Galway); about four incised concentric circles (D125-52); with divisions from hours to quarters; back of dial bears a number of names and initials scratched on it, of which the most conspicuous is M. Gibbons.

2455 NMD103 DIAL - HORIZONTAL PEDESTAL

(William Griffin 53.20 Lat. 1762)

298x298x20. 1762. S.

Stone; square; remnants of iron gnomon; foliage decoration; Roman hours 4-8; (Reg.FL1947:1, Daingen).

(Source: Townland Tinahely; Parish Kilcommon; Barony Ballinacor South; Co. Wicklow); outer circle extends full width (D298); bands and circles to D175, with divisions from hours to eighths; central circular space filled with design of stylised foliage and flowers, carved in high relief; similar designs in four corners, with classical urn in SW corner, and human head in NE corner; remains of gnomon leaded into place.

2430 NMD080 DIAL - HORIZONTAL PEDESTAL

(Constructed by James Hannon N.L. 53°10' A.D. 1834)

MxD 275; Sis 100. 1834. S.

Blue slate; octagonal; metal gnomon (replacement); eight-point compass; hours IV-VIII; (Reg.F1958:79, Daingen).

(Source: Townland Cloonboe; Parish Annaghdown; Barony Clare; Co. Galway); chipped; outer circle (D238); within this, 5mm band divided into 16 spaces, each subdivided into 12; band within this with hours; within this again bands divided into quarters, halves and units; compass card arrangement in centre; gnomon measures 138 along sloping edge.

2433 NMD083 DIAL - HORIZONTAL PEDESTAL

(Constructed by John Hughes Urracly, July 3rd 1854 A.D.)

D 265; Sis 110; W 12. 1854. S.

Blue slate; octagonal; gnomon gone; hours 4-12-8; (Reg.F1960:80, Daingen).

(Source: Townland Urracly; Parish Kilconla; Barony Dunmore; Co. Galway); described in details as hexagonal, but clearly octagonal in sketch; three concentric zones divided into hours, halves and twelfths.

2438 NMD088 DIAL - HORIZONTAL PEDESTAL

(J: M MONEYCANNON JUNE 2 1870)

D 123; Sis 60; W 5. 2:6:1870. S.

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Dark grey slate; hexagonal; gnomon gone; hours 6-12-6; (Reg.F1934:54, Daingen).
(Source: Limerick City); hours within two circles (D102&89); hour spaces on inner circle divided into quarters; two further circles (D75&45), with hours marked by lines from one circle to the other, and the hour spaces on the outer circle divided by dots into quarters, a large dot marking the half hours and smaller dots the quarters.
There are two townlands of Moneycahan [sic] - Co. Antrim and Co Tyrone.

2429 NMD079 DIAL - HORIZONTAL PEDESTAL

(D.K. 1856)

D 280; Sis 110; W 7. 1856. S.

Purple slate; octagonal; gnomon gone; central eight-point compass; hours IIII-XII-VIII; (Reg.F1932:77, Daingen).

(Source: Townland Kilcreevanty; Parish Kilbennan; Barony Dunmore; Co. Galway); incised concentric circles (D227-108), divided from hours to twelfths; hours incised with tops facing inward (unusually); eight compass points marked on circle, which encloses a geometric design of an eight-pointed star with quartered circles in the spaces between the arms, and pendant semi-circles on the circumference.

2457 NMD104 DIAL - HORIZONTAL PEDESTAL

(Lynch Dublin)

D 148. Late 18 early 19 C. G.

Brass; circular; gnomon gone; central four-point compass design; hours IIII-XII-VIII; (Reg.1947:160, Daingen).

(Source: Townland Ballon; Parish Ballon; Barony Forth; Co. Carlow); four concentric incised circles, outer divided into twelfths, second into quarters, third marked N E S W at the points of the compass design; centre circle has D20; this, and the triangles of the compass card are engraved with a feathery design of fine lines.

Morrison-Low 1989,128-9 lists Lynches from 1767-1844.

2462 NMD098 DIAL - HORIZONTAL PEDESTAL

(Made by Tobias McHugh for Patt Royan of Ballymoney)

D 315; W12. 3:1836. S.

Purplish slate; octagonal; gnomon gone; central compass; hours IIII-XI, I-VIII; (Reg.F1960:30, Daingen).

(Source: Townland Ballymoney; Parish Dunmore; Barony Dunmore; Co. Galway); described as "a very fine speci-men"; seven incised concentric incomplete circles, with divisions from hours to eighths; compass card central design with triangular points in relief, having herringbone and rope patterning; eight compass points lettered; decoration of foliage and knotted ribbons; dated "March 1836".

2437 NMD087 DIAL - HORIZONTAL PEDESTAL

(Mr. John Magauran. &c. Corglass. June. 1846.)

278x278x9. 1846. S.

Dark blue slate; square; triangular slate gnomon; central compass; hours 4-12-8; (Reg.F1949:80, Daingen).

(Source: Townland Corglass; Parish Carrigallen; Barony Carrigallen; Co. Leitrim); gnomon height 160, N edge curved concavely; moulding of false relief around edges and corners cut off similarly with fleur-de-lys and cardinal points; two circles (D263&161), with hour spaces divided into sixths and quarters respectively and with arabic hours between; compass-card type series of triangles in centre.

0710 NMD009 DIAL - HORIZONTAL PEDESTAL

Mason Dublin

W 232; H 109. c1800. PC.

Brass; octagonal; outer hours scale IIII-XII-VIII; inner compass rose; gnomon at c53°; three screw holes.

Date on card with instrument.

2445 NMD094 DIAL - HORIZONTAL PEDESTAL

(By Dan O'Connell, Teacher of Rathmines N. School. 1853.)

525x520. 4:1853. S.

Dark grey slate; square; with "Geographical Clock, ..Almanack..Circumferentor"; (Reg.F1963:185, Daingen).

(Source: Townland Shrute; Parish Shrute; Barony Kilmaine; County Mayo); main dial of concentric circles (D515-350), with divisions from hours V-XII-VII to five minutes; most bands divided into monthly sections, two with arabic numerals, one with "dials slower than watches or clocks", "dials fast", "dials slow", "dials fast" at regular intervals, one with names of months, one with Zodiac signs and dates; also figure-of-eight with time of sunrise and length of day; at the bottom of the dial, where the circles are incomplete, is another circle (D140), with hollowed interior, and the names of various cities on extended radii; two more hollowed circles (D105) are incised near the bottom circle, both with roman numbers; inscriptions on the dial include: "A Horizontal Dial, Geographical Clock, Perpetual Almanac Quadrant of Altitude"; "A D Circumferentor Calculated for the latitude of Dublin"; "To find the age of each revolving moon, The index for the month to the Epact join; The sun, bate 30, to the month day add, Or take from 30, age or change is had."; date given in form "April A.D. 1853"; central compass card arrangement with two circles, outer diameter 70; gnomon gone.

2454 NMD102 DIAL - HORIZONTAL PEDESTAL

(Latitude 53.20. Constructed for James Reynolds, 1849)

D 310; Sis 120; W 13; GnH 135. 25:5:1849. S.

Blue slate; octagonal; iron gnomon; central compass card; hours IIII-XII-VIII; (Reg.F1950:39, Daingen).

(Source: Townland Keenoge; Parish Moorechurch; Barony Upper Duleek; Co. Meath); incised concentric circles, divisions from hours to twelfths; central compass card arrangement with eight directions lettered; north pointer much longer than others, with a small sunken panel inscribed "North Pole"; date inscribed: "25th May, A.D. 1849".

4165 NMD138 DIAL - HORIZONTAL PEDESTAL

Spear DUBLIN

W 152; MxW 162; GnH 99. Late 18 early 19 C. R.

Brass; octagonal; gnomon angle c49.5°; central compass design with eight hatched triangles; hours IIII-XII-VIII.

The outside and inside of the hours circle are divided into five minutes, quarter hours, half hours and hours; there are screw holes at four of the corners, and some hacks on the sides and face; the open work gnomon has an S-shaped insert.

Two Richard Spears were active from 1791-1814 and 1818 to 1837 - Morrison-Low 1989,135.

0709 NMD008 DIAL - HORIZONTAL PEDESTAL

Spear College Green DUBLIN

250x250. 1809-1837. A.

Brass (sand blasted?); octagonal; gnomon angle c51°; hours IIII-XII-VIII; eight compass points.

Dates from Morrison-Low 1989,135.

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2446 NMD095 DIAL - HORIZONTAL PEDESTAL

(LAT 52°25' By TN(?) for Mr. M.M. ?L Monemore..)

MnD 270; Sis 75; W 11. Mid 19 C. G.

Slate; 12-sided; gnomon gone; central 16-point compass; hours IV-XI,I-VIII; (Reg.F.1966:449, Daingen).

(Source: Townland Moanmore; Parish Emly; Barony Clanwilliam; Co. Tipperary); six incised incomplete concentric circles (D270-173), with divisions from hours to five minutes; large central compass card design with intersecting triangles, eight of 16 points labelled with directions N NE etc;

2443 NMD092 DIAL - HORIZONTAL PEDESTAL

(James Walsh: Sculptor)

MnD 250; Sis 100; W 8. Mid 19 C. G.

Dark grey slate; octagonal; gnomon gone; centre compass design; hours IIII-XII-VIII; (Reg.1965:461, Daingen).

(Source: Townland Newtown; Parish Tuoghcluggin; Barony Coonagh; Co. Limerick); ten concentric incised circles (D227-87), with divisions from hours to three minutes; central eight-point compass; "I count only the hours that are fine" inscribed along third pair of lines.

2452 NMD101 DIAL - HORIZONTAL PEDESTAL

Unsigned

280x280x6.5. Mid 19 C. G.

Slate; square; gnomon gone; hours IV-XII-VIII; three concentric circles; (no Reg. no. 27/9/1932, Daingen).

(Source: Townland Hacketstown district; Co. Galway); hours and half hours marked with radial lines; two iron pins by which the missing gnomon were attached are embedded in the slate at the centre.

2451 NMD100 DIAL - HORIZONTAL PEDESTAL

Unsigned

MxD 200; W 1. Mid 19 C. G.

Brass; octagonal; gnomon gone; hours IIII-XII-VIII; minutes 15, 30, 45, 60/hour; (Reg.F.1932:78, Daingen).

(Source: Townland Tuam; Parish Tuam; Barony Clare and Dunmore; Co. Galway); incised concentric circles, the outer two have D199&138, divided from hours to twelfths; fleur-de-lys pattern on the inner zone; thickness a little over 1mm.

2448 NMD097 DIAL - HORIZONTAL PEDESTAL

Unsigned

250x250x7; GnH 50, W 35. Mid 19 C. G.

Slate; square; brass triangle gnomon; hours 4-12-8; (Reg.F.1965:1040).

(Source: Townland Knockbrack; Parish Loughcrew; Barony Fore; Co. Meath); four incised concentric circles (D193-36); with divisions from hours to quarters; NS and EW axes marked by lines at right-angles but not labelled with letters.

2447 NMD096 DIAL - HORIZONTAL PEDESTAL

Unsigned

D 127; Sis 53. Mid 19 C. G.

Brass; octagonal; gnomon gone; hours IIII-XII-VIII; (Reg.F.1966:292, Daingen).

(Source: Townland Esker; Parish Lemanaghan; Barony Garrycastle; Co. Offaly); six incised concentric circles (D125-65), with divisions from hours to eighths; also incised two concentric circles towards the bottom of the dial (D47&22), the outer one nearly touching the second smallest of the other circles.

2432 NMD082 DIAL - HORIZONTAL PEDESTAL

(Constructed for Ml Shaughnessy Latitude 53 10 N)

D 280; W 10. Mid 19 C. G.

Blue slate; octagonal; hollow triangle lead gnomon; eight-point compass; hours IV-VIII; (Reg.F.1961:27, Daingen).

(Source: Townland Park; Parish Annaghdown; Barony Clare; Co. Galway); outside numbers are three concentric circles, divided into twelfths, quarters and halves; inside numbers are three more circles, divided into quarters, halves and undivided; central compass with half hatched triangles.

Vendor James O'Shaughnessy, aged 73 in 1961, said it was made for his father (more likely his grandfather?).

2431 NMD081 DIAL - HORIZONTAL PEDESTAL

Unsigned July 14 1840

MxL 163; W 7. 14:7:1840. S.

Blue slate; six unequal sides; iron gnomon incomplete; hours IV-VIII; (Reg.F.1936:106, Daingen).

(Source: Parish Inchegeelagh; Barony East Carbery (W. D.) West Muskerry; Co. Cork); crudely made; unequally six-sided; one corner damaged; hours within a lightly incised circle of D140; inside, two circles divided into hours and halves; across dial E-W is a more deeply incised line, with the N-S line running from its centre, marked by an arrow and two small spirals below it.

1409 NMD058 DIAL - HORIZONTAL PEDESTAL

Unsigned

D 137; B 81x80, H 41. Early 20 C. G.

Two; brass; one circular dated 1661; one square with leaf decoration on corners; both reproductions.

Former has gnomon with curved triangular hole and inscription "only count your sunny hours"; other has a solid gnomon; both have hours IIII-XII-VIII.

Probably made by Pearson-Page, Birmingham - SIS visitors 5:90.

For Pearson-Page information, see Bull SIS, No.3,1984,10-11.

2435 NMD085 DIAL - HORIZONTAL & VERTICAL

(A DECLINING VERTICAL DIAL ELIVATION [sic] OF THE PLANE 36.50' ...STRUCTED FOR ...DOWNEY ...833)

252x180x4. 1833. S.

Blue slate; hours both sides; (Reg.1961:92, Daingen).

(Source: Townland Cloonboo; Parish Annaghdown; Barony Clare; Co. Galway); in spite of the inscribed description, the better side of the dial is laid out as a horizontal dial, that is, with the gnomon displaced towards hour XII away from hours IV and VIII; the back is laid out as a vertical dial with the back of the gnomon slot aligned with the IV and VIII hour lines; gnomon slot surrounded by eight-point compass card arrangement, the N point further indicated by a decorated spearhead; inside the row of numerals are three sets of converging lines marking hours, halves and quarters; part of dial broken off; on the reverse side, the hour numbers are arranged on the diameter of a semi-circle.

0636 NMD253 DIAL - MINER

Braham, Bristol

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CpD 127; VcrD 145; W 250; C 260x172x87.
1828-1838. R.

Brass; glazed compass with spirit level; double line and window sights; vertical circle at side with alidade. Vertical circle divided "LINKS" 30-0-30 and 90-0-90; silvered face on compass with lower scale 10-80°(x4), upper 10-360°; revolving alidade with two window verniers to read circle, and with pin hole sights on ends; mahogany case. From the Egestorff Collection.
Dates from Clifton 1995,37.

0637 NMD252 DIAL - MINER

E.T. Newton, St. Day, Cornwall

CpD 140; CrD 190; C 245x241x144. 1873-1883. W.

Brass; vertical semi-circle over horizontal circle and compass; two sets of clamps and slow motion screws. Latter to control vertical and horizontal movements; arm with window vernier moves around semi-circle varying the position of the attached alidade with pin-hole sights; spirit level between these sights, and two more at the sides of the compass below; mahogany case. From the Egestorff Collection.
Dates from Crawforth 1988,12.

2366 NMD071 DIAL - UNIVERSAL EQUINOCTIAL

L.T.M. (initials of L.T. Müller)

Face 63x63; C 80x21. Pre 1770. PC.

Brass; glazed compass "ME OC SE OR" points; decorated face; hinged hours ring and curved guide 10-80; case. Face decorated with abstract designs; compass needle has arrow at one end; hinged hours ring bisected by a spoke with a needle at right-angles to it; hinged decorated arch at side opposite hours ring hinge; two of three turned legs gone; red leather-covered case with blue cloth lining; brass disc inside lid with signature initials and latitudes - "London 52, Múnché Wien 48, Madrid 41" [sic] etc...

A note from Mary Holbrook (21:12:72) reads: "I believe that when I was in Dublin I said I would send you details about the maker of the sundial signed LTM. He is mentioned both in Zinner, "Deutsche und niederländische astrono-mosche Instrumente des 11. bis 18. Jahrhunderts", Munich, 1956, p.454-5, and in M. Bobinger, "Alt-Augsburger Kompassmacher", Augsburg, 1966, p. 178ff. He was born around 1710 and died in 1770. He produced very little other than equatorial sundials on the lines of yours in Dublin. Neither Bobinger nor Zinner refer to the sundial in the National Museum."; address - Holburne of Menstrie Museum, Great Pulteney St., Bath BA2 4DB.

0650 NMD240 DIAL - UNIVERSAL EQUINOCTIAL

Joh. Schrettegger, Augsburg

D 70. c1800. PC.

Brass; compass in octagonal base on three feet; folding chapter ring, quadrant arm, and plumb bracket; case.

From the Egestorff Collection.

Johann Nepomuk Schrettegger 1764-1843 - Historical Technology 133,1990,154.

0666 NMD224 DIAL - UNIVERSAL EQUINOCTIAL

Unsigned

D 152; C 215x213x90. c1900. PC.

Oxidised brass; silvered chapter ring, quadrant arm, and compass face; two spirit levels; three level screws, case.

Hours on top VIII-XII-III and III-XII-VIII; inside (at right-angles downward) VII-XII-V; brass-bound oak case with green velvet lining.

From the Egestorff Collection.

0651 NMD239 DIAL - UNIVERSAL EQUINOCTIAL

Unsigned

89x89. Early 19 C. PC.

Engraved brass; chapters on cylinder strip on hinged equatorial ring; gnomon, arm, and bracket fold; compass.

Elaborately decorated and cut out; chapters divided to five minutes of arc by a stepped scale; compass is adjustable for variation.

From the Egestorff Collection.

0654 NMD236 DIAL - UNIVERSAL EQUINOCTIAL RING

Geo. Parker, Dublin

D 64. 1761-1766. R.

Silver; suspension piece runs in circular groove on meridian ring; bridge with scales; circular sharkskin-covered slip case.

Declination scale and scale of months; 1st Aries - 10th March.

From the Egestorff Collection.

Dates from Morrison-Low 1989,132.

0657 NMD233 DIAL - UNIVERSAL EQUINOCTIAL RING

Saunders, Dublin

D 216. 1793-1819. R.

Brass; suspension piece attached by rotatable wire rim strop; northern latitudes only; bridge with scales.

Zodiac calendar and declination scales; rising and setting times; square-section hinged mahogany case.

From the Egestorff Collection.

Assumed to be Thomas Saunders, for whom Morrison-Low 1989,134 gives dates 1793-1819.

0655 NMD235 DIAL - UNIVERSAL EQUINOCTIAL RING

Seward DUBLIN

D 194. Early to mid 18 C. PC.

Brass; suspension piece runs in circular groove on meridian ring; scaled for both latitudes; bridge.

Latter has scale of months, zodiac and declination; 1st Aries - 10th March.

From the Egestorff Collection.

John Seward was apprenticed to Gabriel Stokes on 8:7: 1715 - W. Stuart, King's Hospital archives.

0703 NMD002 DIAL - UNIVERSAL EQUINOCTIAL RING

Gab: Stokes Dublin Fecit

D 101 & 83; CeP 67x19. 1715-1742. FL.

Brass; outer ring scale 0-90°; inner hour ring III-XII & I-IX; central revolving plate with sliding hole.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Outer ring has scales AE-10-80 and 20-AE-20, "S.Decl." and "N.Decl."; central plate inscribed with months and zodiac symbols; other side with "N.Decl." and "S.Decl." and "Sun" IIII-VIII "Rise" VIII-III "Set"; suspension ring on top.

Historical Technology 106,1973,97 notes that such ring dials were used for determining local time by the sun without the need for alignment to the north, and were of value to shipmasters approaching a distant port before the invention of medium quality timekeepers; thus he could look up the times of high and low tide, and sail accordingly.

Historical Technology 108,1974,83 notes that these dials were also made for land use - the suspension ring index would be set against the observer's latitude, the sliding aperture against the date on the bridge, and the dial then rotated until the spot of sunlight passing through the aperture fell on the inner hour circle ring.

Dates from Morrison-Low 1989,137.

0656 NMD234 DIAL - UNIVERSAL EQUINOCTIAL RING

Unsigned

D 157. First ½ 18 C. PC.

Brass; suspension piece runs in groove on meridian ring; scaled for both latitudes; bridge with scales.

Month, zodiac and declination scales; 1st Aries - 10th March.

From the Egestorff Collection.

0366 NMD028 DIAL - UNIVERSAL EQUINOCTIAL RING

Unsigned - believed to be German

RisD 269 & 235; BdL 211, W 26. 18 C. PC

Brass; outer ring, European cities' latitudes and 0-90° scale; pivoted ring I-XII hours; bridge with slide.

Cities: Berlin, Danzig, Hamburg, Leipzig, London [s/c], Paris, Praga, Rom, Warfchau, Wien, Amfterdam, Ausbourg; scale 0-90°; revolving pointed finger attached to outer circle; inner ring pivoted between XII points (repeated); bridge rotates around outer ring, central rectangle has slide with hole, engraved IASOND and IMAMFI, with zodiac signs; holding ring on top.

0941 NMD027 DIAL - UNIVERSAL INCLINING

THOS. HARRIS & SON LONDON

D 116; H 108; Sp 123. Mid 19 C. G.

Brass; three level screws; silvered face compass, two spirit levels; hinged hours ring, curved guide; gnomon.

Brass spirit levels at right-angles; compass scale 10-80-10-80-10°, glass cover (cracked); hours I-VIII and IIII-XII; guide 60-0°; gnomon held on two decorated curved brackets within hours ring.

The firm was active throughout the 19 C, Crawforth 1988,9.

2836 NMD106 DIAL - UNIVERSAL INCLINING

Lynch Dublin

D 95; H 60. Late 18 early 19 C. G.

Brass base for compass with silvered face; latitude arc 60-0°; silvered dial ring; 52° S-insert gnomon.

Compass has seven point star and fleur-de-lys, with NE SE SW NW marked on four points; the cardinal points are incorporated in the scale N-10..80-E-80..10-S-10.. 80-W-80..10-N; the side arc does not now fold and does not hold up the dial ring, which has a corresponding notch at the side; two arcs within the dial ring support the gnomon, which can rotate a little off the vertical on each side; inventory no. 1-1961.

Latitudes given on the back of the dial: Constan le 41 00; Amsterdam 52 23M; Bristol 51 53; Cork 51 49; Dublin 53 20; London 31 30; Paris 48 50; Rome 41 54; Waterford 52 12; Belfast 54 39; L.Derry 55 00; Liverpool 53 23.

Morrison-Low 1989,128-9 lists Lynches from 1767-1844.

0662 NMD228 DIAL - UNIVERSAL INCLINING

MELLING & CO., OPTICIANS &c., 39 South Castle Street, LIVERPOOL.

D 76. 1846-1851. W.

Brass; compass below chapter ring; hinge gnomon; case.

Chapter ring is hinged and moves along a folding latitude arm 0-60°; open gnomon with C insert, 60°; in leather-covered wooden case.

From the Egestorff Collection.

Dates from Crawforth 1988,12.

0667 NMD223 DIAL - UNIVERSAL INCLINING

J. Webb, 192 Tottenham Court Road, LONDON

D 114. 1809-1822. A.

Brass; folding gnomon; silvered chapter ring and compass; two spirit levels; three level screws; wooden heart-shaped shagreen case, lined with green silk and velvet.

From the Egestorff Collection.

Dates from Crawforth 1988,16.

0661 NMD229 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

T. Mason, Dublin

D 83. 1805-1838. R.

Brass; silvered compass in base; chapter ring rises on curved replacement quadrant; small mechanical dial; hinged sights.

From the Egestorff Collection.

Morrison-Low 1989,130 lists the first Thomas Mason from 1805-1838.

1401 NMD051 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

Made (for his Amusement) by OLIVER NELSON, Printer to the Honourable the CITY of DUBLIN, 1771.

D 119. 1771. S.

Brass; silvered compass; hinged arc, racked hour ring.

Silver faced compass has two spirit levels (one empty), and raised scale 0-90-0-90-0°; and level screws on compass surround; hinged latitude arc scale 90-10; months and slow/fast adjustment; cracked glass cover on compass; hinged hour ring I-XII twice; signature on hinged sight; missing geared minute scale.

Bought from Sotheby 10:3:87, Lot 102 - illustrated.

Illustrated also in Morrison-Low 1989,3.

0704 NMD003 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

Seward. DUBLIN.

D 83; H 59. Early to mid 18 C. PC.

Brass; compass in base; hinge for hour ring I-XII; central curved limb; mechanical dial; folding sights.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Silvered compass face and scale 0-90-0-90-0°, engraved with months and "TOO FAST" and "TOO SLOW" adjustments; hinged hour ring engraved I-XII twice on central limb divided 90-20°; revolving pointer on mechanical circular dial, semicircular folding sight above with hole; second folding arched rectangular sight, with signature, between limb and dial; latitudes listed on back include eight Irish cities or towns.

John Seward was apprenticed to Gabriel Stokes on 8:7:1715 - W. Stuart, King's Hospital Archives.

0660 NMD230 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

Unsigned

D 115. Mid 18 C. G.

Brass; silvered compass and minute ring; spirit levels at right-angles; three feet, two levelling; shaped case.

When chapter ring is elevated to the latitude, the hour hand is moved until the arched gnomon throws a mark of the sun's position upon a cursor which slides within a calendar-declination scale. From the Egestorff Collection.

2965 NMD118 DISCHARGE TUBE

Unsigned

L 310, MxD 43; L 655, TuD 20. Mid to late 19 C. G.

Two; glass; one has sphere ends and central egg; other is a straight narrow tube; each has two point electrodes.

The smaller has its sphere ends slightly darkened inside and the electrodes reach from the outside ends to near the other end of the sphere inside the tube; one joining arm between a sphere and the central egg is a thick capillary tube (OD6), the other is a wider tube (OD10).

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

3658 NMD117 DISCHARGE TUBE - AURORA

Unsigned

BD 234; H 1254; TuD 81-75. Mid 19 C. G.

Turned boxwood base (cracked); brass stop-cock and sleeve to vertical glass tube; inner sphere electrodes.

The lower electrode is now broken off its mount, but it is still present in the bottom of the vertical tube; the tube tapers slightly as it rises, and is topped by a brass sleeve.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

2597 NMD207 DISCHARGE TUBE - AURORA

Unsigned

BD 165, H 642. Mid to late 19 C. G.

Mahogany base; vertical green glass cylinder; brass ends and internal sphere conductors.

From the Egestorff Collection.

2964 NMD119 DISCHARGE TUBE - SPANGLED AURORA

Unsigned

L 368; TuD 26. Mid to late 19 C. G.

Glass cylinder tube has spiral of small metal circles inside the tube, connecting the brass ends.

The latter are in the form of squashed spheres (MxD34) and sleeves around the ends of the tube, with corks inside.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

2207 NMD120 DISCHARGER - UNIVERSAL

Unsigned

B 303x120x18; TMnH 154, D 83. Mid 19 C. G.

Mahogany base; at sides, turned bosses for glass pillars to adjustable brass conductors; table in centre.

The glass pillars have brass sleeves on top with universal ball joints; from these rise bosses with holes and screw clamps for brass rods, having brass spheres on the ends near the table, and turned glass handles at the other ends after screw contacts; the central table is on a turned wood pillar and can be adjusted up or down, with a clamping screw; it has an ivory panel through its centre; both of the turned wood bosses for the electrodes have splits.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

2966 NMD197 DIVIDERS

Unsigned

L c210. Mid to late 18 C. G.

Brass with curved white-metal points; 10-360° scale at hinge; straight arms have spot marks 2-120 and 2-12.

The marks "2" are about half-way along each arm.

From the Egestorff Collection.

0620 NMD268 DIVIDERS - PROPORTIONAL

R.J. HOPGOOD & CO. LONDON 1918 No 4621

L 235. 1918. S.

Brass with steel points; sliding screw clamp; scales "CIRCLES" 6-20; "LINES", "PLANS", "SOLIDS" 1-10.

From the Egestorff Collection.

0622 NMD266 DRAWING INSTRUMENTS - SET

HENRY TRYON [owner?]

No measurements available. Mid 19 C. G.

Pens, compasses, dividers, scale in sharkskin-covered etui; ebony/brass parallel rule inscribed HENRY TRYON.

Latter made up of two rules joined by pivoting shaped brass cross pieces.

From the Egestorff Collection.

2595 NMD208 ELECTRIC EGG

Unsigned

BD 215; H 722. Mid to late 19 C. G.

Turned mahogany base; glass egg between brass sleeves; brass sphere conductors on rods into egg; stop-cock below lower sleeve.

From the Egestorff Collection.

2594 NMD121 ELECTRIC EGG

Unsigned

BD 165; H 475; EgMxD 195. Mid to late 19 C. G.

Turned mahogany base; brass pipe, sleeve and stop-cock to elliptical glass egg; coil descends into egg.

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The coil has a slightly tapering glass cylinder cover (D41-45) above the brass sleeve on top of the egg, and a narrower cylinder glass cover in the longer part descending into the egg; on top of the upper cylinder is a metal disc top (D50) with a small brass sphere (D9) on its side; a similar sphere is attached to the upper brass sleeve; a copper strip, from the central brass support on the base, runs to a brass screw electric contact on the side of the base.
From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

1392 NMD021 ELECTRICAL MACHINE - CLARKE

IMPROVED PATENT MAGNETO-ELECTRIC MACHINE FOR NERVOUS DISEASES PAWSON & BRAILSFORD, LITH. SHEFFIELD

Hs 221x116x115. Post 1878. D.

Boxwood case housing; brass; handle to decorated wheel; pulley turns two coils at poles of horseshoe magnet.

Coils covered in purple velvet; two brass cylinder electrodes (L95,D23); instructions in hinged lid include use of machine for toothache, tic-doloureux and neuralgia; knob on side of case to remove hinged keeper for magnet.

Presented by Dr Jack Gillespie in 1988 at the suggestion of Charles Mollan.

Medal awards noted up to 1878.

2205 NMD122 ELECTROMETER - GOLD LEAF

Unsigned

BD 178; H 352; DiD 88. Mid 19 C. G.

Turned mahogany base; glass bell jar; brass sleeve on top; brass disc on brass rod through neck to leaves.

The rod in the flask has a glass surround; the gold leaves are broken off.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

2203 NMD214 ELECTROSTATIC GENERATOR - NAIRNE

Unsigned

B 570x245; H 470. Early 19 C. G.

Shaped mahogany base with glass pillars to hold axis of glass cylinder and metal cylinder conductors.

Wood and glass handle to revolve cylinder.

From the Egestorff Collection.

2202 NMD123 ELECTROSTATIC GENERATOR - RAMSDEN

Unsigned

DiD 760 (30"); B 812x324x53; H 1060.

Mid to late 19 C. G.

Mahogany base and bridge; glass disc, rubbed top and bottom by leathers and silk; at side, curved brass conductors.

A brass handle turns the disc between the top and bottom frames for the leathers; a separate mahogany base and brass pillar support a horizontal brass and glass arm ending in two brass spheres (D80); through the nearer of these to the disc run the curved conductors from the combs around the disc; one of the latter is incomplete.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

3764 NMD160 EUDIOMETER - CAVENDISH

BAIRD & TATLOCK LONDON & GLASGOW

BD 152; H 502; MxD 96. Late 19 C. G.

Weighted mahogany base; brass stop-cock to glass pear-shaped vessel with stop-cock; clamped stopper on top.

The brass stop-cock fitting screws into the base, and has a brass sleeve above into which fits the long glass stem below the heavy glass stop-cock; above this is the pear-shaped vessel; there are two brass screw electric contacts on the brass stopper clamp.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

2204 NMD124 EUDIOMETER - CAVENDISH

Unsigned

BD 174; H 363; MxD 83. Mid 19 C. G.

Turned mahogany base; brass coupling with stop-cock; tear-drop glass flask with stop-cock; contacts above.

The "tear-drop" is upside down and elongated; the glass stopper is held on by two brass struts from a neck ring joined by a cross piece, tightened by two screw knobs on top of the struts.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

3753 NMD164 FLUID TRANSMISSIBILITY APPARATUS

Unsigned (but on a GRIFFIN LONDON retort stand)

MxD 265; H 732; NeOD D51-64. Mid to late 19 C. G.

Glass; spherical vessel with long neck on top, a vent on the bottom and vents on two sides, with glass tubes.

The vent on the bottom has a glass tube through a cork, which bends twice through 90° and rises parallel to the neck of the sphere; one of the side vents (broken) has similar tube, bent through 90°.

Harris 1908,648 illustrates the apparatus, with a similar tube out of the other side vent, and with a piston in the long neck, which is described as apparatus to demonstrate the transmissibility of fluid pressure.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

4234 NMD190 FRICTION DEMONSTRATION APPARATUS

Unsigned - but built by Ernest Walton

B 280x210; 510x68; RdL 305, D 7. c1940-1950. G.

Input board with on/off switch, reversing switch, rheostat; second board with electric motor and revolving rod.

Riders would be placed on the revolving rod, whose angle to the horizontal could be altered by means of a screw at one end of the mounting board; at a certain angle, depending on the coefficient of friction, the rider would just stay still and not slide down; this is a prototype demonstration instrument devised by the Nobel prize-winner - apparently not commercially produced; see entry under "Spectacles" 4232 NMD188.

2206 NMD213 GALVANOMETER - ASTATIC, NOBILI

BAIRD & TATLOCK (LONDON) LTD. LONDON. ENGLAND.

BD c195; H c380. Early 20 C. G.

Mahogany base, three level screws; glass cylinder housing, brass ring on top; silvered ring scale 0-90-0-90-0° on top of coil.

From the Egestorff Collection.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3568 NMD147 GALVANOMETER - ASTATIC, NOBILI

GRIFFIN & SONS CHEMICAL INST. MAKERS GARRICK ST. & LONG ACRE LONDON G. PERCIVAL. CORK.
BD 291; H 395; SD 185-215. 1881-1883. F.

Mahogany base; conical silver ring scale 90-0-90; dome.

The base has three brass level screws, two brass screw electric contacts, and a groove for the tall rounded cylinder glass dome; the needle is suspended from a brass crook support and is attached to the double bars inside and on top of the split coil, which is in a mahogany housing; there are also two wire wings above the needle, which extends to read the scale, held slightly above the base.

Burnett & Morrison-Low 1989,154 give 1881-3 for Percival; Crawforth 1988,8 gives 1894-5 for the pair of Griffin addresses. From the North Monastery Cork collection.

2208 NMD125 GALVANOMETER - TANGENT

PHILIP HARRIS & CO 1913 LIMITED BIRMINGHAM ENGLAND

BD 223; H 350; CoHsD 225. 1913. S.

Mahogany disc base, support, and coil housing; in centre of coil, magnetometer in glazed brass cylinder case.

The mahogany base is on three brass pointed level screws; a small mahogany turned pillar in the middle of the base holds a rectangular mahogany support (87x68x68) with a brass top; this, in turn, holds a turned brass pillar holding the magnetometer, which has a silvered ring scale 0-90-0-90-0°, and a central disc parallax mirror; the support has a knurled brass knob in front to clamp it to the base support, and two brass screw electric contacts at the sides; the mahogany coil housing has four more brass screw contacts labelled "1 2 3 4" with ivory discs; on the base are scratched: "1 & 2 10.92 ohms" and "3 & 4 201 ohms".

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation).

3375 NMD308 GALVANOMETER - TANGENT

G. PERCIVAL CORK

Sp 197; BSD 148; H 200; CoHsOD 153, ID 100.

1881-1883. F.

Brass; divided base scale 0-90-0-90-0 with three level screws; brass disc in this holds ebony housed coil.

One of the level feet is bent; the brass disc turns within the base scale, and the coil housing rises vertically from the disc; the coil wire is covered in white and green insulating material; rising from the bottom of the coil housing is a short brass pillar to a table with a spike for the missing magnetometer.

From the North Monastery Cork collection.

Dates from Burnett & Morrison-Low 1989,154.

4163 NMD136 GALVANOMETER - TANGENT

W.G. PYE & Co CAMBRIDGE, ENGLAND. T. MASON 5, DAME ST., DUBLIN

Sp 169; BD 142; H 195; CoHsD 160; MaD 113.

1900-1916. A.

Mahogany base and vertical coil housing; three brass level screws; brass magnetometer with parallax mirror.

The glazed magnetometer sits on a tapering brass pillar; its scale is 0-90-0-90-0°; the needle is at right-angles to a small red and blue magnet; the coil housing is cracked.

The Pye signature is around the scale; the Mason signature on an ivory disc on the base.

Mason dates from Morrison-Low 1989,131.

3648 NMD168 GAS GENERATOR

Unsigned

BD 86; H 150&280; D 113&115. Mid 19 C. G.

Disc base; bulbous spherical lower vessel with rimmed neck; in this, spherical upper vessel with pipe below.

The upper vessel has a curved neck and opening (D43) which is not ground; its bottom is ground and fits into the ground top of the lower vessel, which has a lip (D48); a pipe extends from the centre of the upper vessel to the bottom of the lower vessel, which has an output pipe at its top side; the apparatus is clearly a precursor of the Kipps apparatus, e.g. 3745 NMD166.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3745 NMD166 GAS GENERATOR - KIPPS

Unsigned

BD 172; VsMxD 103&130; H 388. Mid to late 19 C. G.

Glass; flat bottom for arched lower vessel integrated with sphere middle vessel; large sphere upper vessel.

The middle vessel has an angled side arm, and a large ground glass opening on top, into which fits the ground glass joint of the upper vessel which has a central pipe descending into the bottom vessel; the upper vessel has an unground opening on top.

Also five upper vessels (MxD137-150) for missing Kipps apparati; all are spherical with top openings, and ground glass joints below with central pipes.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3755 NMD163 GAS HOLDER

J.J. GRIFFIN & SONS 22, GARRICK ST LONDON. W.C.

CyBD 258, H 462; H 1102; FnMxD 230. 1867-1890. F.

Metal cylinder has outlet pipe at bottom, stop-cock on rounded cover, and funnel on vertical tube on top.

The cylinder has a vertical glass tube between sleeves on the side (with a screw cap) to show the water level inside.

The apparatus is illustrated in Griffin 1915, 154, and described as "Gas-Holder, Griffin's school pattern, japanned zinc body, 18 x 10½ in., capacity 1500 cubic in., un-graduated. £3 3s 0d".

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

Dates at this address from Downing 1988,53; the holder presumably dates to the end of the 1867-90 period.

3756 NMD162 GAS HOLDER

Unsigned

CyBD 221, H 270; H 598; FnMxD 82. Late 19 C. G.

Metal cylinder has stop-cocks on pipes at bottom, on rounded cover, and on vertical tube to funnel on top.

The cylinder, which is painted green (chipped), has white and red highlights, and has a vertical glass tube between sleeves at the side to show the level of water inside; this apparatus is similar to, though smaller than, 3755 NMD163, but has a smaller funnel, and has stop-cocks at the bottom output, and on the vertical tube below the funnel.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3644 NMD170 GAS MIXING APPARATUS

Unsigned

BD 192; H 328; SrsD 95&91. Mid 19 C. G.

Mahogany base; pillar to T brass support pipe for right-angled sleeve to two stop-cocks and glass spheres.

Each glass sphere flask has a flat bottom, and they are held vertically in metal sleeves, leading to the stop-cocks, the other sides of which fit into the sleeve held by the T support pipe; the other end of the pipe has a right-angled down turn.

The apparatus was used to demonstrate that, when communication is opened between two closed vessels containing gases, they will at once begin to form a homogeneous mixture.

A similar apparatus is illustrated, and the gas mixing laws detailed in Ganot 1890,165.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3778 NMD153 GLASS BELL JARS

Unsigned

BD 79-192; H 120-275. Mid to late 19 C. G.

Six; largest with closed top and knob; others with vent on top; three cylinder shape; one bell; one tulip.

The largest three have ground glass rims at their bases.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3574 NMD165 GLASS GOBLET ON METAL BASE

Unsigned

BD 217; H 442; GoMxD 199. Mids to late 19 C. G.

Turned iron base; sleeve, with right-angled brass pipe with stop-cock, below upside-down tulip-shaped goblet.

The top rim of the goblet is ground and has some small chips; the side pipe has a stop-cock closed using a knurled brass knob; further out it has a sleeve for a missing part, and it ends in a ribbed sleeve for a rubber tube; the pipe leads into the bottom of the goblet.

As the rim of the goblet is ground, this apparatus was presumably used in vacuum experiments, perhaps to illustrate fountain effects?

From the North Monastery Cork collection.

0786 NMD218 GLOBE - CELESTIAL

Smith & Sons, 63 Charing Cross, London, 1871

D 407. 1871. S.

Mahogany, brass, and plaster; three carved claw feet, glazed compass between; mahogany globe support; brass ring.

Matches terrestrial globe 0649 NMD241.

From the Egestorff Collection.

0648 NMD242 GLOBE - TERRESTRIAL

G & J CARY, 86 St. James's Street Jan. 1st 1840

D 305. 1840. S.

Four turned wood legs, cross supports, to horizontal circle; vertical brass circle; plaster globe.

A circle on the globe has the inscription: "CARY'S NEW TERRESTRIAL GLOBE DELINEATED From the best Authorities extant. Exhibiting the late Discoveries towards the NORTH POLE, and every improvement in Geography to the present Time.

LONDON: Made & Sold by G & J CARY, 86 St. James's Street Jan. 1st 1840."

From the Egestorff Collection.

G. & J. Cary were successors to William Cary, Taylor 1966,385.

0649 NMD241 GLOBE - TERRESTRIAL

Smith & Sons, 63 Charing Cross, London, 1871

D 407. 1871. S.

Mahogany, brass, and plaster; three carved claw feet; glazed compass between; mahogany globe support; brass ring.

Matches celestial globe 0786 NMD218.

From the Egestorff Collection.

2365 NMD070 GLOBES - CELESTIAL & TERRESTRIAL

LANE'S Improved GLOBE, LONDON 1833

D 75; CD 85. Post 1833. S.

Plaster terrestrial globe, in leather-covered wood case containing celestial globe gores on the inside.

Voyage dates inscribed - e.g. "Cook's going out 1776", "Cn King's Return 1780"; last date is "Enderbys Land 1833" - based on a note of the discovery of the southern polar continent.

Van der Krogt 1984,180-2 lists Lane globes from 1776 - post 1833; Downing 1988,73 lists George Lane, 1841-2.

2458 NMD105 GNOMON

Unsigned

105x85x70; W 5. Mid 19 C. G.

Slate; right-angled triangle, with tenon; heart on one side, bird on other; (Reg.F1964:210, Daingen).

(Source: Townland Montiagh; Parish Claregalway; Co. Galway); marginal groove on both sides, with short incised lines at right-angles in it.

0639 NMD250 GRAPHOMETER

Buterfield [sic] AParis

D 89. 1677-1724. FL.

Brass; sleeve with wing nut to ball joint below semi-circular frame with inset compass; moving alidade.

Line and window sights on arm extensions of horizontal frame and on alidade; latter has verniers under each sight.

The incorrectly spelled signature may suggest that the dial is not an original Butterfield.

From the Egestorff Collection.

Dates from Bennett 1987,76.

0923 NMD026 GRAPHOMETER

Butterfield AParis (AP entwined)

L 252; W 122; CpHsD 80. 1677-1724. FL.

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Decorated brass; semicircular; fixed and moving line and window sights; compass; ball and socket joint below. Semicircular scales 0-180° and 180-0°; compass scale 0-90-0-90-0°, inscribed "Nord Sud Est Ouest"; moving sights on pivot at centre of fixed sights on diameter; vernier on moving sight with 12 divisions corresponding to 11 on degree scale; sleeve for stand below ball and socket joint. SIS visitors in 1990 reported that the signature is not by Butterfield, but was rather crudely added to a contemporary instrument. Dates from Bennett 1987,76.

0621 NMD267 GUNNER'S CALLIPERS

W. DEANE. Fecit.
L 152. 1718-1748. W.
Brass; degree scale at hinge; engraved with line of lines and other information for artillery men. Arms have concave profiles on inner sides, leading to points at the ends away from the hinge. From the Egestorff Collection. Dates from Crawforth 1988,6.

3768 NMD158 HEMPEL FLASK

Unsigned
BD 100; SrD 70; H 268. Late 19 C. G.
Turned black wood stand ends in egg-cup holding glass sphere; pipes above and below lead into the sphere. The glass pipe on top rises vertically; that below enters the wood stand, bends, and exits from the turned wood pillar above the disc base. The flask is illustrated in Maiben 1914 as part of "Hempel's Explosion Pipette" (p57) and as part of "Hemple's Estimation of Flour Apparatus" (p266); and also in Baird 1914,846 as part of "Hempel's Explosion Pipette". From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3769 NMD157 HEMPEL FLASK

Unsigned
BD 74; SrD 69; H 216. Late 19 C. G.
Rusted iron stand ends in egg-cup holding glass sphere; pipes above and below lead into the sphere. The glass pipe on top rises vertically; that on the bottom enters the stand, turns, and exits from the side of the pillar; the apparatus is similar to 3768 NMD158, except that the stand is of iron, and the flask cannot in this case be removed from the stand. From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork. The name comes from Maiben 1914,57, and from Baird 1914,846.

3772 NMD155 HEMPEL GAS ABSORPTION BULBS

Unsigned
B 290x95x22; H 297; SrsD 70,64,64,64. Late 19 C. G.
Blackened wood base and vertical support for four inter-connected glass spheres ending in a bent capillary tube. The spheres are joined by glass tubes bent through 180°; the right sphere has a pipe extending vertically from the top; the left sphere is larger than the others and has a white-backed capillary tube leading from its top, bent in two right-angles and through 180° such that the vertical end rises above the support; two of the spheres are at a higher level than the other two, and all contain water. The apparatus is described as "Hempel's Gas Absorption Bulbs" in Baird 1914,845, and as "Hempel's Explosion Pipette" in Maiben 1914,58. From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3685 NMD131 HORIZONTAL INSTRUMENT

Unsigned
MxW 168; AIL 175. Mid 19 C. G.
Brass decagon plate with revolving alidade; each quarter of plate divided by circles or lines. Around the outside of the plate are two inscribed circles with two diagonal lines cutting them into quarters; inside this is another circle with the number 100 at the top of the vertical diagonal, and 0 at the bottom, with nothing at the left of the horizontal diagonal and 50 at the right; between the 50 and 100 are inscribed 60 70 80 90 with increasing separations as the numbers get higher; between the 50 and 0 are inscribed 40 30 20 20, and between 50 and the blank 10 and 20; each 90° quarter of the circle beneath this divided line is inscribed differently; the left upper quarter has 17 arcs and 19 horizontal lines, with the numbers 2 and 1 inscribed at arcs 6 and 14 from the centre respectively; the top right-hand quarter continues the arcs and horizontal lines, with the addition of two vertical lines parallel to the 100 0 diagonal; the bottom right-hand quarter has three horizontal lines, the bottom one with the numbers 1 2 3 4 5 inscribed, close to the horizontal diagonal, and is otherwise blank except for the continuation of the two vertical lines from the upper right-hand quarter, which pass to the right of the 2 and 4 marks; the bottom left quarter has 12 horizontal lines parallel to the horizontal diagonal, and the rest of the quarter is blank; the alidade has points at each end, which extend just beyond the edge of the plate; it has circular holes near each point, and two rectangular holes at each side of the centre; it screws to the centre hole of the plate using a bolt and knurled knob. The purpose of the instrument is unknown. Allen Simpson suggests it may be some sort of mathematical calculator, used in surveying, and looks fairly home-made.

1438 NMD110 HYDROMETER

DRING & FAGE MAKERS TOOLEY ST LONDON No..6790
H 313; BuD 40&58; ThS 311x31; Ru 336x45;
C 370x113x62. c1875. S.
White-metal; elliptical bulb; pear-shaped weight; scales 1-20, 20-40, 40-60; thermometer; slide rule. In mahogany case with blue velvet lining and silver presentation plaque: "Presented to Mr. Walter C. Wachter, ON THE COMPLETION OF HIS ARTICLES by R & H. Jenner & Sons, 11 JUNE. 1875."; the hydrometer is signed: "Dring & Fage, LONDON No..6790", the thermometer: "DRING & FAGE LONDON", and the slide-rule: "DRING & FAGE MAKERS TOOLEY ST LONDON"; the weight is at the bottom of a tapering rod below the bulb; the three scales are on the sides of the stem (5x5) above the bulb, and correspond with having no weight on the spike above the stem "OW", a lighter disc weight "1", and a heavier disc weight "2" (DisD16); the glass mercury thermometer has a white-metal scale plate 40-210°; the slide rule is of copper-bound boxwood with an ivory central slide (L169); it has scales for: "SPECIFIC GRAVITY", "PROOF SPT PR CT", "D EX PR BARL", "D EX PR ENT", "DENSITY"; the scales on the slide are 50-150B and 50-150A on one side, and 50-150D and 50 50C on the other.

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It was presented to Cork Public Museum in June 1971 by George Kelleher, who bought it in 1970 in Sutton, Surrey. Mr Kelleher is now deceased.

The instrument was passed on to the National Museum in September 1990 at the suggestion of Charles Mollan.

0415 NMD035 HYDROMETER - SIKES

[On plaque] SIKESS HYDROMETER THOS BENNETT PATRICK STREET CORK

[On instrument] LONG LONDON Little Tower St LONDON No 17655

[On thermometer] T. BENNETT OPTICIAN CORK

L 167; D 38; ThHs 180x24; C 204x97x52. 1821-1867. A.

Brass; scale 0-10; nine weights 10-90; cylinder stem cap; ivory-back mercury thermometer 30-100°, mahogany case.

Case, lined in red silk and purple velvet, has marquetry rectangular inlay.

Bennett dates 1810-1867, Burnett & Morrison-Low 1989, 144; Long, Little Tower Street dates from Clifton 1995, 171.

1414 NMD063 HYDROMETER - SIKES

SIKES HYDROMETER W.G. EDMONDS & CO DUBLIN

C 193x72x46. Late 19 early 20 C. G.

Brass; nine weights and cap; ivory-back mercury thermometer with scale 30-130°; in red-lined mahogany case.

0711 NMD010 HYDROMETER - SIKES

[On plaque] M. JORDI & CO. LTD 31 LOWER ORMOND QUAY DUBLIN. SYKES' HYDROMETER No 15603

L163; D37; ThHs 181x24; C204x100x54. Early 20 C. PC.

Brass; scale 0-10; nine weights 10-90; cylinder stem cap; ivory-backed mercury thermometer 20-100°; mahogany case.

Case lined with red silk and velvet; thermometer and hydrometer also signed Jordi.

Date on card with instrument; 2613 PRI246 is No.39543. Jordi firm were brewers - A. Morrison-Low PC.

4235 NMD191 INVERTED PENDULUM APPARATUS

Unsigned - but made by E.T.S. Walton

Bk 82x50x50; Br 172x17. c1940. G.

Original diagrams; brass machined block with three bolts to hold a flat iron bar; electric coil on frame.

The bar can be clamped at any point along its length; the coil fits over a W-shaped layered frame, such that the higher central element is located below the vibrating bar; an alternating current through the coil will activate the bar, and its frequency of oscillation will depend upon its free length; built by Ernest Walton, Nobel prize-winner; see entry under "Spectacles" 4232 NMD188.

0593 NMD293 LAMP - MICROSCOPE

Unsigned

BD c90; MnH c385. Mid 19 C. G.

Brass stand with ring base holds brass and glass oil lamp with a condensing lens.

The oil lamp and lens arm can be moved up or down the stand; the lens is in a brass housing on a universal ball joint to the arm.

From the Egestorff Collection.

4434 NMD185 LANTERN - UNIAL

[On box] GBN [with Trade Mark] FEINE LATERNA MAGICA LANTERNE MAGIQUE FINE MAGIC LANTERN LINTERNA MAQGICA

Sp 180X155; H 415; Hs 170x141x194; C 340X293X230.

Early 20 C. G.

Child's toy; red painted tin housing; gold claw feet; black chimney with brass and tin vented top; box.

The lantern has a push focus polished metal objective and has a sliding door at the side; the box contains an oil burner, elongated cylindrical globe, parabolic mirror, and a large quantity of coloured glass slides most of which have four illustrations; the lantern also has a mechanical slide to give coloured designs.

From the Egestorff Collection.

4435 NMD178 LANTERN - UNIAL

[On box] J.S. [with Trade Mark] Laterna Magica Magic Lantern Lanterne Magique MADE IN GERMANY

B 151x89x10; C 259x205x130. Early 20 C. G.

Child's toy; painted wood base; bell shaped oil vessel; spherical brass centre; black chimney; box.

The objective is in a polished metal cylinder with push focus, and is held on a decorated frame; the box contains a bell-shaped oil bottle, glass elongated globe, coloured slides each with four illustrations (most are broken or chipped), child's tickets "Ticket for Entertainment with the Magic Lantern", and instructions in three languages.

From the Egestorff Collection.

2162 NMD217 LENS SYSTEM

Ross, London, 30117 (also Nos 34843, 46226 & 46817)

L 568; MxD 298. Early 20 C. G.

Brass bound; slit for Waterstone stops; objective shade and turned wood cover.

Three more lens systems on cameras.

Other Ross lens systems are fitted to bellows cameras in the photography collection: No 34843 Ross LONDON Universal; No 46226 Ross LONDON Universal (LsD 100 - 4"); No 46817 Ross LONDON PORTRAIT (LsD 100 - 4").

From the Egestorff Collection.

Turner 1989, 155-164 gives serial number 5461 as 1888.

0413 NMD033 LEVEL - TELESCOPIC

Spencer Dublin

L 330; H 169; TuD 41. 1845-1863. F.

Brass and oxidised brass; two spirit levels at right-angles on top; four screw double plate base; rack and pinion focus.

Large spirit level along the top of the tube; small level at right-angles at the objective end; eyepiece focus; objective lens cover with hinged flap; screw thread below for stand.

Dates from Morrison-Low 1989, 136.

0486 NMD034 LEVEL - TELESCOPIC

YEATES & SON. DUBLIN PATENT

L 329; H 154; TuW 43. c1887. CT.

Brass and black enamel; octagonal tube; on top, spirit level; centre bubble level; two disc four screw base.

Rack and pinion eyepiece focus; rounded shade for objective lens; screw thread below for stand.

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"S.M. Yeates' Improved Dumpy Level (Patented). This instrument is really the only improvement made in the Dumpy level since first introduced by Gravatt. The telescope, stage, &c., of this level are all cast in one piece....These improvements not only render the instrument much more durable...but also more compact".
Quote from Yeates 1887,27.

0627 NMD261 LEVEL - WATER

Register book records that it is by J.J. Hicks
W 330; CpD 71; C 370x279x71. 1893. D.

Lower and upper brass pipes, two glass cylinders at sides; inlet pipe on top to add water; on short tripod.

An unsigned oxidised brass prismatic compass screws on in the centre; it is marked underneath "20 O.S. 40 9 04"; the level itself is marked "66 4 96 WL 1 0 06".

The fitted boxwood case, which is partly lined with distressed green velvet, contains a turned boxwood handle (which may not belong since it is too large to allow the case to close properly), and a leather strap; it is marked: "Water Level No 13".

A red-leather-bound book "95 REGISTER OF STATE OF INSTRUMENT No ", which contains a green card stuck inside the front cover "O.S. 75. Should this Book be lost, the person who may find it is particularly requested to forward it by Post under cover, addressed thus - ON HER MAJESTY'S SERVICE. To The Director General of the Ordnance Survey, SOUTHAMPTON.", records: "O.S.O. Soton 8 Decr 1893 Water Level No 13 by J.J. Hicks issued to D.U. 12 new. The Stand has a brass sliding tube, wooden cap and leather strap. The detached stores in Box are, One Prismatic Compass (Four spare glass Tubes - crossed out). Box has two brass hooks & eyes. By Order W.A. Coyle C.S.M.R.E."; the book records the use of the level up to 20/11/23.

From the Egestorff Collection.

0629 NMD260 LEVEL - Y

Spencer & Son, 19 Grafton St., Dublin

MxL 394; C 393x205x122. 1866-1883. A.

Brass and oxidised brass; two disc/four screw base; bubble level below, spirit level on tube; rack and pinion eyepiece focus. Hinged objective flap; on mahogany tripod with brass fittings.

The fitted mahogany case has a trade label: "J. SPENCER & SON, Opticians and Scientific Instrument Makers To The Queen, BOARD OF PUBLIC WORKS AND BOARD OF TRADE 19, GRAFTON STREET, DUBLIN.", and has a leather shoulder strap.

From the Egestorff Collection.

Dates from Morrison-Low 1989,136.

0630 NMD259 LEVEL - Y

Troughton London

MxL 553; C 485x233x146. Late 18 early 19 C. G.

Brass; two disc four screw base; spirit level below tube, compass below this; signature on compass rose; case.

Mahogany and brass tripod; the fitted mahogany case has a trade label: "J. & E. Troughton [unreadable line] Mathematical, Optical & philosophical INSTRUMENT MAKERS No 136 Fleet Street London".

From the Egestorff Collection.

Edward Troughton lived from 1753-1835.

2963 NMD126 LEYDEN JAR

Unsigned

D 99; JaH 206; H 303; DiD 114; SrD 29.

Mid to late 19 C. G.

Glass cylinder with diamond pattern foil pieces inside and out; mahogany disc cap with brass rod to top sphere.

Wire and chain inside jar from conductor; on the disc cap is inscribed: "a/m" - perhaps the price?

0705 NMD004 LINEN PROVER

Seward DUBLIN A TELLER Shewing the ds100 in Linens by No. of Threds.

B 54x54; MnH 37; Wd 6.5x6.5; DEHs 42.

Early to mid 18 C. PC.

Brass; square base and window; screw thread magnifier.

The latter is in a cupped disc housing and screws into ring table (D39) supported on three turned pillars (one detached) from base; scale of number of threads against ds100.

John Seward was apprenticed to Gabriel Stokes on 8:7:1715 - W. Stuart, King's Hospital Archives.

1138 NMD046 LOG BOX

Unsigned - attributed to Pieter Holm.

163x47x34. 1729. S.

Brass and copper box; perpetual almanac and lunar calendar on top; below, table for calculating speed of ship.

On top also portraits of Julius Ceasar, dated 45 (BC) and Pope Gregory XIII, dated 1582 (Julian and Gregorian calendars); on bottom Amerigo Vespucci(?) dated 1497.

"Tobacco boxes of this kind were devised by Pieter Holm, a Swedish mariner, who set up a navigation school in Antwerp in the middle decades of the eighteenth century. The slogan on the side of the box, 'Regt Door Zee', refers to this school."

Quote from Wynter 1975,89.

3682 NMD130 LORRAIN GLASS

MASON 21. PARLIAMENT ST. DUBLIN

216(8½")x158(6¼"); C 238x177x25. 1884-1895. A.

Rectangular black glass plate, convex in both directions; in hinged leather-covered, silk-lined case.

The case is covered in red leather; both fastening hooks are incomplete, and the case is slightly warped; one hinge has come loose, but is complete; the inside of the lid is lined with blue silk, with the Mason signature on a small leather stick-on label; the glass, which has a high polish on its convex side, is surrounded by a protective wall of blue velvet.

This sketching aid owes its name to the use of a convex glass for painting by the French landscape painter Claude Lorraine (1600-1682) - see Turner 1973,279.

Tesseract 13,1986,53, describing a similar glass, records: "The effect of the dark mirror gives subtle coloration to a reflected scene, and with binocular vision one perceives a fascinating exaggerated three-dimensional effect."

Pike 1856,1,32 records: "I don't know whether it was the invention of the famous Italian artist, who was in landscape paintings what Landseer is in the representation of animals; or whether the mirror was so called because, like Claude Lorraine [s/c], it is said to improve upon nature; but, at all events, it is a great curiosity. Its construction is the same with the ordinary looking-glass, except that jet is used in place of quicksilver, and it is intended to reflect only the inanimate world. The Claude Lorraine mirror derives its value from the principle that all objects are more beautiful in miniature, which renders their defects less apparent; for the unsightly strikes the eye with immediate pain, while that which is perfect grows upon us more gradually."

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With this mirror, you frame for yourself, as it were, little landscapes at every turn, in which the sky is softer, the grass richer, and the foliage more graceful, than anything you can see without it." - this is given in quotation marks, but no source is indicated; Pike sold the mirrors in three sizes, 4x5.75, 5x6, and 6x7 inches for \$2.50, \$4.50, and \$6.00 respectively.

Alison Morrison-Low (Bull SIS No.41,15) writes: "The French landscape painter Claude Gellée (1600-1682), commonly called Claude de Lorraine, produced subdued and harmonic landscapes. The glass which bears his name does not appear to have been invented by him, but its convex darkened surface reflected scenes which could assist would-be artists." She gives a reference to "The Science of Art..." by Martin Kemp, New Haven and London 1990, 199-200.

The instrument came to the Museum via Charles Mollan.

Dates from Morrison-Low 1989,131.

4019 NMD182 MECHANICAL MODEL - CLOCK ESCAPEMENT

BOOTH BROTHERS 63 UPPER STEPHEN ST DUBLIN

B 460x200; WhR 151. Late 19 C. G.

Mahogany base; brass; ratchet wheel; long rod pivoted at centre with pivoted arm to click catch; refurbished.

A restraint near the bottom of the long arm limits its movement, allowing the catch to engage or disengage; a short pivoted arm with another click catch lies opposite that attached to the long rod. From the North Monastery Cork collection.

4022 NMD184 MECHANICAL MODEL - LIFT PUMP

Unsigned - attributed to P. Cahill, Coalquay

Ta 360x235x215; H 580. Mid to late 19 C. G.

Green painted tin tank; two pillars inside hold sprocket wheels above and below to lift discs vertically through a tube.

The tank is on four claw feet, has a tap at one end, and has two glass sides (one now missing); the wheels, above and below, each have six pairs of parallel sprockets to move the discs (D43), which are joined by a chain (now broken); these would lift water from the tank to the top of the tube, which has a run off lip, returning the water to the tank; the tube was once part of a brass telescope.

This model has similarities to the water wheel model 4020 NMD183, signed by P. Cahill, 8 Coal Quay.

From the North Monastery Cork collection.

3612 NMD173 MECHANICAL MODEL - PISTON ENGINE

Unsigned

B 243x239x22; H 560; WhD 390. Mid 19 C. G.

Cast iron; two gothic window type trunnions to axis of a heavy grooved wheel; double U coupling for piston rod.

Much of the model is painted green; the wheel has four curved spokes; its axis is bent in a large U, with its centre coupled to the double U which raises and lowers the rod into the piston; the far end of the axis has a small disc (D40) with an off-centre coupling to raise and lower a valve rod at the pipe outlet; above the trunnions is a double arc support for a two-ball governor (SrsD17); this does not now turn, but probably did using a small pulley wheel on its axis, and two other pulley wheels at the side of the double arc support, via a pulley thong.

A particularly attractive model.

From the North Monastery Cork collection.

4020 NMD183 MECHANICAL MODEL - WATER WHEEL

P. CAHILL 8 COAL QUAY

Ta 528x273x180; H 410; WhOD 305. Mid to late 19 C. G.

Blue painted tin tank with claw feet and two glass sides; the wheel has 24 vanes on one side and 12 buckets on other.

One of the four claw feet is missing; the wheel is held by a bridge in the centre of the tank, which has an output tap at one side; the rectangular tapering hanging buckets are painted in different colours; there is a run-off chute and tube below the axis of the wheel.

From the North Monastery Cork collection.

Morrison-Low 1989,121 lists Patrick Cahill at Wellington Quay, Dublin, from 1876-1922, but not at Coal Quay.

3748 NMD180 MECHANICAL MODEL - WATER WHEEL

P. CAHILL COALQUAY

B 620x319x26-49; WhD 309, W 80. Mid to Late 19 C. G.

Tin; angled low wall tank base; two vertical supports for wheel, which has 26 horizontal curved vanes.

The base is raised on one side with two feet, and there is an outflow guide on the other side; the wheel has two sets of four spokes, offset from each other; a raised curved piece on the floor of the tank in front of the wheel is presumably to adjust the water flow; the axis has a pulley wheel (D18) on an extension.

From the North Monastery Cork collection.

Morrison-Low 1989,121 lists Patrick Cahill at Wellington Quay, Dublin, from 1876-1922, but not at Coalquay.

3782 NMD152 MERCURY TROUGH

Unsigned

L 222; H 51; MxW 78. Mid to late 19 C. G.

Light brown ceramic; long narrow trough on three feet with wider and deeper part at one end near a raised table.

The latter is attached to the outside walls of the trough, but is open inside, and has a hole in it. From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

0587 NMD299 MICROSCOPE - COMPOUND

BAKER, 244 High Holborn, LONDON

MnH 450. Second ½ 19 C. G.

Brass; Y-foot; trunnions to pivot; tube body on transverse arm with fine focus; mahogany case.

Triangular limb runs in rectangular casting; two-way movement to stage; rack and pinion adjustment to substage condenser; cupboard-type case has four drawers of accessories.

From the Egestorff Collection.

Charles Baker worked from 1851-1919, Downing 1988,6.

0372 NMD029 MICROSCOPE - COMPOUND

Mon E. Hart. & A. Praz. A. Prazmowski suc'r Rue Bonaparte, 1 Paris Bryson Edinburgh

MxH 280; Fo 117x76; TuSvD 30. 1876-1881. R.

Brass; Y-shaped iron foot; pivot; side arm for tube.

Pillar from foot to pivot; on this, bracket for mirror; stage above pivot; then pillar arm with fine focus adjust screw on top; side arm bracket to support for microscope tube; push coarse focus; double objective; three eyepieces numbered 3, 4, and 4; condensing lens from angled joint from tube support.

Prazmowski dates from Payen 1986,160; Bryden 1972,45 gives James Bryson dates 1850-1893.

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0592 NMD294 MICROSCOPE - COMPOUND

E. Leitz, Wetzlar, No. 63565

MnH 278. 1902. N.

Brass, steel, and black enamel; cast foot to pivot for limb with stage, mirror below; curved arm to tube.

Coarse focus by double knob rack and pinion; fine focus by knob on top of limb pillar; substage condenser; mahogany case with eyepieces and objectives, latter in brass cylinders.

From the Egestorff Collection.

Serial number - date list from J. Bennett.

0583 NMD302 MICROSCOPE - COMPOUND

Powell & Lealand, 4 Seymour Place, Euston Square, London 1855

H c450; CW c210; Accessories C 302x288x80. 1855. S.

Brass; three leg trunnion foot; tube on transverse arm on top of pivoted limb, supported by two struts.

Substage condenser with rack and pinion adjustment; rotating mirror below; stage provided with two-way movement; a mahogany case contains a large number of eyepieces, objectives and other accessories.

From the Egestorff Collection.

2837 NMD107 MICROSCOPE - COMPOUND

Spencer & Son 19 Grafton St. Dublin.

Sp 129&135; MnH 322; TuD 28; SaD 85. 1864-1886. F.

Cast iron trunnion foot; brass; cylinder on pivot for mirror below and limb for tube above; circular stage.

An oxidised brass sleeve on the pivoted cylinder allows the (cracked) plain and concave mirror on a semicircular mount to move up or down; a limb at right-angles on top of the cylinder holds the base of the tube; coarse focus in by double knob rack and pinion with triangular rack; fine focus is by means of a bar from the objective with a knurled knob and screw; double circular stage with ring of four apertures.

Dates from Morrison-Low 1989,136.

2600 NMD205 MICROSCOPE - COMPOUND

WATSON & SONS PATENT 56 313 High Holborn LONDON 18418

Sp 244; MnH 462; C 386x256x101. Late 19 early 20 C. F.

Brass; circular base with three arms; pillar to pivot for circular stage; curved bracket to tube mount.

Revolving mirror on mount from base; substage condenser; coarse focus by double knob rack and pinion on tube mount; stage divided 70-0-120; "WATSON & SONS PATENT 56" on stage; "WATSON & SONS 313 High Holborn LONDON. No 18418." on base; alternative binocular tubes; the fitted mahogany case has spaces for accessories but only some remain, including: one eyepiece; one empty objective lens tube "3 INCH WATSON & SONS 313 HIGH HOLBORN LONDON"; a short objective lens tube "1/6 R & J BECK LONDON", containing the lens; a parabolic reflector; a large brass circular stage with [cracked] glass top; a bakelite plate with clips to hold slides; and a [broken] glass trough.

From the Egestorff Collection.

Firm assumed this name in 1882, Clarke 1989,87.

0591 NMD295 MICROSCOPE - COMPOUND, BINOCULAR

HENRY CROUCH, LONDON 2397

MnH 372; C 398x218x170. c1875. R.

Brass and oxidised brass; cast trunnion foot to pivot for curved limb holding mirror, stage, and double tube.

Rack and pinion coarse focus; circular stage with ring of apertures below; revolving plain and concave mirror on sleeve on cylinder extension of limb below stage; Wenham prism optics; fine focus to nosepiece by knurled knob and lever; mahogany case contains three eyepiece and three objective lenses; a double nosepiece; two mounted nicol prisms; a Wenham parabolic reflector; a rotating disc of four apertures; a mount for a camera lucida prism (missing); a frog plate; and a Botterell's trough.

From the Egestorff Collection.

Historical Technology 131,1988,105 gives c1868 for No.760; 133,1990,77 c1890 for No.5858.

0577 NMD307 MICROSCOPE - COMPOUND, CUFF

J. CUFF Londini Invt & Fecit

CH c410. c1744. D.

Brass; mahogany case and base; focus by two-pillar system; three-arm stage; one sided mirror; condensing lens.

Latter on rod above stage with semicircular mount; accessories include a lieberkuhn with an adjustable sleeve, six powers and two original pasteboard diaphragms; the microscope is on a mahogany drawer base, and in a mahogany pyramid case with another drawer.

The instrument has an accompanying illustrated tract, dated "September 20th. 1744": "THE DESCRIPTION of a NEW CONSTRUCTED Double Microscope: In which Some Useful IMPROVEMENTS are introduced: As Made and Sold by the INVENTOR, JOHN CUFF, Over-against Serjeant's-Inn Gate, in Fleet- ftreet, LONDON."

From the Egestorff Collection.

0578 NMD306 MICROSCOPE - COMPOUND, CUFF

Unsigned

CB 210x202; CH(-Ha) 505. Mid 18 C. PC.

Brass; variation of Cuff type, with stage focus and two arm stage; double sided mirror; sub-stage condenser; case

The mahogany pyramid case has a brass handle on top, and a drawer at the bottom, inside the door; the latter contains a Lieberkuhn sleeve, a live box, and a fish plate.

From the Egestorff Collection.

0580 NMD312 MICROSCOPE - COMPOUND, CULPEPER

J. Lynch & Son DUBLIN [Trade label] No26 Capel Street JAMES LYNCH & SON...

B 154x152; MnH 372; SaD 90; C 186x188x430. 1808-1825. F.

Brass; mahogany drawer base; two sets of three scroll legs; circular stage; in pyramid case with trade label.

Rotating condensing lens on rod from stage; rack and pinion focus; small double disc (D33), with spring, above larger circular stage; rotating concave lens (silvering imperfect) below stage; the drawer contains accessories, including five objective lenses, cylinder with lieberkuhn, fish-plate; specimen box, live box, under-stage cone, tweezers, rod with spring tongs, ivory double box for talcs and wire rings, five ivory slides with specimens, three glass tubes of different diameters (fishing-tubes, two chipped) and flat and curved glass discs; the instrument is contained in a mahogany pyramid case with brass baskets of fruit and rings at two sides, and a sphere in a collar on top; the Trade Label on the inside of the door of the case has a separate entry 2591 NMD313. This is the microscope which started off the Egestorff collection; it was given as a present to Paul from Edith.

Dates from Morrison-Low 1989,129; names of accessories from Turner 1989,49 and Beck 1894,35.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0374 NMD030 MICROSCOPE - COMPOUND, CULPEPER

Unsigned - attributed to Edward Scarlett, London

H 410; B 172x172; MxHsD 82; SaD 88. c1725. PC.

Octagonal wood base, drawer with accessories; three turned brass legs; black turned wood and shagreen housing.

Central mirror on base with ball and socket joint; brass circular stage; shagreen cover draw focus with decorated green inside cover; accessories in drawer include lenses and brass revolving slide carrier.

A card with the instrument attributed it to Edward Scarlett c1677-1743, optician to King George II; Turner 1981,41 notes that the octagonal box foot was "used in the 1740s".

3663 NMD128 MICROSCOPE - COMPOUND, DRUM

J. SPENCER

BD 83; MnH 293; DrD 58; TuD 30,26&26. 1845-1863. F.

Brass and oxidised brass; mirror in drum below two-part stage, upper part floating; three power objective.

The mirror housing is a revolving oxidised brass disc and ring frame, but the mirror is now replaced by silver paper; it is turned via a knob at the side of drum; the latter rests on the brass base disc and has its front cut off; in the lower part of the oxidised brass stage sits a peg holding a bracket for a condensing lens, which can be moved in or out via a pivot, or turned around using a knob; under the lower stage is a revolving disc of apertures; the upper floating stage is adjusted by means of a spring-loaded screw in a brass cylinder descending vertically below the stage; at the back of the stage is a pillar for the transverse arm holding the sleeve into which the microscope tube fits, coarse focus being by pushing in this sleeve; the objective has three lenses which screw into one another and which can be used together or separately; there are two eyepieces, which slide onto the top of the tube; the microscope is in a fitted mahogany case with some accessories: a brass and glass tank (63x24x8); an ebony and ivory disc (D31); a brass rod probe (L112) with one pointed end; there are places in the case for some more missing accessories; the signature is scratched at the back of the stage below the pillar mount, and its inconspicuous nature suggests that Spencer was the retailer, rather than the maker.

The vendor, Saul Moskowitz of Massachusetts, suggests that it is French, made by Georges Oberhaeuser or the firm of Nacet, and indeed it is very similar (though not identical) to the Nacet Microscope illustrated in Turner 1981,86.

Purchased in 1990 via the Royal Dublin Society instruments fund, with a donation from the Pfizer Chemical Company.

Illustrated in Historical Technology 131, Spring 1988,21; 133, Spring 1990,22.

Dates from Morrison-Low 1989, 136.

0585 NMD301 MICROSCOPE - COMPOUND, GOULD

Cary, London

H c170; C c80x60. Second ¼ 19 C. G.

Brass; mounted on side of mahogany case; stage focus; cylinder and tapering tube on transverse arm; mirror; three ivory sample slides.

This type of microscope designed by Charles Gould and described by him in 1827; Gould was one of William Cary (1759-1825)'s men and this type of microscope is often called a Cary type.

From the Egestorff Collection.

Gould and Cary details from Turner 1989,75.

0581 NMD304 MICROSCOPE - COMPOUND, GOULD

T. Harris & Son, London

H c250; C c175x130. Second ¼ 19 C. G.

Brass; mounted on side of mahogany case; stage focus; cylinder tube on transverse arm; with accessories.

Two sliding bars of powers with lenses 1-6; converts to simple microscope on removal of the tube; modification of type of microscope introduced by Charles Gould and described in 1827 - this one has a longer cylinder tube with a short tapered bottom, rather than having the usual longer tapered bottom.

From the Egestorff Collection.

The firm was active throughout the 19 C, Crawforth 1988,

9; Gould details from Turner 1989,75.

0586 NMD300 MICROSCOPE - COMPOUND, GOULD

Unsigned

H c290; C c145x105. c1842. PC.

Brass; mounted on mahogany case; stage focus; tube on transverse arm on top of support; three objectives.

The latter can be mounted together; flat single-sided mirror under stage; three boxwood slides; cylinder and tapered tube.

From the Egestorff Collection.

0399 NMD032 MICROSCOPE - COMPOUND, GOULD

Unsigned

H 204; D 23; C 114x105x30. Late 18 C. PC.

Brass; shaft screws into case centre; tapering base to tube on bracket on top of shaft; rack and pinion stage.

Mirror in semicircular frame can also revolve around axis; stage has circular centre; object holder attaches to stage; in red leather-covered case; ivory slide for seven objects; ivory and metal spike.

Date on card with instrument.

1132 NMD040 MICROSCOPE - COMPOUND, JONES

Carpenter, 24, Regent, Street, LONDON.

H 389; Sp 173; TuD 38. 1826-1833. A.

Jones Most Improved type; brass; folding tripod legs; pivot for limb; rack and pinion stage focus; arm for tube.

Tapering pillar on folding legs to pivot; square section limb on bracket from this; sliding mirror on limb; focusing stage; circular top into which slides arm for bracket to hold objective end of tube; latter has small diameter at eyepiece end expanding to cylindrical body; in fitted case with accessories; including seven ivory object slides; eye-pieces; condensing lenses; circle of six objective lenses.

Dates from Clifton 1995,.49.

0582 NMD303 MICROSCOPE - COMPOUND, JONES

Clarke MANUFACTURER Sackville St. DUBLIN

Sp c230; H c560. 1810-1821. A.

Brass; most Improved type; folding tripod legs and pillar to pivot for limb; tube on transverse arm above.

Square-section limb holds mount for double-sided mirror, sub-stage condensing lens on arm with two right-angles, stage with Bonanni spring and lieberkuhn on arm and frame on another arm with two (of three) lenses; mirror, condenser, and stage are all independently adjustable; cone and cylinder tube on transverse adjustable arm on top of limb has carousel of six powers at objective.

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Dates from Morrison-Low 1989,122.
From the Egestorff Collection.

0588 NMD298 MICROSCOPE - COMPOUND, JONES

Dollond London
C 345x246x102. Early 19 C. PC.
Brass; version of Jones Most Improved type; folding tripod foot and pillar to pivot for limb; fitted case.
Square-section limb, with mirror, condensing lens, and stage, individually adjusted; objective end of tube on adjustable transverse arm on top of limb; in mahogany case with variety of accessories.
From the Egestorff Collection.

2367 NMD072 MICROSCOPE - COMPOUND, MUSEUM

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON. WATERHOUSE MUSEUM MICROSCOPE NO. 10631.
HsB 374x272, H 366. 1882-1902. R.
Glazed mahogany case; brass tube; 12-slide carousel.
Case stained black, glazed on three sides, rises to a point near the eyepiece of the microscope; iron stand has disc base, swan-neck bracket for tube; screw focus at eyepiece; rotating mirror to give light to slides on carousel, through a hole in each mount; knob at side of housing rotates the carousel; two white-metal clips to secure slides to carousel; almost identical instrument 4079 ULS001.
Firm assumed this name in 1882, Clarke 1989,87; listed as a Limited Company 1902, Anderson 1990.88-89.

1135 NMD043 MICROSCOPE - SCREW BARREL

Ja. Mann. Londini; Fecit 1730
MnL 55; D 28; W 91. 1730. S.
Brass frame; turned ivory handle; brass lens housing screws into frame; sample held by spring and plates.
Brass sample plate near screw has wooden frame and arch for inserting sample; other circular brass plate held by spring from frame end; latter incorporates lens.
James Wilson introduced the screw-barrel microscope to London - he published his design in the Philosophical Transactions of the Royal Society in 1702.

1136 NMD044 MICROSCOPE - SCREW-BARREL

Unsigned
MxL 77; W 76; D 27. c1730. Sl.
Brass frame; turned ivory handle; brass lens housing screws into frame; sample held by spring and plates.
Brass sample plate near screw has arch for inserting sample; other circular brass plate held by spring from frame end; latter incorporates lens; with simple microscope 1137 NMD045.
Similar to Mann microscope 1135 NMD043 dated 1730.

0579 NMD305 MICROSCOPE - SCREW BARREL

Unsigned
C c105x70. c1780. PC.
Brass; ivory handle; in wood case with black fishskin; with compass microscope 2592 NMD210.
Focus by turning screw barrel.
From the Egestorff Collection.
Details from Turner 1989,250.

1137 NMD045 MICROSCOPE - SIMPLE

Unsigned
L 80; LeHsD 28; HaD 29; C 161x19x10. c1730. CO.
Brass; turned disc attached to circular screw frame for five lenses by revolving arm; case for ivory slides.
Arm can revolve about centre of disc and also about centre of arm; four lenses protected by ivory caps; screw thread on disc, presumably for missing handle; black fish-skin-covered case for collection of samples in ivory slides, some with brass mounts; accessories include sample forceps; brass retention block; black and white background in brass frame; brass tweezers; may be a set with screw-barrel microscope 1136 NMD044 - see Wynter 1975,206

2592 NMD210 MICROSCOPE - SIMPLE, COMPASS

Unsigned
C c105x70. c1780. PC.
Ivory handle; lieberkuhn lens mounting; specimen held in tweezers; with screw-barrel microscope 0579 NMD305.
In wood case with black fishskin; handle a later replacement?
From the Egestorff Collection.
Name from Turner 1989,257.

0589 NMD297 MICROSCOPE - SOLAR

Dollond, London for Lord Provost Lawson Edinburgh 1860
MnL 575; MiHs 390x119; C 453x257x217. 1860. S.
Brass; hinged rectangular mirror behind mount for window shutter; tapering and straight tube; box at objective.
Knurled knobs to adjust position of mirror; rectangular oxidised brass optical box at objective end with brass lens system housing; fitted oak case contains three brass objective cylinders, "No.1 Power", "No.2 Power" and "No.3 Power", six brass plates with handles for lenses, two marked "ACHROMATIC", one similar plate with no lens, and a right-angled prism; a tray holds additional accessories.
A typed record with the instrument reads: "LARGE BRASS SOLAR MICROSCOPE BY DOLLOND, LON-DON. Comprising Adjustable Heliostat with oblong Mirror for Screwing into window shutter, Body Tube fitted at tapering end with large condensing Lens of 4 inches clear aperture, Rackwork sliding Tube with dovetailed slot for condensers, Spring Stage for Objects, Right angled Prism for casting image in any direction, 6 non-achromatic Objectives in circular blackened brass mounts and marked 1 to 6, 5 relative dovetailed brass plates with handles containing condensing lenses for use with above Objectives, 3 Achromatic Objectives marked 1, 2 and 3 in circular brass boxes with Lids, 3 relative dovetailed brass plates with handles containing condensing lenses marked Achromatic 1, 2 and 3, for use with Achromatic Objectives, Polariscope consisting of adapters containing Polarising and Analysing Nicol Prisms, Adapter for Achromatic Objectives, Square Brass Box Apparatus fitted with Adjustable Mirror and 3 Sliding lenses and Spring Stage all for showing opaque Objects, Hand Microscope with Achromatic Objective and tapering end and Ramsden Eyepiece, Live Box for Pond Life, all in Light Oak Varnished fitted Case. Note:- The foregoing Instrument perhaps one of the finest Solar Microscopes ever constructed was made and supplied to the order of the Late Lord Provost Lawson of Edinburgh, and was bought by me at the sale of his effects by Dowell at 34 George Square, Edinburgh, on 24th February, 1903. Full directions and particulars by Dollond and Mr Lawson are enclosed in Case."

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A hand-written note by Provost Lawson reads: "Monday, 9, July, 1860. Solar Microscope by Dollond. This Instrument I ordered to be made for me regardless of expense to be best adapted for shewing Animalcules. It has three Achromatic Object glasses and six others mounted in black metal which are not achromatic. A prism to shew the object either below or on one side and polarizing prisms. Dollond tried the Instrument and found it to act well before it was delivered to me. he told me the magnifying power would depend on the distance of the screen from the object glass. With it is supplied a hand microscope having an achromatic object glass and a Ramsden's eye piece. this I told them to make for me with the Instrument. It is intended to examine (magnified any) small object the tube being held in the hand its magnifying power will vary as the tube is more or less drawn out. This Solar Microscope was delivered to me on Tuesday, 3rd July, 1860, and for which I paid at the time about £70. It fits into its Oak box, Oak being the wood I gave instructions to have it made of. The objects with some glass slides and very thin microscopic glass fit into and are kept in two other boxes, one made with a sliding cover as I directed. A number of Papers (Advertisement, Bills) given me in the streets about this time July 3th to 9th are left in the box to be kept with the instrument to shew what was in existence at this time."

Also enclosed in the case are six hand-written pages of instructions from Dollonds. The envelope containing these sheets has the name and address: W. B. Dunlop Esq 4a St Andrew Square. From the Egestorff Collection.

0590 NMD296 MICROSCOPE - SOLAR

Ross

MnL 445; MiHs 374x159. Mid to late 19 C. G.

Brass; hinged rectangular housed mirror behind tube plate; in brass-bound blue-lined mahogany case with accessories; for transparent objects.

From the Egestorff Collection.

4175 NMD144 MORTAR & PESTLE

Unsigned

BD 58&65; ToD 86&93; H 50&70; Pestle L 182, MxD 30.

Late 19 early 20 C. G.

Two circular glass mortars with lips, and one turned wood and ceramic pestle.

From North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

1628 NMD069 MUSICAL GLASSES

Unsigned

MxD 35-110; C 956x505x259. Mid to late 19 C. G.

Thirty two bulb glasses with stems in turned wooden bases; music played by tapping or rubbing edges.

Contained in glass-topped mahogany cabinet on legs.

0671 NMD220 NOCTURNAL

Unsigned

L c240; D 114. Early 18 C. G.

Wood; for "BOTH BEARS"; local time in inner chapter ring; on the reverse - pole star variation from true North.

By setting the chosen bear indicator to the date, and viewing the pole star through the central hole, the alidade, when aligned with the appropriate star, will indicate local time on the inner chapter ring.

From the Egestorff Collection.

3641 NMD172 NOOTH APPARATUS

Unsigned

BD 261; H 745. Mid 19 C. G.

Glass; flat bottomed lowest vessel; bulbous middle vessel; pear-shaped top vessel with bent pipe below.

The lowest vessel is shaped like a bell, with a ground glass opening and lip on top; into this fits the large bulbous central vessel (MxD201), which has a side vent at its bottom, just above the joint; it also has a ground glass opening and lip on top, into which fits the top pear-shaped vessel (MxD130); this has a tapered vent on top, and a pipe descending from its bottom curving into the large middle vessel.

There is also the flat-bottomed part of a second Nooth apparatus (BD271; H185), but the rest is missing.

The apparatus is Dr Nooth's for impregnating water with 'fixed air' (carbon dioxide) to prepare medicinal waters; it was originally described by John Mervin Nooth M.D., F.R.S. (1737-1828) in a paper read to the Royal Society on December 15, 1774; in the complete apparatus, the neck between the bottom two vessels would have held an ivory valve mounted in a cork; this would have allowed the carbon dioxide through, but prevented the water above it from escaping into the bottom vessel, which would have held the reacting chemicals generating the carbon dioxide (e.g. chalk and sulphuric acid); the upper vessel with the bent pipe dipping into the water in the middle vessel would have received water being displaced by the carbon dioxide, giving also a seal and producing a pressure in the middle vessel, in which water would become carbonated and could be run off through a tap on the side arm; by trial and error, the amount of chemicals needed to generate enough carbon dioxide, but insufficient to cause the upper vessel to overflow, would be found.

From the North Monastery Cork collection.

See Turner 1983,207; D. Zuck, British Journal of Anaesthesia 50, 1978, 393-405.

1131 NMD039 OCTANT

BUCKLEY * DUBLIN (overwriting London signature)

R 256; L 303; W 245. 1832-1859. F.

Ebony, ivory, and brass; curved T support; reinforced index arm; scale 0-105°; vernier 0-20; mirrors gone.

Index arm tangent and clamping screws missing; three filters for index mirror in square brass housings; three circular frames for horizon mirror filters, but one glass gone; no half horizon mirror; one foot missing; letter "O" can be detected between the "I" and "N" of Dublin and letter "N" after the "N" of Dublin, indicating that the London signature was scraped off and the Buckley signature added.

Dates from Morrison-Low 1989,121.

0609 NMD279 OCTANT

B. Condry, Philadelphia, 1775 (3?) for Captain C.T. Bethel (partly erased)

R 343; CL 430, W 390, H 107 & 60. 1773 or 1775. S.

Ebony; ivory scale; engraved flat brass index arm.

Double peep sight; single peep back sight; index, horizon and half horizon mirrors; filters can be moved to either mirror; index arm has a window sight with an ivory vernier, but no tangent screw, and is decorated with a floral motif; in stepped oak case with trade card: "Mrs. JANET TAYLOR & Co. Mathematical Instrument Manufacturers, CHART, MAP & BOOKSELLERS, Nautical Academy by Appointment. NAVIGATION WAREHOUSE, 104 Minories opposite Rail Road LONDON. UNDER THE PAT-RONAGE OF THE ADMIRALTY, EAST INDIA COM-PANY & TRINITY HOUSE. AGENTS FOR THE SALE OF

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

ADMIRALTY CHARTS, CHRONOMETERS RATED & REPAIRED The Deviation of Compasses in Iron Vessels found & corrected. Agents for Mr Dent's Chronometers. Nautical Instruments made & repaired on the premises."
From the Egestorff Collection.

2593 NMD209 OCTANT

G. RAHTJEN. BREMEN.

R c260. Early 19 C. G.

Ebony, brass and ivory; reinforced index arm, window vernier, tangent and clamping screws; no half horizon mirror.

Three filters in square housings for index mirror and three in circular housings for horizon mirror. From the Egestorff Collection.

1130 NMD038 OCTANT

Yeates Dublin

R 276; L 325; W 268. 1826-1858. G.

Ebony, ivory, and brass; curved T support with ivory pencil top; index and horizon glasses; shades missing.

Reinforced index arm with replacement mirror; tangent and clamping screws on index vernier; scale 0-100°; eyepiece with two peep-holes and slide cover; clamp and adjusting screw for horizon mirror; no half horizon mirror.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

0610 NMD278 OCTANT

Unsigned

R 244. Early 19 C. PC.

Ebony frame; ivory scale; reinforced brass index arm; double peep; ivory topped pencil; no half horizon mirror.

Tangent and clamping screws on index arm, which has a window sight and vernier; filters for index mirror only.

From the Egestorff Collection.

3573 NMD148 OPTICAL BENCH

G. PERCIVAL (Maker) CORK.

B 899x162x16; H 487; LeHssD 223; PrsD 13.

1881-1883. F.

Mahogany base holds four brass pillars to brass ring housings for glass plates to make hollow lenses.

The ring housings have varying widths (19-77), and have signed ("G. PERCIVAL CORK") caps on top; two plates are added to each to make a biconvex, a biconcave, a plano-convex, and a plano-concave lens when filled with liquid; the biconcave (the widest) has been repaired with wax, presumably to stop a leak.

From the North Monastery Cork collection.

Dates from Burnett & Morrison-Low 1989,154.

3583 NMD149 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN C4 G3 E3 C3

Hs 608x73x63 - 295x51x46. Mid to late 19 C. G.

Two; boxwood with mahogany lip and tapering input below; single turned wood capsule; one pipe has a slide on top.

The larger has parallel mahogany rods on the top front of the housing, and a sliding mahogany panel in these, with a window above a rounded rectangular hole in the boxwood; the capsules have two short pipes, one sticking vertically up from the centre of the dome, and the other at its side.

From the North Monastery Cork collection.

0645 NMD244 ORRERY

NEWTON & SON, 66 Chancery Lane

BD 435. 1841-1883. A.

Brass crank-operated mechanism above and below paper-covered base board which is on three turned mahogany legs.

Showing movements of earth, moon, and seven planets.

From the Egestorff Collection.

Dates from Clifton 1995,200.

0623 NMD265 PANTOGRAPH

J. & W. Watkins Charing Crofs

L 660; C 705x76x67-133. 1784-1798. R.

Brass; ivory castors; two long and two short limbs; disc weight base; divisions 1/2,5/11,2/5,1/3,1/4...1/12; case.

Divisions on one of the long limbs "B" and on one of the short limbs "D"; case has a poorly cut elliptical trade card with a crest on top: "Jerh & Walr Watkins OPTICAL, MATHEMATICAL & PHILOSOPHICAL Instrument Mak-ers to his Royal Highness The DUKE OF CLARENCE. Charing Crofs, LONDON."; the motto on the crest is: "NEC TEMERE NEC TIMIDE".

From the Egestorff Collection.

Dates from Jeremiah and Walter from Clifton 1995,291.

3784 NMD150 PNEUMATIC SHELF

GRIFFIN. GARRICK ST.. LONDON.

D 127; H 51; HID 31. 1867-1898. F.

Unglazed white ceramic; shaped like a pulley wheel with a central hole on top, but with none at the side.

Also a brown glazed beehive pneumatic shelf - a cylinder with an open bottom, a hole in the top, and a hole in the side (with a complete rim on the bottom) signed: "GRIFFIN LONDON".

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

3783 NMD151 PNEUMATIC SHELF - BEEHIVE

P. HARRIS & Co., LTD. DUBLIN.

D 67; H 41. 1902-1911. F.

Ceramic cylinder with open bottom and closed top except for central hole, and a side arch; for gas collection.

Used in a pneumatic trough.

There are several others, one (D75,H41) signed: "PORT DUNDEE[?] GLASGOW POTTERY CO"; and another (D110,H70), which looks older, and which has a complete rim around the open bottom, with a long curved hole in the side rather than an arch rising from the bottom.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with

sponsorship from Pfizer Pharmaceuticals, Cork.

Name given in Harris 1908,104.

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3775 NMD154 POTASH BULBS - MOHR

Unsigned

H 108&117; W 90&103; VsD 20-40,22-38.

Mid to late 19 C. G.

Two; glass; five pear-shaped vessels, three small ones below, one middle-size and one large above, joined by tubes.

The three small vessels have the tubes extending to their bottoms; the largest has an input pipe above, and a pipe from its bottom into one of the small vessels; the middle-size vessel has an output pipe on top, and its bottom is connected to the upper side of one of the small vessels; thus gas would go through the largest vessel, bubble through the three small vessels and emerge through the middle-size vessel.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

Name from Maiben 1914,385.

2596 NMD127 POWDER HOUSE

Unsigned

B 176x95x7; MxH 248. Mid to late 19 C. G.

Mahogany "house" with walls and roof; attached conductors demonstrate the firing of gunpowder using electricity.

The house collapses entirely when the explosion occurs being held together by six sets of hinges; inside, from the centre of the base, rises a turned mahogany pillar with a small metal container on top for the charge; there is a small ivory cone at the side of the metal container; a pin, which fits loosely in the ivory cone connects, via a chain, with the bottom of a "lightning conductor" running from its pointed top above the house "chimney"; in the centre of the conductor is a propeller-like brass revolving bar, which can presumably allow a continuous flow of the charge when it is aligned with the conductor, or stop it when placed at right-angles; another pin from the metal charge vessel is connected, via another chain, to the other side of the house, where it connects to an eye and hook on the outside; there is some chipping on one of the inner walls of the house, but it is otherwise in very good condition.

From the George Smith Collection, purchased in 1990 via the Royal Dublin Society instruments fund (anonymous donation). Details from Pike 1856,I,311.

0706 NMD005 PROTRACTOR

William King DUBLIN

131x93; R 65. 1767-1784. W.

Brass; scale with proportional parts; semi-circular pro-tractor on one side of this - two curved spokes.

Scale 10-90 and 1-8; on protractor 10-170°, 350-190°, and 180-10°; reverse side blank.

Dates from Morrison-Low 1989,128.

1410 NMD059 PROTRACTOR

Negretti & Zambra, LONDON

168x111; R 83; AL 153. Second ½ 19 C. G.

Brass; rather more than semicircle; scales 0-180 and 180-360; pivoted arm with window vernier; centre mark.

Pivot in form of ring with half of hole covered and line to mark centre; vernier 15-25 and 5-15 with clamping knob; two knobs on plate across bottom for holding instrument; arrow mark at right-hand side of plate labelled "W D 2139".

0625 NMD263 PROTRACTOR - CIRCULAR

Thomas Jones, 62 Charing Cross, London R 100 Trade card for Henry Porter

L 305; C 344x180x50. 1816-1850. R.

Brass and oxidised brass; silver scale; alidade and cross bar below; two tube prick arms; two right-angled verniers.

Tangent and clamping screws for window sight offset from one of the vernier arms; the bottom of the mahogany case is lined with green velvet.

A hand-written note in the case reads: "Protractor with pricking device by Thomas Jones, 62 Charing Cross, London. The limb is divided into ½ degrees and a vernier gives a reading to one minute of arc. First half 19 Cent."

The case contains a trade card: "HENRY PORTER APPRENTICE & SUCCESSOR TO THE LATE W. CARY, Optician & Mathematical Instrument Maker, TO THE ADMIRALTY, WAR OFFICE, ROYAL GEOGRAPHICAL SOCIETY, CHRISTS HOSPITAL, TRINITY HOUSE & THE SWEDISH & NORWEGIAN GOVERNMENTS, &c &c, 181 STRAND, LONDON. Repaired Adjusted May 1886 Index Error _____".

From the Egestorff Collection.

Dates of Thomas Jones from Clifton 1995,154.

0617 NMD271 PROTRACTOR - CIRCULAR

Spears & Co., Dublin.

D 203. 1838-1864. F.

Brass; single diagonal with centre of upper edge the centre of the circle; scales 0-90-0-90-0 and 10-360°.

From the Egestorff Collection.

Dates from Morrison-Low 1989,135.

2599 NMD203 PROTRACTOR - CIRCULAR

Troughton London

D c145. Mid 19 C. G.

Brass; four spokes; mechanical arm at right-angles to two limbs with verniers and open-work folding pricking arms; scale 0-360°; circular mahogany case.

From the Egestorff Collection.

2598 NMD206 PROTRACTOR - CIRCULAR

Unsigned J.B. Greene [owner]

D c120. Mid 19 C. G.

Brass; one diagonal with two perpendicular supports to upper semicircle; scales 0-90-0-90-0 and 10-360°.

Diagonal runs below centre and has a raised portion at the centre with a point hole for the centre point of the circle; rectangular mahogany case.

From the Egestorff Collection.

2959 NMD201 PROTRACTOR - RECTANGULAR

ELLIOTT BROS LONDON

154x45. Mid to late 19 C. G.

Ivory; 10-170°(x2); "DIAGL" scale 1/250000; on back, diagonal scales "M 1/5000" & M 1/10,000".

The degree measurements are around three tapered edges of the front; the fourth tapered edge has a scale 0-7000; the back

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has another scale "M/M" 1-15.
From the Egestorff Collection.

1579 NMD068 RAIN GAUGE

YEATES & SON DUBLIN

B 222x141x48; H 125. c1876. R.

Mahogany stepped base; four turned ebony pillars for glass sides; two dials; two coil electromagnet mechanism.

The dials, on a white glazed face, read "INCHES" and "HUNDREDTHS"; electromagnet mechanism, triggered via battery (missing) when bucket in funnel on roof (also missing) fills, is contained between two brass plates at right-angles, behind the dials.

This is an instrument of the type sent to 1876 exhibition at South Kensington.

Yeates 1877, 47 records that this is S.M. Yeates' Electrical Rain-Gauge: "The advantage of this rain-gauge is that, while the receiver is placed in some suitable and exposed position out of doors, the registering apparatus can be fixed in the study or library, or any convenient place indoors. The electrical contact is made by an improved form of rocking-bucket which measures the rainfall by hundredths of an inch; and as it is entirely self-acting, each hundredth, as it is weighed and recorded, is emptied out, so that no error can arise from evaporation." (P47) - see Ex0094.

Illustrated in Knowles Middleton 1969, 160 - reference given to Meteorological Magazine 1876, 11, 153-5.

The instrument came to the Museum via Charles Mollan.

4236 NMD192 RECTIFIER

Unsigned

C 129x69x55. c1930. G.

Mahogany case has four brass screw terminals on top for an A.C. current and a D.C. instrument.

The instrument is labelled "INSTRUMENT RECTIFIER" - "Suitable for audio-frequency currents up to 100 ma. To convert R.M.S. values multiply D.C. instrument readings by 1.11. CAUTION. The D.C. instrument circuit must not be broken while A.C. current is flowing."

This was among the artefacts belonging to Ernest Walton, Nobel prize-winner - see under "Spectacles" 4232 NMD188 - and may have been built by him.

0606 NMD282 REFLECTING CIRCLE

TROUGHTON & SIMMS LONDON No 341.

D 292. Late 18 early 19 C. G.

Brass and oxidised brass; open ring; three moving vernier arms; turned wood handle and arch support; telescope.

One arm has tangent and clamping screws on a window sight; pivoted magnifier to read silver scale.

From the Egestorff Collection.

0669 NMD221 SAND GLASS

Unsigned

No measurements available. 18 & 19 C. PC.

Three; two by half hour, one by hour; wood disc top and bottom, with pillars between; two with central thongs; one without.

One has four wood pillars between the discs, and the other two have five pillars.

From the Egestorff Collection.

3387 NMD309 SAVART DISC MACHINE

YEATES & SON DUBLIN

Sp 222&883; H 490; L 978; Whd 445.

Mid to late 19 C. G.

Mahogany frame on three legs for heavy iron pulley wheel; this drives a spindle to turn four brass Savart discs.

The pulley spindle (D27) is on the axis of the toothed discs (D100,73,60,50), and there is an endless screw on the axis to a double disc (D41,72) counter, with scale 0-90 on the smaller, and 0-9 on the larger; a shaped boxwood plate runs along the edge of the discs to help hold the vibrator; the pulley wheel has five spokes and is turned by a brass and turned wood handle.

From the North Monastery Cork collection.

1406 NMD056 SCALE

Cole London

L 152, W 21. 1766-1782. R.

Brass; scales: 1-9; "Chord" 10-90, 0-20 & 7-0; other side 1-18 and 1-9; subdivisions and proportional parts.

Some divisions have additional segments divided into 12; proportional parts - two diagonal hatched ends with numbers 2468; with small shagreen case containing set of dividers and replacement pen - this has a place for a scale into which this one fits, but the case does not then shut, suggesting that the scale does not belong to the set

Date for Benjamin Cole Junior from Clifton 1995,61.

0612 NMD276 SCALE - GUNTER

Unsigned

L 610. 18 C. PC.

Boxwood; engraved with Gunter's logarithmic lines and with lines of trigonometrical functions.

The Gunter scale, or "line of numbers", consists of two scales of logarithms placed end to end and used with dividers to multiply and divide; the scale was devised by Edmund Gunter in 1607, and published in 1623; the development of the Gunter scale led to the slide rule.

From the Egestorff Collection.

Details from Turner 1983,286.

0613 NMD275 SCALE - GUNTER

Unsigned

L 305. 18 C. PC.

Boxwood; engraved with Gunter's logarithmic lines; used with dividers to multiply and divide.

From the Egestorff Collection.

1405 NMD055 SECTOR

N. Bion AParis

L 127&329; W 15.5&31. Late 17 early 18 C. R.

Brass, folding "pied-de-roy"; scales "les Cordes, les solides, Poids des boulets, Calibre des pieces" etc.

On one side: "les Cordes" inclined scale 10-80 twice, 10-64 not inclined; "Poids des boulets" $\frac{1}{4}$ -8; "Solides" 1-60 twice; "Metaux", symbols; other side: "les parties Egales" 10-200 inclined twice, 10-64 not inclined; "Calibre des pieces" $\frac{1}{4}$ -8;

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"poligones" 3-12 twice; "plans" 1-60 twice.

Dates from Daumas 1972,79-81 & 259; "pied-de-roy" from Turner 1987,184.

0618 NMD270 SECTOR

Tho. Heath Fecit No. 37

L 305. c1725. R.

Brass; two pivoted arms and one at right-angles at end of lower arm; leaf decoration; engraved sectoral lines.

Latter include scale of hours and latitudes; leaf decoration on pivot disc.

From the Egestorff Collection.

Clifton 1995,131 gives dates 1720-1753 for Thomas Heath - the low serial number suggests an early date.

2602 NMD204 SECTOR

JACOB & HALSE London

L 152. 1809-1810. R.

Two boxwood arms with scales parallel and inclined to arms; brass disc hinge.

There is also a similar unsigned ivory sector.

From the Egestorff Collection.

Dates from Clifton 1995,149.

1404 NMD054 SECTOR

P. le Maire AParis

L 175&335; W 16&32. c1750. R.

Brass, folding "pied-de-roy"; scales "les Cordes", "les Metaux"; and "les Parties Egales", "les Poligones".

On one side "les Cordes" scale 10-50, "les Mataux" with symbols; other side "les Parties Egales" 10-200 and "les Poligones" 4-12.

Called "pied-de-roy" by Turner 1987,184; Pierre, son of Jacques Lemaire, Fl c1739-c1760, Daumas 1972,259.

0619 NMD269 SECTOR

J. Sisson London. RERUM NATURA Anthony Binks

L 152. 1722-1788. R.

Brass; two pivoted arms and one fixed at right-angles at end of lower arm.

From the Egestorff Collection.

Dates of Jonathan Sisson 1722-1747 or son Jeremiah 1749-1783 from Clifton 1995,253.

0712 NMD011 SECTOR

Spear Dublin

L 247&457; W 65&32; PvD 36. 1791-1837. F.

Brass disc pivot and brackets for ivory arms; parallel and angled scales, eg "Tangs., Latit., Hours, Chords".

Also: "In. Mer., Rum., Lon., TANGENT, SINES, V. SINES, LIN, SEC, CHO, SIN, TA, TAN"; upper and lower case names inscribed on brass; upper case only on ivory.

Dates from Morrison-Low 1989,135.

2163 NMD216 SET SQUARE

Pixii, Neveu et Succr.. de Dumotiez Rue du Jardinot No,2 à Paris

No measurements available. 1815-1835. R.

Brass rule; diagonal corner hinge; hole for plumb-bob.

Hambly 1988,107 illustrates such an instrument: "Folding brass rule hinged to form a set square"; this one has various markings - e.g. "Lignes", "Pouccs Français".

From the Egestorff Collection.

Dates from Anderson 1990,64 and Payen 1986,159.

0607 NMD281 SEXTANT

[Trade Label] HENRY HUGHES & SON, 59, Fenchurch Street

R 193; CW 340, CDa 282, CH 138. Late 19 C. A.

Brass; triangle and lattice frame; index arm with window sight, tangent and clamping screws, and pivoted magnifier.

Long telescope; scale divided to ten minutes, vernier reading to one minute; in triangular mahogany fitted case with trade label: "ADMIRALTY CHART AGENTS. [Crest] CHRONOMETERS & WATCHES. HENRY HUGHES & SON, Optical Nautical Mathematical Instrument Makers, 59, Fenchurch Street, London. N.B. NO OTHER ESTABLISHMENT."; inside the lid is hand-written: "Errigal R".

From the Egestorff Collection.

Firm at this address from 1877, Downing 1988,65; Ltd by 1905, Anderson 1990,42.

0608 NMD280 SEXTANT

J.W. Norie & Co., London

R 241. 1816-1839. R.

Ebony, brass and ivory; reinforced index arm, window sight, magnifier; index and horizon filters; no half horizon mirror.

Tangent and clamping screws on index arm; brass telescope; wood handle underneath; two re-inforcing struts between the scale arc and the cross bar.

From the Egestorff Collection.

Dates of John William Norie & Co. From Clifton 1995,201.

0626 NMD262 SEXTANT

SPEAR DUBLIN

D c65; W c100. 1791-1809. A.

Brass; miniature; T-insert; index arm with vernier; no filters; no half horizon mirror; wood knob on top.

In shaped leather-covered case.

From the Egestorff Collection.

Dates from Morrison-Low 1989,135.

2603 NMD202 SEXTANT - BOX

Elliott Bros. London

D 71. Third ¼ 19 C. G.

Brass and oxidised brass; silver scale and vernier; index arm turned by knob; pivoted magnifier; leather case.

From the Egestorff Collection.

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0614 NMD274 SLIDE RULE

W & S Jones, 30 Holborn London
L 762. 1800-1860. A.

Boxwood; single slide in centre of stationary sides; brass slow-motion screw with clamp.
From the Egestorff Collection.
Dates from Clifton 1995,155.

1128 NMD036 SLIDE RULE - BREWER'S

Unsigned

226x35; SdW 12. Mid to late 19 C. G.

Ivory, silver metal ends; scales 2-8,6-30,20-100, 60-300; slide 60-10 under, and 10-70 over proof.

1129 NMD037 SLIDE RULE - FULLER CYLINDRICAL

STANLEY, Maker. LONDON. No 1900 1361

L 426; D 88; CysD 81 & 63. Late 19 early 20 C. G.

Mahogany, brass, and papier maché cylinder scales, fixed centre cylinder and moving outer cylinder; handle.

Turned mahogany handle fixed to lower cylinder support.

The operation of the instrument is described in 0384 RDS017.

The 1900 may be its date; 0384 RDS017 has 1904 and 1944; 1098 TCE056 has 2892 11 [1911?].

2962 NMD198 SLIDE RULE - FULLER CYLINDRICAL

STANLEY Maker, LONDON FULLER SPIRAL SLIDE RULE 7363 40

MnL(-Ha) 338; C 457x118x111. 1940. S.

Turned wood handle and ends for concentric white cylinders; clear plastic arms from upper and lower ends.

Outer cylinder has divided spiral line; inner cylinder has various scales; a further unmarked cylinder inside this allows the upper arm to be positioned where required - the arm is divided .02-.98; handle fits onto bent brass bar on end of mahogany case.

From the Egestorff Collection.

The "40" in the serial number is assumed to refer to 1940.

4232 NMD188 SPECTACLES

[On Case] DIPPLE & CONWAY. LTD. 1, SIDNEY ST. CAMBRIDGE.

LeFrD 40; C 120x55. 1927-1932. D.

Worn by Ernest Walton when he observed the splitting of the atom; wire frames, covered in brown plastic; circular lenses.

Walton records (Garvin 1993,43): "In the microscope there was a wonderful sight - lots of scintillations, looking just like stars flashing out momentarily on a clear dark night", first observed on April 14, 1932; the announcement of the splitting of the atom was reported in the international press on May 2, and Walton - with John Cockcroft - became famous over-night; he and Cockcroft received the Nobel Prize for Physics in 1951, Walton being the first (and, so far, only) Irishman to be so honoured.

In addition to these glasses, which were donated by the Walton family, the National Museum also received other personal items belonging to Walton: His next pair of glasses - lenses of similar size, but stiff frames of tortoiseshell plastic. His Trinity College B.A. (or Scholar's) gown. His Trinity College Chapel surplice. His dress suit purchased in Cambridge, presumably in 1932 (Johnson's OUTFITTERS CAMBRIDGE). His "tails" worn when he received the Nobel Prize. His TCD M.A. gown and hood (plus red doctoral flashes). Two cardboard/leather brief cases labelled E.T.S.W.". A collection of watches and watch parts. Press cuttings and photographs mostly from 1932. See also entries 4233 NMD189 - Wireless; 4234 NMD190 - Friction Demonstration Apparatus; 4235 NMD191 - Inverted Pendulum Apparatus; and 4236 NMD192 - Instrument Rectifier.

Thomas Ernest Sinton Walton was born on October 6, 1903, in Dungarvan, Co. Waterford, the son of a Methodist Minister, Rev. J.A. Walton. He attended Methodist College ("Methody"), Belfast, and won a junior mathematical sizarship to Trinity College, Dublin, in 1922, where he obtained a foundation scholarship in 1924. He graduated with a double Moderatorship in 1926, taking first place (with a large gold medal) in experimental science and second place in mathematics. In 1927 he obtained an M.Sc. from TCD, and won a Research Scholarship to St John's College, Cambridge, where he worked under the famous Director of the Cavendish Laboratory, Ernest Rutherford. He received his Ph.D. from Cambridge in 1931. He and John Cockcroft built an accelerator to provide high energy protons which bombarded a lithium target - the lithium being "split" into two helium atoms converting some of the mass into energy, in agreement with Einstein's formula, thus heralding the age of nuclear power. He returned to Dublin in 1934, receiving a Fellowship from Trinity College in that year, and he became Erasmus Smith's Professor of Natural and Experimental Philosophy (dating from 1723) in 1946. In 1993, Walton sold his house at 26 St Kevin's Park, Dartry, Dublin, and moved to Belfast, where he died on June 25, 1995. Some of his historic possessions were also donated to Trinity College and to the National Museum.

4246 NMD194 SPYGLASS

GIVSEPPI MOSCHINO IN GENOVA

L 66-102; MxD 41; CL 76, D 45. Mid to late 18 C. G.

Turned wood lens housings with silver metal rings; tortoiseshell outer casing; green leather draw; case.

The green leather-covered draw can be taken away from the outer casing; it has silver decoration on the leather; the cylindrical wood case, with a lid, is covered with black leather outside, and is green on the inside.

Museum number 31 1917, donated by Miss E. Warren.

0604 NMD283 SPYGLASS

Unsigned

L 57-82. c1750. PC.

Non achromatic; black ivory ends; wooden tube with red fish-skin; draw of decorated green pasteboard; case.

The eyepiece and the ferrule for the object glass are of black ivory; the draw tube has impressed decoration; the wooden case is covered with dyed fish-skin.

From the Egestorff Collection.

0615 NMD273 STATION POINTER

Unsigned

D 228. c1900. PC.

Brass; ring with three spokes; three extending arms pivot from the centre, two with tangent and clamping screws.

Used for finding a position on a chart from three points observed with a sextant.

From the Egestorff Collection.

4433 NMD186 STEREO VIEWER

Unsigned

H 1557; B 395x370. Late 19 C. G.

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Rectangular walnut pillar; curved eyepiece viewer on top with focus; double knobs to move slides into view. The pillar is slightly tapering with angled corners; the eyepiece focus is by rack and pinion using two brass knobs; the knobs to move the slides into view are of turned mahogany; the slides include scenes of Paris, Rome, Italy, Switzerland, Russia, Germany, England, Spain, Australia, some being coloured. From the Egestorff Collection.

3153 NMD109 SURVEYING INSTRUMENT

Gab Stoakes Dublin Fecit 1717

Lm 388x25; MxD 153; CpHsD 97. 1717. S.

Brass; compass with one (of two) double line and window sights; horizontal circle, two single line and window sights.

The glazed central compass has an iron needle with a brass cap; the sighting arms attached to the compass have windows near the compass to read the horizontal circle; the remaining double sight is attached to the end of the arm with a butterfly nut; outside the horizontal circle is a brass ring with stylised lyre brackets holding the single sight arms; the compass has a fleur-de-lys at North, and seven other directions in triangles (including "Eaft" and "Weft"), with a divided circumference ring 0-360°; the divided circle has two scales - inner, 0-90-0-90-0° and outer, 10-360°.

This is the earliest known instrument by Gabriel Stokes (1682-1768), who was the author of "A scheme for effectually supplying every part of the City of Dublin with pipewater without any charge for water engines or any water forcers, by a close adherence to the law of sanitation and the principles, rules and experiments of Hydrostaticks" (1735); Gabriel married Elizabeth King in 1711, and they had two sons; John became Regius Professor of Greek and Archbishop King's Lecturer at Trinity, and was the grand-father of Sir George Gabriel Stokes FRS (1819-1903), Lucasian Professor of Mathematics at Cambridge, and President of the Royal Society; the second son, Gabriel, became Professor of Mathematics at Trinity, and was the ancestor of the distinguished line of Dublin Physicians, the most famous of whom was William Stokes (1804-1878) of "Cheyne-Stokes breathing" and "Stokes-Adams syndrome" fame.

This is the second oldest Irish signed instrument in Ireland, the oldest being the 1688 Johannes Lewis circumferentor in Stokes dates and most details from Burnett & Morrison-Low 1989,19,22,105; see also J.B. Lyons in Mollan 1985,34.

0635 NMD254 SURVEYING INSTRUMENT - UNIVERSAL

Schmalcalders Patent, 82 Strand, London

H 185; W 179. 1810-1826. A.

Brass; right-angled bosses to fit stand; compass plate with vernier at side; on top, glazed compass and sight tube.

The brass compass disc at the side has triangles to 32 points, and has verniers to read opposite sides, turned by a knurled knob; the glazed compass has brackets, including one Y-bracket, to hold the telescope.

This is effectively a theodolite which requires two operations to measure the horizontal and vertical angles.

From the Egestorff Collection.

Patented with his compass in 1812, PC, P. Delehar; dates at this address from Clifton 1995,245.

0596 NMD290 TELESCOPE - REFLECTING

G ADAMS LONDON

TuL 337; D 70. 1772-1795. R.

Brass; on pillar with folding tripod legs; rod from eyepiece end to adjust secondary mirror.

From the Egestorff Collection.

Dates of George Adams junior from Clifton 1995,2.

0599 NMD288 TELESCOPE - REFLECTING

J. DAVIS, EDINBURGH

TuL 1194; D 152. 1836-42. FL.

Brass; supported on heavy pillar ending in folding tripod legs; cover cap on end of tube.

From the Egestorff Collection.

Dates from Bryden 1972,46.

0601 NMD286 TELESCOPE - REFLECTING

W & S Jones, 30 Holborn, London The SPECULA by JOHN CUTHBERT 1844

TuL 610; D 102. 1844. S.

Brass; pillar, folding tripod legs; curved trunnions.

Small finder on top side; turned wood handle for brass hooks joint.

From the Egestorff Collection.

Dates of W & S Jones at this address 1800-1860, Clifton 1995,155.

0594 NMD292 TELESCOPE - REFLECTING

* JAMES SHORT LONDON 130/834=12

C c470x175. c1754. R.

Brass; pillar screws into lid of mahogany case; side rod to focus upper mirror; peep sights on tube top.

Cover cap on end of tube; focal length 12".

From the Egestorff Collection.

Date from Turner 1969,100.

0597 NMD289 TELESCOPE - REFLECTING

J. WATSON London

TuL762; D 152. c1771-1824. W.

Brass; on trunnions with vertical and horizontal movements, on pillar with folding tripod legs; with finder.

From the Egestorff Collection.

Dates from Crawforth 1988,16.

3659 NMD196 TELESCOPE - REFLECTING

Unsigned

No measurements available. Mid 19 C. G.

Brass; on pillar with folding tripod legs; tube is covered in dark leather; rod adjusts secondary mirror.

From the Egestorff Collection.

3660 NMD195 TELESCOPE - REFRACTING

Dollond London

MnL 565; MxD 89. Mid 19 C. G.

Leather-covered mahogany body with brass fittings; one brass draw; eyepiece lens flap.

A note with the instrument states: "HALLEY'S COMET TELESCOPE' A low power telescope of good light grasp, produced

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by Dollond's for the easy finding of celestial objects."
From the Egestorff Collection.

2374 NMD078 TELESCOPE - REFRACTING

[Thomas] GRUBB DUBLIN

Sp 280; PvH 37; L 420; TuD 38-68. Mid 19 C. G.

Brass; terrestrial; rack and pinion focus of eyepiece tube; on turned stand with folding cabriole legs.

Pivot on top of stand for tube support; latter can also revolve about the vertical axis of the stand (in all comprising a simple alt-azimuth mount); objective lens hood; in mahogany case (damaged); SIS visitors - 5/90 - reckoned that the stand was not original to the telescope, but dates some 30-40 years earlier to early 19 C.

Bought from Christie 29:6:89, Lot 144, via Patrick Wayman and Charles Mollan - illustrated in Christie catalogue.

0600 NMD287 TELESCOPE - REFRACTING

H. Hunt, Cork

L 142-432; D 38. 1844-1884. F.

Brass; leather-covered outer tube plus three draws; sliding eyepiece lens flap.

From the Egestorff Collection.

Dates from Burnett & Morrison-Low 1989,149 - firm in Directories in 1844, 1846, 1881, 1883, & 1884.

1133 NMD041 TELESCOPE - REFRACTING

R Spear, Dublin

L 247-761; D 48,38,32,&28. 1791-1837. F.

Mahogany-covered outer tube plus three brass draws; brass objective lens cover.

Dates from Morrison-Low 1989,135.

0603 NMD284 TELESCOPE - REFRACTING

TULLEY & SONS Islington LONDON

TuD 64; C 807x181x107. 1826-1830. R.

Brass; mounted on pillar with folding tripod legs; rack and pinion focus; bar from base to tube; mahogany case.

From the Egestorff Collection.

Dates from Clifton 1995,283.

1134 NMD042 TELESCOPE - REFRACTING

Signature worn, "...d London...or Sight. CUSTOMS"

L 528-925; D 63 & 48. Late 19 early 20 C G. G.

Brass; outer tube leather-covered plus one draw; small eyepiece; used in 1916 to take name of gun-running Aud.

Engraved: "Telescope used to take the name of the Aud by the British Coastguard garrison Ballyheigue April 20th 1916. This garrison was subsequently captured by the I.R.A. under the command of MICHAEL PIERCE column o/c and William Leen Vice o/c in May 1920. Engraved By Eileen O'Connell Tralee."

The Museum also has a two-draw telescope by T. COOKE & SONS LTD. LONDON & YORK. No. 5909; silver metal; outer tube leather-covered.

0595 NMD291 TELESCOPE - REFRACTING

Unsigned

D 42. c1750. PC.

Non achromatic; wooden tube covered with green fish-skin; plus three draws of green pasteboard; brass ferrules.

Eyepiece cells of lignum vitae; eye lens with sliding cover.

From the Egestorff Collection.

0602 NMD285 TELESCOPE - REFRACTING

Unsigned

TuD 64. c1880. PC.

Brass; folding tripod legs; tapering pillar to pivot; objective lens cap.

From the Egestorff Collection.

3761 NMD161 TEST-TUBE RACK

Unsigned

B 610x126x20; H 132; HIsD 19[x2], 25[x4]. Late 19 C. G.

Mahogany; base has four supports to table with six holes; small holes in base (D12) correspond to upper holes.

From the North Monastery School collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

0633 NMD256 THEODOLITE - EVEREST

Troughton & Simms, London

CrHsD 127; L 390; C 285x181x222. Mid 19 C. G.

Brass; two disc four screw base; horizontal circle with magnifiers; two vertical arcs; spirit level above tube.

Arcs divided on silver 30-0-50, with verniers; two verniers also on horizontal circle; on mahogany tripod with brass fittings; in mahogany case labelled: "5 IN THEODE No136" including an angled eyepiece and lens hood.

A red leather-covered book "REGISTER OF STATE OF INSTRUMENT No 95" has a green card stuck inside the front cover:

"O.S. 75. Should this Book be lost, the person who may find it is particularly requested to forward it by Post under cover, thus- ON HER MAJESTY'S SERVICE. To The Director General of the Ordnance Survey, Ordnance Survey Office, SOUTHAMPTON."; this records the use of the instrument from 6th August 1898 until 20/11/23 with an unclear last entry 22.8/25 or 35; the first page describes the instrument: "O.S.O. Soton 6th August 1898 Copy of old Register for 5" Theod No 136 The Box has a lock & key & two brass hooks & eyes & brass handle The detached parts are Telescope with cover for Cross Hairs & Object Glass, One Direct Eyepiece, One Diagonal "-", Two Double Lens Microscopes, One Hand Reading Glass, One Brass Plummet, One Turncrew Common, One do with Capstan Pin, The Stand has a Brass Cap & two Brass Rings. M Cullen [?] Sergt. R.E."

The entry for 20/11/23 records "Bubble on Telescope cracked."

From the Egestorff Collection.

Devised by Sir George Everest (1790-1866) for work in India, Turner 1983,251.

0631 NMD258 THEODOLITE - PLAIN

Adams, London

H 300; CrHsD 178; MnL 270. 1788-1817. R.

Brass; two disc four screw base; horizontal circle, compass above; trunnions; tube on Y-brackets on half-circle.

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Spirit level below telescope tube; rack and pinion adjust for both horizontal circle and vertical half-circle; spirit level alongside compass, which is above the horizontal circle and between the trunnions; telescope objective focus by rack and pinion.
From the Egestorff Collection.

Dates for Dudley Adams from Clifton 1995,2.

0634 NMD255 THEODOLITE - PLAIN

Thos. Grubb, Dublin

H 250; CrHsD 127; MnL 310. Mid 19 C. PC.

Brass; two disc four screw base; horizontal circle; compass and trunnions; vertical half-circle; Y supports for tube.

Spirit level on top of telescope tube; two more on top of horizontal circle; tangent and clamping screws for horizontal circle; magnifiers to read both circle and half-circle; rack and pinion telescope objective focus.

From the Egestorff Collection.

3665 NMD129 THEODOLITE - PLAIN

S. Mason., Dublin.

MnH 263; TuMnL 343; HoCrD 133; VeCrD 134.

Mid 19 C. G.

Brass; two disc four screw base; silvered horizontal and vertical scales; central compass; tube on Y-brackets.

The base discs have clamping and tangent screws, as do also the full circle angled horizontal scale 10-360°, and the half-circle vertical scale; the latter is divided 90-0-50° on silver on one side, and 30-0-30 "Diff. of Hypo. & Base." on brass on the other; both silvered scales have verniers and magnifying lenses; on top of the angled horizontal circle are two spirit levels at right-angles to each other, and a central compass with a silvered dial showing eight directions, and having a raised ring scale 10-360° under the glazing; a small lever at the side of the compass clamps or releases the needle; the vertical half circle has its axis resting on two trunnions from the sides of the compass, and has the two Y-brackets for the long telescope tube; under the tube is another spirit level; focus is by objective rack and pinion with a knurled knob at the side of the tube; the hinged clamps for the tube, on the Y-brackets, are held by two plugs held on strings from the brackets; the eyepiece tube pulls out and is stored separately in the fitted mahogany case (300x234x158) which also contains two turned brass plumb-bobs on strings, one with an iron point.

Presented by Mrs Pat R. S. Malone, of Mullingar, via Brendan Finucane and Charles Mollan, in January 1991.

The S. Mason is presumably one of the Seacombe or Seacome Masons, who have dates 1780-1879, Morrison-Low 1989,130-1.

0632 NMD257 THEODOLITE - PLAIN

Unsigned

H 365; MnL 353; CrHsD 230. c1800. PC.

Brass; compass and two spirit levels above horizontal circle; trunnions for half-circle; spirit level below tube.

Both horizontal circle and vertical half-circle are adjusted by rack and pinion; telescope objective focus also by rack and pinion; sleeve below instrument for stand.

From the Egestorff Collection.

0638 NMD251 THEODOLITE - SIMPLE

A. Odelem in Brauns

CrD 184; CpD 64. c1700. PC.

Brass; moveable alidade with two sights; four fixed sights; rubricated divisions; shaped and fitted case.

Stepped scale reading to 10 minutes of arc; compass in centre of circle - variation line at 10½°W. From the Egestorff Collection.

For a similar instrument, see Bennett 1987,74.

1398 NMD048 THERMOMETER - MAXIMUM & MINIMUM

ROBINSON DUBLIN

HsL 203, W 43; CL 215, W 55. 1845-1884. F.

Ebony back; ivory scale plate -10-120 and 0-130°; silver metal fittings; in red case with silk and velvet lining.

Three limb glass thermometer with mercury and alcohol (now mixed up); maximum marker now in bulb.

Dates from Morrison-Low 1989,133.

3388 NMD310 THERMOMETER - METALLIC, APPOLIT

Appolit's Metallic Thermometer YEATES & SON DUBLIN

BD 145; H 595; W 310. Mid to late 19 C. G.

Turned mahogany base; two brass pillars to pivot for long metal needle to read arc scale 30-90 on support.

The latter has a standard glass mercury thermometer, with an ivory scale 40-80°; the long needle has an adjusting screw at its point, and two more at right-angles at its base, and is pivoted from its centre.

From the North Monastery Cork collection.

2591 NMD313 TRADE LABEL

No.26 Capel Street James Lynch & Son, Mathematical Philofophical and Optical Instrument makers To TRINITY COLLEGE HIS MAJESTY'S ORDNANCE &c&c Dublin.

Inside lid of Culpeper microscope 0580 NMD312.

Morrison-Low 1989,129 gives dates 1808-1825.

1396 NMD066 TRADE LABEL

ROBERT NEILL & SONS, NO. 25, HIGH-STREET, Belfast. NO. 27, SHIP QUAY-ST. Londonderry. ESTABLISHED NEARLY HALF A CENTURY. WHOLE-SALE AND RETAIL Chronometer, WATCH And CLOCK MAKERS; JEWELLERS, SILVERSMITHS AND OPTICIANS. ALSO MATHEMATICAL AND NAUTICAL INSTRUMENT, GLOBE, AND CHART SELLERS. [Enlarged reproduction displayed on wall of Museum gallery.]

Burnett and Morrison-Low 1989,153 give Shipquay Street address, as well as 6 Diamond, Londonderry, for 1846.

1407 NMD067 TRADE LABEL

The Old Established Beam & Scale MANUFACTORY All sorts of Beams, Scales Weights & Measures, Manufactured in the best manner & Sold by Jas. Pickering, Beam & Scale Maker To the Bank of Ireland, No 73, Pill Lane Dublin. NB. All Sorts of Beams & Scales Neatly Cleaned & Repaired.

On case of balances 1408 NMD057.

Crawforth-Hitchins 1994,1831 gives dates 1810-1834.

2838 NMD108 WAYWISER

JONATHAN SISSON LONDINI FECIT

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H 1325; WhD 798; SHsD 201. 1722-1747. W.

Oak and mahogany; six-spoke wheel with iron rim; heart-shaped handle; circular housed brass scale I-XII.

The handle is damaged; the glazed brass scale is in a hinged mahogany housing, has two watch hands, and is divided 1-80 2-80 3-80...10-80 outside, then 1-40, then I-XII; "The Capital Figures are MILES & ye Subdivisions between them are Furlongs The Large Numerical Figures are Chains & Links Note 8 Furlongs Makes one MILE 40 Poles or 10 Chains one Furlong 4 Poles or 100 Links one Chain 16½ Feet one Pole 7 92/100 Inches one Link."

Dates from Crawforth 1988, 14.

3582 NMD187 WIND CHEST

Made by Yeates & Son Dublin

Sp 262 & 162; Hs 203x105x64; H 134.

Mid to late 19 C. G.

Cast iron base and four feet; mahogany box with two turned bosses above; brass input and output tubes; two stops.

The stops, in front of the box, have turned mahogany knobs and brass rods; behind the box are large and small oxidised brass tubes (D17&8) on a right-angled bracket over the top edge of the box, where there are two small stop-cocks.

From the North Monastery Cork collection.

4233 NMD189 WIRELESS

Unsigned, but built by Ernest Walton

B 458x205x54 & 408x280x80. 1934-1936. D.

"Push-Pull Quality Amplifier" and "Quality Super-heterodyne Receiver" built by Ernest Walton, Nobel Prizewinner.

The amplifier followed instructions in the "Wireless World" of May 11, 1934 (the originals of the magazine are with the apparatus); it includes two stages of resistance-coupled push-pull amplification, to give reduced amplitude distortion, with an undistorted output of four watts; it is built on a metal base, and includes two transformers, three "DUBILIER" dry electrolytic condensers, and five "Osram" valves (2xMHL4, 2xPX4, 1xMU14); printed technical details are included (dated 1932) about the MHL4 and PX4 valves; some components are missing.

The "QA Super" receiver follows instructions in "Wireless World" of February 14 and 28, and March 6, 1936; by paying special attention to the early circuits, amplitude distortion is avoided in the frequency changer and in the IF stages, and "an exceptionally high standard of quality is consequently obtained"; it is built on a metal base, and includes one "DUBILIER" dry electronic condenser, two "SOUND SALES" variable-selectivity IF transformers, two coated "Osram" IF VMP4G valves, a coated "Osram" D41 valve, three more "Osram" valves (MH4, MHL4, X41), a transformer for the AVH HT supply, two "BULGIN" multi-coils, and a metal rectifier H50; technical leaflets are included for the VMP4F, D41, and X41 valves (dated 1935).

A manuscript, in Walton's handwriting, gives the "Operating condition of valves" in 1940.

Also included is a "MAGNAVOX 'DUODE' 33", loudspeaker (with a review from the "Wireless World" of March 6, 1936), and a "FERRANTI" inductor speaker, plus two "FERRANTI" transformers (one rewound by Walton with an additional primary), and a collection of valves (some in original cartons - "Osram" D41 MET, MU14 (three), X41, "Cossor" V8, "Ediswan" EM80, "Mullard" FC4) and other wireless components.

Presented by the Walton family in June 1993, see entry under "Spectacles" - 4232 NMD 188.

3575 NMD179 WOULFE BOTTLES

Unsigned

H c130, BD c70; H 170, BD 100. Mid to late 19 C. G.

Ten small and one large (cracked) glass bottles, each with two chimney vents on top (ground glass in two cases).

The large bottle had a brown (Ferrous?) residue, and it cracked when this was being removed.

From the North Monastery Cork collection, purchased through the RDS instruments scheme, with sponsorship from Pfizer Pharmaceuticals, Cork.

4436 NMD177 ZOETROPE

Unsigned

BD 258; H 360; DrD 300. Late 19 C. G.

Turned mahogany base and pillar to revolving tin drum, open on top with 13 slits around sides; moving elephant strip.

The strip is loaded at the bottom of the open drum, which is then rotated; looking through the slits, the elephant is seen to jump over a drum; the strip is inscribed: "ENTERED AT STATIONERS HALL 39 [the 39 is upside down] THE LIGHT FANTASTIC TOE".

The zoetrope was invented in England by William Horner in 1834, and rediscovered and patented by Milton Bradley and Company in the USA in 1867 (Harley, 1988, 22).

From the Eggestorff Collection.

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NATIONAL MARITIME MUSEUM - NMM

Haigue Terrace
Dun Laoghaire
Co. Dublin
Telephone (01) 280-0969

3280 NMM020 ARTIFICIAL HORIZON

Unsigned

HsB 163x93, H 109; C 186x151x125. Mid to late 19 C. G.

Fitted mahogany case; oxidised brass and glass rectangular frame; wood mercury bottle; wood and glass tray.

The hinged-lid case has a brass handle; the frame has two glass panels on the sloping sides, at right-angles to each other; the mercury bottle is similar to the cistern of a stick barometer, and has both wood and ivory screw stoppers; the mahogany tray has a copper plate below, a framed compartment with pouring corner for the mercury above, and a glass top.

3286 NMM026 ATLANTIC CABLE SAMPLES

FRANCO AMERICAN SUBMARINE TELEGRAPH CABLE TELEGRAPH CONSTRUCTION & MAINTENANCE COMPANY LIMITED

CB 478x479; CH 145. 1869. S.

Mahogany and walnut glazed case with 12 cable samples.

The case is lined with blue velvet and shows six lengths of cable with the corresponding cross-sections.

The full inscription, engraved on a silver plate, is: "FRANCO AMERICAN SUBMARINE TELEGRAPH, SUBMERGED, 1869. TOTAL LENGTH 3333 NAUTICAL MILES. EXTREME DEPTH 2700 FATHOMS. No.1 MAIN CABLE BREST SECTION No..2 INTERMEDIATE No.3 SHORE END No.4 MAIN CABLE ST. PIERRE SECTION No.5 INTERMEDIATE No..6 SHORE END TELEGRAPH CONSTRUCTION & MAINTENANCE COMPANY LIMITED CONTRACTORS.". There is a separate sample displayed by itself, corresponding to No.3 above.

3267 NMM007 CHRONOMETER - MARINE

BROCKBANK & ATKINS, No.6, COWPER'S COURT, CORNHILL London No.1304 F. RÖTIG 51, rue de Paris, HAVRE.

C 163x159x157; DIHsD 103. 1815-1840. F.

Brass; gimbals mount; mahogany double-hinged case.

The chronometer has a silvered face with hours I-XII, small seconds dial 10-60 (D29), and an "UP DOWN WIND" upper dial 0-50 (D23); it is contained in double ring gimbals in a brass-bound mahogany case with a glazed top under the upper hinged lid; stuck on the latter is a trade label for Brockbank & Atkins: "CHRONOMETER MAKERS, TO THE RIGHT HONOURABLE THE LORDS OF THE ADMIRALTY, AND THE HONOURABLE EAST INDIA COMPANY with: "General Directions for the use of Chronometers"; at the side of the housing is an elliptical trade label: "51, rue de Paris, opposite Notre Dame Church. F. RÖTIG CHRONOMETER WATCH CLOCK & NAUTICAL INSTRUMENT MANUFACTURER .HAV-RE.". Dates from 1982,384.

3268 NMM008 CLINOMETER & PRISMATIC COMPASS

WATKINS CLINOMETER PATENT 217 J. HICKS MAKER 8 HATTON GARDEN LONDON No.4703 RAYMOND. E. PALEY HsD 73, H 35; CL 118, H 58. c1885. A.

Oxidised brass cylinder housing; wood and card case.

The clinometer is on one side of the housing (which can be detached from the compass housing), with a semi-circle window to display the weighted arm and ivory scale 45-0-45; the arm is released with a push button; the clinometer mirror is detached; the compass on the other side has an arc window to reveal the green card 10-360° with a central signature: "J. HICKS, 8. 9. & 10 HATTON GARDEN, LONDON"; it has a hinged prism and a hinged line sight; the combined instrument is contained in a shaped case with a red leather outside and red velvet and paper inside, with the owner's name: "R.E. Paley" on top; the name: "RAYMOND E. PALEY" is inscribed on top of the compass housing also.

Firm changed address from 8 to 8, 9 & 10 Hatton Garden in 1884-85, Downing 1988,59.

3269 NMM009 COMPASS

Unsigned

DID 71; BwD 43; HsD 80-88. 17 C. PC

Conical wood housing for bowl with vertical needle and raised scale with chinese characters around its top.

A card with the instrument notes that it is a 17th Century Chinese hair compass which was originally enclosed in a covering of human hair; it notes also that the Chinese were the first to use compasses, and that the original floating design remained unchanged for hundreds of years; this example was found in an abandoned junk in the Malay seas in 1950 by an Irish Officer of the Blue Funnel Line.

3270 NMM010 COMPASS - MARINE

THE "VICTORY" HOLMES LIGHTS CO. LONDON. E.C. THE TRINITY HOUSE LONDON No.41

DIHsD 115; C 178x176x123. Early 20 C. G.

Black enamelled brass; gimbals mount; liquid filled.

The ring gimbals is pivoted to the mahogany case which has a (missing) slide lid; the compass housing, which is nearly full of liquid, is in turn pivoted to the ring; the black and white compass rose shows seven directions and a decorated pointer to the North; it has a raised mound in the centre inscribed: "THE TRINITY HOUSE LONDON. No. 41".

3281 NMM021 COMPASS - MARINE

MURRAY, Mc.VINNEY & CO. LTD., GLASGOW. 424

Hs 199x197x135; CpHsD 142. Early to mid 20 C. G.

Oak slide-lid case; black enamelled brass gimbals ring and compass housing; black and white rose in liquid.

Some of the liquid is now gone, leaving a large bubble.

Firm not listed in Bryden 1972, nor Clarke 1989.

3291 NMM031 COMPASS - MARINE

POLLOCK & CO (IRELAND) LTD DUBLIN

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HsD c250. Late 19 early 20 C. G.

Black and white rose, seven compass points, raised centre; in glazed brass housing pivoted to brass gimbal ring.

3289 NMM029 COMPASS - MARINE, IN BINNACLE

F. ASHCROFT. 7 KING STREET, LIVERPOOL.

RoD c150. Mid 19 C. G.

Black and white rose, seven compass points, in gimbal mount; in brass font-shaped binnacle with crown-shaped top. The compass rose is considerably smaller than the housing, and is presumably not original.

3290 NMM030 COMPASS - MARINE, IN BINNACLE

WHYTE, THOMSON & CO. LD., GLASGOW. No31328

RoD c215. Late 19 early 20 C. F.

Black and white ring rose, seven compass points, raised centre; in brass-domed binnacle on iron font.

The rose rests on two pairs of parallel white bars; the iron font-shaped support for the brass top of the binnacle has two iron balls at its sides, and rests on a rectangular pedestal with a plaque: "WHITE THOMSON'S PATENTS NEW ERA No7891 MAKERS GLASGOW".

Bryden 1972,59 gives firm dates 1889-1900+.

3284 NMM024 MARINE AZIMUTH INSTRUMENT

KELVIN & JAMES WHITE LORD KELVIN'S (SIR Wm THOMSON) PATENTS No 7383

BL 161, MxW 75; H 120; TuD 36; C 224x150x117.

c1900. F.

Oxidised brass; tube with lens at angle from base; on top, rotating prism and two grey filters; mahogany case.

The open-work base has three feet and a central spring; at the end away from the rising tube is a circular bubble level now missing some of its liquid; the tube, with its magnifying lens, rises at an angle of about 60°; one of the supports for the prism and semicircular filters is now detached from the top of the tube; the mahogany case contains a wood pallet (L125,W63) and printed instructions in the lid, signed: "Maker-JAMES WHITE, 16 to 20 Cambridge Street, Glasgow."

The instructions begin: "INSTRUCTIONS FOR THE USE OF SIR W. THOMSON'S AZIMUTH MIRROR. BEAR-INGS can be taken with this instrument in two ways:- (1) By looking direct at the object over the top of the prism. The degrees of the card reflected in the prism are then seen close below the object; (2) By looking through the lens at the degree divisions of the compass card, and at the image of the object in the prism which is seen on the proper degree of the card. The first method is applicable to objects on the horizon, and is more particularly useful for taking bearings of distant landmarks which are too indistinct to be seen when reflected in the prism. The second method may be used either for taking bearings of objects on the horizon or for taking bearings of the sun, moon, or stars...."

Firm took this name in 1900, Bryden 1972,59.

3263 NMM003 OCTANT

.Rodgers & Co. Liverpool. LBR [monogram on scale]

R 302; L 350; W 285. Early 19 C. G.

Ebony, brass and ivory; scale 0-95; window vernier 0-20, clamping and tangent screws; index and horizon glasses.

Three filters, two red and one green, in square frames; sight with two peep holes and flap to cover that not in use; curved T insert in frame, with hole on top for missing pencil.

A card with the instrument notes that it belonged to Captain Kellett, one time Master of the Nautical College, and was presented by Mrs Kellett.

3273 NMM013 PANTOGRAPH

Elliott Bros., London.

AsL 991 & 510; WeD 94. Third ¼ 19 C. G.

Brass; two long and two short pivoted arms; five (of six) ivory wheels; brass-bound lead weight; point and pencil arm.

The latter has a brass hemisphere on top for a weight; three of the arms are labelled "B", "C" (both long), and "D" (short); "B" is divided 1 2 to 1 12, as is "D"; the vertical pin on the base, for holding the instrument, is broken off.

The pantograph was formerly the property of Captain Robert Charles Halpin 1836-1894 who, when Master of the "Great Eastern", laid the first cables which connected Europe with America in 1868-69.

A card with the display of Halpin instruments notes: "After marrying Jessie Munn in 1873, Halpin returned more frequently to his Wicklow home at Tinnakilly. He was well known throughout for his generosity, regularly supporting local charities and institutions. In 1892, he was elected chairman of Wicklow Harbour Board and in the same year was narrowly defeated by 208 votes in the General Election, standing as a candidate for East Wicklow."

Note, however, that the first submarine transatlantic cables were laid in 1857 and 1858 (both failures), and the first successful cables were completed in 1865; the 1869 cable was French. (Encyclopedia Britannica 1968, Vol.21, p. 771.)

3271 NMM011 PELORUS

R. DAVIES, LIVERPOOL. LONDON. POLARIS.

H.& Co..325.

Hs 260x257x175; PD 201; RiD 132. Late 19 C. G.

Mahogany case; metal compass plate on gimbal mount; above, hour circle with hinged line and window sights.

On the side of the case is a semi-circular oxidised brass scale 60-0-60 which shows the level of the casing; the white-metal compass plate is pivoted to an oxidised brass gimbal ring, pivoted in turn to the case; the plate is divided 0-90-0-90-0°, and gives 15 compass points; above it is a

vertical protractor 0-90-0° "S. LAT" and "N.LAT" holding the horizontal four-spoke hour circle I-VI-I and XII-VI-XII with the folding sights; a brass screw bolt clamps the gimbal when not in use, and one side of the gimbal is inscribed: "SHIP'S HEAD".

The pelorus was formerly the property of Captain Robert Charles Halpin 1836-1892.

A card with the instrument notes: "A pelorus or dummy compass card is a circular ring fitted to the rim of a compass bowl and carrying two sighting vanes. The ring can be fitted to a 'dumb' compass which can be set by hand to the course (bearings) of the ship before taking a bearing. The word pelorus comes from the name of Hannibal's pilot who sided with the Carthaginians and assisted his troops across Europe and kept him in touch with Carthage by sea."

3279 NMM019 POSITION FINDER

ASHE'S PATENT No2854/06 HEATH & CO., LTD. CRAYFORD, LONDON.

D 120&152; AsL 251, W 23. 1906. P.

Yellow transparent ebonite(?); two divided discs 0-90-0-90-0; two pivoted arms from centre; case plus instructions.

Both discs have sixteen compass directions; one is located above the pivoted arms and one below; each arm has a brass screw clamp; they pivot from a brass central ring (OD35) with a hole in the ebonite disc in its centre; an elastic cord attaches to a brass cylinder (D21H14) which also has an ebonite disc with a central hole; the mahogany case is missing its slide lid.

The instructions are signed "F.A. ASHE, Master Mariner. WHOLESALE ONLY OF: HEATH & CO., LTD CRAY-FORD, LONDON TO BE OBTAINED OF ALL NAUTICAL OPTICIANS AND STATIONERS, ETC., ETC.", and they give directions

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about how to find the ship's position, to find true or magnetic courses from one position to another, to find the course to steer, to find true bearing of any object, the compass bearing being known, to measure any angle, and to use for finding true, magnetic, or compass bearings of objects.

Another leaflet with the instrument advertises it: "CAPT. ASHE'S PATENT POSITION FINDER AND COURSE PROTRACTOR...£2 0 0... Sole makers: HEATH & CO., Ltd., Crayford, LONDON, And 2 Tower Royal, Cannon Street, LONDON, E.C.:"; this advertisement is numbered 457, and the other side, numbered 458, advertises the Heath & Co, "New Patent 'Hezzanith' PRISM." binoculars.

3292 NMM032 PRESSURE GAUGES

Various signatures.

HsD c170-190. Late 19 early 20 C. G.

Six in glazed brass housings; four by Dewgrance, one by Wright & Co., one by Guest & Chrimes.

Two are signed: "DEWGRANCE & CO LONDON", with scales 0-260; two are signed: "DUPLEX TEST GAUGE DEWGRANCE LONDON", one with scale 0-100(x2), the other No89208 has a brass lid with a knob on top and scale 0-350 (X2); one is signed: "BOURDON STEAM PRESSURE GAUGE, Improved WRIGHT & CO., MAKERS, Birmingham.", with scale 0-90; the last is signed: "WATER & PRESSURE GAUGE Guest(?) & Chrimes FOUNDRY & GENERAL BRASS WORKS, ROTHERHAM.", with scale 0-630.

3272 NMM012 QUADRANT - ARTILLERY

Spear 23 Capel St, Instrument, Maker to His Majestys, Ordnance

SL 458; QOR 157, IR 140. 1793-1809. A.

Brass; 18" rule on T-section bar has, at one end, a quarter ring divided 0-90°, with a pivoted window sight.

The quadrant is on the plane of the shaft of the T, so that the rule is at right-angles to it.

Formerly the property of Captain Charles Halpin 1836-94.

The instrument name, artillery or gunners' quadrant, comes from entries in Historical Technology, 132,1989,32 and 134,1991,28; while these do not appear to have the T-section rule, they are otherwise similar in design; the 1989 entry is also of brass, and has a spirit level on its index arm - "In operation, the long base would be placed down the muzzle of the cannon, the quadrant set for a particular angle of elevation corresponding to a desired range. The bubble would be used to determine that the proper angle had been established."

Another example is illustrated in Christie 18:6:92, Lot 226.

Dates from Morrison-Low 1989,135.

3278 NMM018 SAND GLASS & BUBBLE LEVEL

Simonton Dublin 12 Secs.

BD 99; LvD 42; CyHsD 52, H 126. 1863-1876. F.

Brass; disc base houses a circular bubble level; on this sits the cylinder housing for the sand glass.

Most of the liquid from the bubble level has gone; the cylinder housing has two rectangular windows 64x34 to view the sand glass, containing brown sand, which has been blown in one piece without a break at the constriction.

Morrison-Low 1989,134 lists James Simonton from 1863-76.

3283 NMM023 SEXTANT

W.C. Cox, Devonport. JOHN LILLEY & SON, London. E.C.

R 208; L 254; W 283; C 293x277x130. Late 19 C. R.

Brass and oxidised brass; silver scale 0-150; lattice frame; index arm has window vernier and magnifier; case.

The reinforced index arm has a pivot for the magnifier and has clamping and tangent screws; the index mirror has four filters (red, green, grey, red) in square frames with a rounded corner; the horizon glass has three filters (green, red, red) in ring frames; there are two short and one long telescopic eyepieces, plus a tapering eyepiece; under the frame is a wood handle.

The oak fitted case has a trade label: "JOHN LILLEY & SON, Nautical & Mathematical Instrument Manufacturers, To Her Majesty's Royal Navy. INVENTORS & PATENTEES OF THE NEW LIQUID STEERING COM-PASS, ADJUSTERS OF IRON SHIPS COMPASSES. 9, London Street, Fenchurch Street, London. E.C."

A note in the case records the donation of the sextant by Miss O'Neill, St Alban's Park, Sandymount, 7:9:82.

Downing 1988,77 lists John Lilley & Son, with an EC address from 1887-1900+.

3275 NMM015 SEXTANT

W. Jewitt & Co. South Castle St Liverpool.

R193; L240; W234; TuL184,D21. Mid to late 19 C. G.

Brass and oxidised brass; ivory scale 0-130; curved frame inserts; index arm has brass and ivory window vernier.

A magnifier is on a pivoted arm from the reinforced index arm; the index mirror has four filters (green and three shades of red) in square frames with one rounded corner; the horizon glass has three filters (green, red and red) in ring frames; there is a long telescope; under the frame is a wood handle; the index arm has clamping and tangent screws.

Formerly the property of Captain Robert Charles Halpin 1836-1894.

3264 NMM004 SEXTANT

E. LEVETT M.V. O'NEAL, 1641 THAMES STREET, BALTIMORE, MD.

R 170; L 216; TuL 184, D 20; C 244x234x122.

Mid to late 19 C. G.

Brass and oxidised brass; silver scale 0-160; lattice frame; window vernier; index and horizon glasses; case.

A pivoted arm on the reinforced index arm holds a sleeve for a missing scale magnifier, with an angled glass below the sleeve; the index mirror has four filters (green, red, grey, and red) in square frames, and the horizon glass three filters (grey, red, and green) in ring frames; the index arm and vernier have clamping and tangent screws; there are four eyepiece tubes.

The fitted hinged mahogany case has a trade label: "M.V. O'NEAL, CHRONOMETERS, MARINE GLASSES, QUADRANTS, BAROMETERS, COMPASSES, NAUTICAL BOOKS, ETC. BY APPOINTMENT: AGENT FOR LIQUID COMPASSES AND GOVERNMENT CHARTS AND ALMANACS. FIRST CLASS CHRONOMETERS TO LET. REPAIRING A SPECIALITY. ADJUSTER OF COMPASSES IN IRON VESSELS. 1641 THAMES STREET, BALTIMORE, MD.", with "REMOVED TO 510 E. PRATT ST." stamped on later.

A card with the case notes that this was a sextant used by Captain Robert Halpin, of Wicklow, when Master of GREAT EASTERN, who laid the first cables which connected Europe with America in 1868-69.

282 NMM022 SEXTANT

F.M. Moore, Dublin & Belfast

R 143; L 185; W 204; C 215x205x118. 1864-1899. F.

Brass and oxidised brass; silver scale 0-150; lattice frame; index arm has window vernier and magnifier; case.

The reinforced index arm has a pivot for the magnifier, and has clamping and tangent screws; the index mirror has four filters (green, red, grey, red) in square frames with a rounded corner; the horizon glass has three filters (green, red, grey) in ring

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frames; there are two short and one long telescopic eyepieces; under the frame is a wood handle; the fitted case has green velvet lining.

Burnett & Morrison-Low 1989,152 lists the firm in Belfast and Dublin from 1864-1899, when it became a Limited Company.

3276 NMM016 SEXTANT

J. Sewill, 61, South Castle St. Liverpool

R191; L234; W263; TuL108,D20. 1841-1895+. R.

Brass and oxidised brass; silver scale 0-150; lattice frame with ellipse; index arm with window vernier.

The latter has clamping and tangent screws, two vertical tapering supports H12 for a missing slide, and a broken pivoted arm for a scale magnifier; the index mirror has four filters (green and three shades of red) in square frames; the horizon glass has three (green red, and red) in ring frames; there is a wood handle under the frame.

Formerly the property of Captain Simpson of the SS Glenageary.

Dates for Joseph Sewill from Clifton 1995,249.

3265 NMM005 SEXTANT

Wilson & Gillie. Bruce & Sons Ltd...Cardiff Barry Dock & Newport. K817 "Hezzanith" CERTIFICATE Oct 1913

R 174; L 220; W 232; C 260x242x126. Pre 1913. D.

Brass and oxidised brass; silver scale 0-150; three-ring frame.

The reinforced index arm has a window vernier with clamping and tangent screws, and a magnifier on a pivoted arm; the index mirror has four filters (green and three shades of red) in square frames, and the horizon mirror three filters (green, red and red) in ring frames; there are three eyepieces, one tapered, and a long and short straight tube; below the frame is a wood handle.

The fitted mahogany case has the certificate from "The 'Hezzanith' Observatory Works, LONDON", dated "Oct 1913" and the printed signature: "G.W. HEATH, M.I.Mec.E., F.R.G.S., M.R.I., Director." and the "Examiner E.P.".

There is a second certificate in the lid "Die Deutsche Seewarte." dated Hamburg 8:9:1920.

3262 NMM002 SHIP'S LOG

THE "PENDENT" LOG REYNOLD'S PATENT LONDON 416 COHEN, JACOB & CO, Ely Place, & Charterhouse St., Holborn, E.C.

MnL 297; FiL 405, MxW 127; C 448x220x156.

1873-1879. G.

Brass housing; scales 10-100, 1-10, ¼-1; wood and metal fin.

The latter has a wood centre shaft with brass binding rings signed "REYNOLDS PATENT", and four curved metal vanes at an angle to the axis of the centre; the rotation is transferred via a metal chain and rope to the end of the brass scale housing; the instrument is stored in a boxwood box with the Cohen signature "Sole Wholesale Agents" on the printed instructions inside the lid; the housing has hinged scale flap and a pivot handle.

Dates from Downing 1988,25.

3261 NMM001 SHIP'S LOG

T. WALKER'S PATENT HARPOON SHIP LOG A.1. London

L 496; MxW 132. Mid to late 19 C. G.

Brass; cone front; cylinder with white scales 10-100, 0-9 & ¼ to 1 mile; conical guide; five revolving fins.

The guide is in the shape of a heart and is screwed to the cylinder body of the instrument below the scale plate.

McConnell 1982,162&75 gives Thomas Walker dates 1805-73, but also a Patent by him dated 1879.

3287 NMM027 SOUNDING TUBES

Unsigned - attributed to J. White, Glasgow.

OTuL 635, D 12; ITuSD 612, D 5; CL 617, D 31.

Late 19 early 20 C. G.

Tin cylinder case; brass tube with cap and rope; eight glass tubes with one end capped by red resin and copper.

A torn label on the tin case reads: "SIR WM. THOMSON (LORD KELVIN) PATTERN SOUNDING TUBES This tin should be kept in a cool dry place. When taking soundings with these tubes be careful to see that they are kept in a vertical position when being withdrawn from the.. (the rest is torn off, but the last word remains).. re-coated."

Kelvin was raised to the peerage in 1892, Smith 1989,799.

3288 NMM028 SPHEROGRAPH

Proprietors S.M. Saxby & H. Wood & Co. Liverpool No.41

397x328; C 350x312x63. 20:10:1857. S.

Two; leather-edged board; on one side rotating card disc with hours, months, dates; behind "KEY TO SPHEROGRAPH".

The card has radii with zodiac signs, and labels for each hour I-XXIII, and 20 and 40 minute divisions; outside these is a ring with months and dates 5 10 15 20 25 30; this disc revolves and the backing card has a fixed scale around the circumference with hours from "MIDNIGHT" to "NOON" and small divisions 0-87-0-87-0 giving corrections "additive" or "subtractive" to "True Altitude" for "FORENOON", "AFTERNOON", "NIGHT" AND "NI-GHT"; one example has the printed and hand-written elements: "No.41. - Date Oct 20th 1857 Signature ppro S M Saxby Gordon H Saxby"; the second, though identical, does not have the hand-written details.

On the back are printed instructions: "By Her Majesty's Royal Letters Patent KEY TO SPHEROGRAPH, PART III, (STARS)"; these instructions also are present on two separate cards, which have, on the back: "DIRECTIONS FOR USE" with details to find latitude, apparent time, and compass error; the first: "I. - TO FIND THE LATITUDE FROM ANY CELESTIAL OBJECT, AT ANY HOUR, WITH OR WITHOUT AN ALTITUDE." starts: "Five things (excluding Longitude) enter more frequently into Nautical computation, viz: Latitude, Declination, Altitude, Time and Aximuth. When any three of these are given, either of the others may be readily found by the Spherograph..."; both boards and cards are contained in a hinged mahogany case.

3285 NMM025 TELEGRAPH APPARATUS

CASELLA LONDON No 20 (& No 21)

Various Late 19 early 20 C. G.

A brass-housed double coil printer on mahogany stand; two metal-housed tape drives(?); a two-coil tapper.

The printer has a clockwork mechanism housed in brass (149x77x45), and a pivoted bar above the two vertical coils; a spring holds the tape on the roller, and a disc rises from a semi-circular reservoir; the housing sits on a tall (H924x244x143) mahogany cupboard with two brass screw contacts on each side and a three point switch with one of these pairs; the housing is signed: "CASELLA LONDON No20"; the tape-drives are in heavy black metal housings (162x118x49); at one side are three buttons which, when pressed, drive the white metal and brass rollers, through which, it is assumed, the tape would run; the pair are signed: "CASELLA LONDON No20" or "CASELLA LONDON No21"; the morse tapper is on an oak base (230x86x13) and has a sprung tapper, an interruptor connected to a bar above two vertical coils, and three screw electrical contacts with "BUZZER" and "SOUNDER" on ivory panels between them.

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3266 NMM006 TELESCOPE - REFRACTING

Bardou et Fils à Paris pour Widdifield & Co., Boston

L 665-829; MxD 68; ObD 53. Mid to late 19 C. G.

Brass; leather-bound tapering outer tube plus single draw; eyepiece lens flap.

A card with the instrument notes that the it belonged to the Bosun of the U.S.A.'s Naval Expedition to Japan, and that it is alleged that the first sighting of the coast of Japan was made with it.

Bardou firm lasted from 1818-1911, Brieux 1980,13, Anderson 1990,7.

3274 NMM014 TELESCOPE - REFRACTING

Unsigned

MxL 1040; TuD 77&39; LeD 74; PvH 372. Late 19 C. G.

Folding iron cabriole legs; brass; tapering pillar to pivot; small eyepiece tube focused by rack and pinion.

The focus mechanism does not now work; there is an eyepiece lens flap.

Formerly the property of Captain Robert Charles Halpin 1836-1894.

3277 NMM017 TRADE LABEL

FRANCIS M. MOORE 23, EDEN QUAY, DUBLIN. AND 102, HIGH STREET BELFAST [trade label on octant case].

[Octant] L370; W 329; De 61&92. 1864-1899. F.

Oak hinged arc-shaped case with deeper section at narrow end; F.M. Moore trade label inside lid.

The latter reads: "FRANCIS M. MOORE, Practical CHRONOMETER & WATCHMAKER, Adjuster of the Compasses of Iron Ships, OPTICIAN, &c. MOORE'S PATENT STANDARD AND STEERING COMPASS, WITH PERFECT SYSTEM OF ADJUSTMENT. 23, EDEN QUAY, DUBLIN. AND 102, HIGH STREET, BEL-FAST. TIME SIGNALS DIRECT FROM GREENWICH OBSERVATORY. BAROMETERS & TELESCOPES, SEXTANTS, QUADRANTS, BINNACLES, COMPASSES, CHARTS &c. MATHEMATICAL INSTRUMENTS. MARINE CHRONOMETERS RATED BY TRANSITS. Nautical Instruments repaired with the utmost Care. BY APPOINTMENT METEOROLOGICAL AGENT TO THE LORDS OF THE PRIVY COUNCIL FOR TRADE. LONDON CHRONOMETERS OF THE MOST APPROVED MAKERS. A few good second hand Chronometers Guaranteed & ready for Sea. Marcus Ward & Co. Ltd."; the fact that the Printer has a Limited Company suggests that the trade label post-dates the octant; the label is topped with illustrations of a sextant, a chronometer, and a compass.

A hand-written paper in the case notes it was donated by Captain T. Walsh, "Sup. Nautical College".

Morrison-Low 1989,132 lists the firm in Belfast and Dublin from 1864-99, when it became a Limited Company.

INSTRUMENTS IN PRIVATE COLLECTIONS - PRI

Note: The names and addresses of the owners of the instruments in this section are not published, to protect their privacy. However, if anyone wishes to have more information about any of the instruments, the author will contact the owner to see if he/she will allow this and, if so, will pass on the necessary details to the enquirer.

4451 PRI265 ABACUS

Unsigned
188x70x18. Late 19 early 20 C. G.
Japanese; brown and black hardwood; numbers on ivory; thirteen rows of six beads, five below and one above division.
Turner 1983,281 records that this is a traditional form of Japanese abacus, which continues in production to-day; below the division, the beads count one unit, above it, five units.

4427 PRI261 ANEMOMETER - LOWNE

ZERO SETTING AIR METER PATENT No3729 J. HALDEN & CO MANCHESTER & LONDON No..3517
BD 59; H 83; SHsD 61; RiD 69; C 112x100x88. 1915. P.
Brass and oxidised brass; eight aluminium vanes; outer scale 10-90 FEET, with five subsidiary scales; case.
Oxidised brass base with central screw thread for small boss with short horizontal tube (L21,D13) below; three turned legs rise to the shallow glazed brass cylinder with the outer scale and five small dials (D14), 1-9 "HDS", "THDS", "MILLNS", "10THDS", "100THDS"; at the side is an oxidised brass ring held vertically by a bracket on the base and two struts from the scale housing; this has three spokes in front, protecting the eight thin aluminium vanes; the anemometer is contained in a fitted mahogany case stamped "T 1003", with a calibration graph in the lid, headed: "S. & B. No. 5570 - CORRECTIONS FOR 6 DIAL AIR METER - No.5570 - Tool No.1003".
Name from Stanley 1901,544 - which shows a slightly different version.

3664 PRI262 ANEMOMETER - LOWNE

ZERO SETTING AIR METER PATENT No3729 J. HALDEN & CO MANCHESTER & LONDON No..3518
BD 59; H 83; SHsD 61; RiD 69. 1915. P.
Brass and oxidised brass; eight aluminium vanes; outer scale 10-98 FEET, with five subsidiary scales.
Oxidised brass base disc with a central screw thread, presumably for a stand; three turned brass legs rise to the shallow glazed brass cylinder housing for the silvered scale, divided from 10-90 "FEET" around its circumference, and with five small dials (D14), 1-9 "HDS", "THDS", "MILLNS", "10THDS", "100THDS"; only three watch hands remain; at the side is an oxidised brass ring held vertically by a bracket on the base and two struts from the scale housing; this has three spokes in front, protecting the eight thin aluminium vanes; under the base is scratched: "Malt Kiln 2201", suggesting that it was used in the brewing or distilling industries.
Name from Stanley 1901,544 - which shows a slightly different version, housed in a wood case.

0670 PRI126 ASTROLABE

Unsigned - attributed to Balhoomal of Lahore, India.
D 155. c1850. PC.
Brass; seven tablets; rete with 12 leaf-shaped star pointers; one of the seven tablets is a double sided tablet of horizons; the rest cover latitudes 17° to 50°; the interior is engraved as gazetteer of 57 towns.
David A. King (Personal Communication) writes: This astrolabe is from Muslim India, probably 19th century, possibly 18th. From the photos I think we can discount the possibility that it is a 20th-century copy. The piece is well-made, from the throne to the plates and the star-pointers on the rete. The latter appear to be correctly labelled. The numbering 1-60 on each of the 6° intervals on the front rim is unusual, but within the Indian tradition. The throne is rather elegant. And the single quadrant of trigonometric markings on the back is typically Indian. (A modern faker would not have been able to resist the temptation to add more.) The unusual semicircle on the lower back seems to be for finding the solar declination, its radius about 12 units (corresponding to 30 x the sine of the obliquity) compared with the inner radius of the outer scale, namely, 30 units. The alidade is also divided for 30 units. (The unusual base for trigonometric scales was 60, and I have not seen one for 30 before.) The astrolabe is similar to one illustrated in Gunter 1932, Vol.1,172, which is signed by Balhoomal, the Astronomer of Lahore, A.D. 1849, Balhoomal being then in the employ of Sir Henry Elliott, K.C.B., Chief Secretary of His Lordship the Governor-General in Kayroorthalla. The inscription describes it as a "Sulsi Astrolabe with the Majayyab (Sinus) Quadrant and beneath it the Harjah". Gunter's details also match the present instrument: "The tracery of the ankabut is admirably designed; the entire space between the 12 large leaves, which are inscribed with the names of the stars whose positions they mark, is filled with delicate tendril ornament. The zodiacal circle is supported by an east-west bar above the centre line. The equinoctial band is not connected with others by any broad bar or band, being supported solely by the tendrils of the fretwork. A single knob serves as a handle (mudir) for turning the rete. The tablets, 5.5 inches in diameter, and 7 in number, are coarsely engraved. Six are marked for latitudes 17° and 20°; 23° and 26°; 29° and 32°; 35° and 38°; 41° and 44°; 47° and 50°. All plates show the lines of equal and unequal hours, and one shows azimuths below the horizon. The seventh plate is engraved on both sides with the tablet of the horizons. The Back is graduated 0° to 90° in all 4 quadrants, and with a scale of sines in the right upper quadrant, the other 3 quadrants being bare."

4224 PRI242 BALANCE - EQUAL ARM

JAMES WARREN, at the sign of St. Dunstan in Skinner Row, Dublin.
BmL 252; PoL 76l PasD 53; C 278x127x43.
1752-1768. A.
Iron beam with swan neck ends, pointer and shears; brass pans; oak case with trade label; eight brass weights.
The trade label reads: "An Explanation of Money Weights, Made and Sold by AUTHORITY, ONLY by James Warren, at the Sign of St. Dunstan in Skinner-Row, Dublin: Who Sells the beft Money-Scales, and all Sorts of Goldsmith and Jewellers Work, on the moft reafonable Terms", and this is repeated; below these two statements are the weights and values of the double pistole, pistole and half pistole, the moydore, half moydore and quarter moydore; the French guinea and half guinea, and five

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new Portugal pieces; three of the weights (4.J4, 5:5 and 6:22) are initialled I and W on either side of a shield; two (2:J3 and 5:3) have intertwined JWW on the other side, and all these are dated 1760; another (X8) is unsigned and is dated 1698, another unsigned (9.5) is worn with the last number of the date 7; the final weight (I) is the smallest, unsigned and undated; the made-up oak box has wire hinges, and has an attractive brass beaked animal to engage a wire loop to close the box. Dates from Crawforth-Hitchins 1994, 1844.

2586 PRI220 BALANCE - EQUAL ARM

Unsigned

L 149&151; PasD 64&63. Mid 19 C. G.

Pair; white metal; swan neck ends; shears and pointer; brass or glass pans; drachm, grain, and scruple weights.

Both have mahogany cases; one has mainly circular brass "APOTHECARIES WEIGHT"s in drams or drachms; the other has a variety of weights, including GRAINS, DRACHMS, and SCRUPLES, in a tin box labelled: "THE OOWANA SHAVING STICK".

1002 PRI146 BALANCE - EQUAL ARM

Unsigned

BmL 155; PasD 64. c1750. PC.

Iron beam; swan neck ends; pointer; shears to hook; brass pans; on non-original drawer stand.

Balance mounted on modern black metal support on hardwood drawer base.

Label with instrument reads: "Type of balance used by Joseph Black c1750."

1141 PRI018 BALANCE - FOLDING COIN

STEPHEN HOUGHTON & SON, Makers, Ormskirk, Successors to A. Wilkinson

Hs 135x24x16; H 75. c1824-1853. A.

Mahogany housing; brass; two turns; pivot; slide 0, ½S, S; pan; instructions inside housing.

List of current weights given for guinea, half guinea, seven shilling piece, sovereign, and half sovereign.

Dates from Crawforth 1979, 152 - listed in directories from 1824, moved to Liverpool around 1853.

4222 PRI241 BALANCE - FOLDING COIN

T. HOUGHTON, MAKER, FARNWORTH, near WARRINGTON, LANCASHIRE

CL 142, W 35-17. Turn 18,19 C. R.

Tapering mahogany hinged case; brass; slider on one side and two turns on other; printed instructions.

The slider scale is divided 0-12; on the other side of the fulcrum are the letters "T.H"; the trade label has pointed ends.

The instructions read: "The turn at the end for a guinea; to the centre for half a guinea; and the slide at the cypher, where it ftops; every ftop nearer the centre, is a farthing above the fstandard; the divifions the other way are a penny each for light gold."

The second column reads: "When you want to weigh quick, put the flide a farthing or two above weight, for safety; and what gold will not draw, may be tried afterwards with the flide at the cypher (Price ."

Crawforth 1979, 21 notes: "The traditional fine crafts-manship associated with watch-making influenced all the Lancashire balance makers, and their confident abilities led them to devise alternative styling... Of particular merit was the work of Thomas Houghton who went out of his way to produce a different stylistic interpretation for each component part."; a balance of the same style as this is illustrated with the date c1798.

1006 PRI148 BALANCE - FOLDING COIN

Unsigned

C 129x17x12; H 67. c1800. PC.

Brass; folds into brass case; coin arm has slide weight on scale 0-10; instructions on base of case.

Instructions on paper, some of which is torn - they use the old form of "s"; flower decoration on top of case; turn at end of beam away from coin pan

1004 PRI147 BALANCE - PRECISION

Unsigned "G" & "D" on pans

B 241x118x47; H 260; BmL 141; PasD 55. c1860. PC.

Brass; stores in mahogany drawer base; pillar to beam; brass pans; scale on top, five divisions each side.

Label with instrument reads: "Portable French Chemical balance c1860" - "G" gauche, "D" droit.

3296 PRI080 BAROGRAPH - ANEROID

(JUNIOR ARMY & NAVY STORES LTD. DUBLIN.)

BW 360, H 40; Hs 300x160x150.

Late 19 C early 20 C. G.

Glazed rosewood(?) housing with drawer base; seven evacuated capsules; brass fittings.

The owner notes that the wood is not as dark as mahogany, more like rosewood.

2136 PRI034 BAROGRAPH - ANEROID

SHARMAN D. NEILL LTD. OPTICIANS BELFAST

Sp 235&377; H 220; Hs 300x154x153. Early 20 C. G.

Mahogany drawer base and glazed housing; eight evacuated capsules; brass base plate, drum, and fittings.

Word "OPTICIANS" on chart paper, but not on ivory signature plaque on base.

Firm became Ltd in 1910 and is listed until 1921, Burnett & Morrison-Low 1989, 154; the house was furnished c1927.

3859 PRI118 BAROGRAPH - ANEROID

(Pollock & Co., Grafton Street)

No measurements available. Early 20 C. G.

Telephone report from owner, June 1991; no further details available.

Firm not listed in Burnett & Morrison-Low 1989.

3738 PRI113 BAROGRAPH - ANEROID, SHORT & MASON

(Recorded as Yeates & Co; assumed to be Yeates & Son.)

No measurements available. Early 20 C. G.

Mahogany glazed housing; brass drum and fittings; evacuated capsule under brass disc on base; levers to pen.

The owner records (letter 14:4:1989) that the barograph has an eight-day clock drive for the drum; referring to the weather forecast table within the glazing, he records: "The attempt to produce a table which would give a forecast from just a pressure reading...was a brave undertaking, but it seems to have been copied by British manufacturers in the 1930's."; however, Banfield 1986a, 126 illustrates what appears to be an identical instrument, patented by Short & Mason in 1904, containing the "Cyclo-stormograph" chart.

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3529 PRI089 BAROMETER

(Williamson Cork)

No measurements available. Unknown date.

A United States Visitor to the National Museum reported that he had a barometer by Williamson of Cork.

Information from Michael Kenny, who hopes to be sent more details.

3667 PRI095 BAROMETER - ANEROID

(Cary, Strand, London, 175, (Compensated))

D c115. 19 C. G.

Brass mounted; rotating rim for altitude correction.

3675 PRI104 BAROMETER - ANEROID

(R. Wallace Limerick)

D 121. 1856-1881. F.

With thermometer showing Fahrenheit and Centigrade; in good working order.

Belonged to owner's father, about 1900, but may have been inherited from his grand-father.

Dates from Burnett & Morrison-Low 1989,156.

3297 PRI081 BAROMETER - ANEROID

Yeates & Son, Dublin

D 197; SD 90. Mid to late 19 C. G.

Carved oak frame with leaf decoration; glazed metal housing; red and black lettering; 27-31".

Single white-metal evacuated capsule mechanism.

2612 PRI046 BAROMETER - ANEROID, PORTABLE

Compensated CURTIS 10, Suffolk St. DUBLIN

HsD 48, W 14; C 80x61x25. 1893-1897. A.

Glazed oxidised brass cylinder housing; silvered face 23-31"; revolving divided ring 0-8000; shaped case.

Brass knob on top turns the ring around the edge of the dial scale; hinged leather-covered case with green velvet and silk lining.

Morrison-Low 1989,123 gives Curtis Brothers at this address from 1893-1897.

4032 PRI131 BAROMETER - ANEROID, PORTABLE

SHARMAN D NEILL. Optician BELFAST.

D 47; W 19. 1884-1909. F.

Glazed gilt watch-case housing with ring handle; silvered dial 23-31", with outer altitude ring 0-8000.

Dates from Burnett & Morrison-Low 1989,153-4.

2611 PRI045 BAROMETER - ANEROID, PORTABLE

Improved scale Compensated WATSON & SONS LD LONDON

HsD 50, W 15; CD 61, W 36. Early 20 C. F.

Glazed brass cylinder housing; silvered face 26-31", revolving divided ring; compass and thermometer in case.

Brass knob on top turns the ring around the edge of the dial scale; ring divided 0-5000 on outside, with concentric scales labelled 20, 50 and 100 "Feet", each with a smaller

number of divisions; in broken hinged red leather-covered case, with circular mercury glass thermometer 10-130° "FAHRT" and -10-50° "CENTE", and small glazed compass in lid; the thermometer has its scale on an ivory disc; the compass has a clamping knob

Anderson 1990,88 lists the firm as a limited company in 1902; Clarke 1989,87 in 1908.

2610 PRI044 BAROMETER - ANEROID, PORTABLE

YEATES 2 GRAFTON ST DUBLIN [on thermometer]; YEATES & SON DUBLIN [on compass]

HsD 46, W 18; C 145x107x23. Mid to late 19 C. G.

Glazed brass housing; in case with compass and thermometer.

Leather flap case with buckle has a red velvet-covered container for the three instruments; the barometer is in a cylinder housing and has a silver-metal face 26-31" with a brass ring handle on top - it is unsigned but has "Compensated" inscribed on the face; the glass mercury thermometer is in an ivory housing (101x12x11), scale -10-120°; the compass, with 16 points, is in a silver-metal glazed cylinder housing; probably a made-up set.

Judging by the signatures and look, the thermometer is earlier than the compass, the barometer in-between.

3398 PRI083 BAROMETER - ANEROID, PORTABLE

HPBN [H above PB, N below] BAROMÈTRE HOLOSTÉRIQUE

D 49; W 20. Late 19 C. G.

Gilt; watch-type case; white-metal scale 61-80; "TEMPETE Pluie Vt. VARIABLE Beau T. TRES-SEC".

2621 PRI054 BAROMETER - BANJO

G. BIANCHI WARRANTED

H 962; MxW 255. Mid 19 C. G.

Mahogany with light wood edge; scroll top; hygrometer gone; red spirit thermometer; silvered dial; spirit level.

Scroll pediment broken; circular hole for missing hygrometer; silvered thermometer scale 10-100° in arched glazed frame; convex mirror in circular wood frame; dial 28-31" in brass and glass frame; ivory-framed hole and boss for missing adjust key for brass register hand; blue-metal reading hand; red spirit in level with corroded brass signed disc behind, but missing glass cover.

Goodison 1977,302 lists a "V. Bianchi Dublin" for a banjo barometer with a clock above the dial - no date.

Clifton 1995,30 lists three G. Bianchis at Ipswich between 1805 and 1844.

1426 PRI035 BAROMETER - BANJO

G. Biancho Cork

H 966; MxW 263. Mid 19 C. G.

Mahogany, light wood edge; scroll top; hygrometer and mirror gone; thermometer; silvered dial; spirit level.

Circular hole for hygrometer on top; broken glass mercury thermometer with silvered scale 0-110° in arched frame; hole for missing convex mirror and frame; dial 21-31" with brass and glass frame; ivory-framed hole and boss for missing adjust key for brass register hand; blue-metal reading hand; pink spirit in level, which has a signed brass disc behind, but is missing its glass cover and frame.

Other barometers are signed "Bianchi" but this has been carefully checked and is "Biancho".

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2606 PRI040 BAROMETER - BANJO

BINDA CORK

H 1033; MxW 324. 1846-1852. R.

Mahogany veneer; mother-of-pearl inlay; rounded top; thermometer gone; silver-metal dial; no spirit level.

Inlay of birds and plants; two screws remain above the dial which presumably held a thermometer; the frame and glass from the dial are missing; a turned ivory knob below the dial moves the brass marker hand; the register hand is of blue metal; one of the wings of the shaped bottom is detached.

Burnett & Morrison-Low 1989,145 give 1846-52 dates for G. or J. Binda.

1718 PRI025 BAROMETER - BANJO

BINDA 78 OLD GEORGES STRT. CORK

L 910; MxD 265. Mid to late 19 C. G.

Mahogany veneer; rounded top; mirror (D60); glass mercury thermometer 10-140°; white metal dial 28-31".

Thermometer mounted on white metal scale housed in mahogany and glass frame on the stem of the instrument above the dial, which has a white metal indicator hand and also a brass marker hand adjusted by an ivory square-cross-section rod below; there was originally a knob to adjust this; below the dial is a brass signature disc, with a horizontal slit for a spirit level with orange liquid.

Burnett & Morrison-Low 1989,145 do not list this address.

2000 PRI033 BAROMETER - BANJO

(Giovanni Binda Cork)

No measurements available. 1846-1852. R.

Signature on spirit level on bottom; no other details available.

Dates from Burnett & Morrison-Low 1989,145.

1999 PRI032 BAROMETER - BANJO

(G. Binda Fecit Cork)

No measurements available. 1846-1852. R.

Signature on spirit level on bottom; no other details available.

Dates from Burnett & Morrison-Low 1989,145.

2569 PRI204 BAROMETER - BANJO

JOHN BINDA CORK

L 960; MxW 250. 1846-1852. R.

Mahogany; scroll top; hygrometer, thermometer 10-120°, convex mirror (gone), dial 28-31", spirit level.

An inlay of pale wood follows the outline of the instrument; the hygrometer, thermometer and dial are glazed, but the glazing of the spirit level is gone; the latter contains pink liquid, and has a brass disc backing with the signature engraved on it.

Dates from Burnett & Morrison-Low 1989,145.

2618 PRI052 BAROMETER - BANJO

HUGH COCHRANE, New Ross

H 880; MxW 275. Mid 19 C. G.

Mahogany; rounded carved top; glass mercury thermometer 30-120°; silvered dial 28-31"; carved leaf below.

Silvered scale plate for thermometer in rectangular glazed frame; brass and glass frame for dial plate; ivory turned knob below for brass register hand; blue-metal reading hand.

Maker not listed in Burnett & Morrison-Low 1989.

2619 PRI053 BAROMETER - BANJO

D. FAGIOLI & SON 3.. Gt.. Warner St.. Clerkenwell

H 1130; MxW 365. 1840-1851. A.

Mahogany; onion top and bottom; hygrometer 20-0-20; thermometer gone; silvered dial 28-31"; spirit level.

Silvered disc scale for hygrometer and backing for spirit level; frame and glass for hygrometer missing; two screws and a tall shadow remain where there was originally (presumably) a thermometer above the dial; brass and glass frame for dial and for spirit level at the bottom; three of eight mother-of-pearl inlay discs (D15) remain on bosses at the sides of the instrument; pink spirit in hygrometer; brass and blue-metal hands.

This barometer was on offered as Lot 955 in the Mealy Sale 19-20:11:91, and sold for £180.

Dates from Downing 1988,44.

2617 PRI051 BAROMETER - BANJO

D. Gatty Lewes Warranted

H 1120; MxW 310. Early 19 C. G.

Mahogany, inlay edge; scroll top with brass urn; hygro-meter, thermometer, convex mirror, dial, level.

The inlay edge is of black and light wood; all the plates are silvered; hygrometer in circular brass glazed housing; glass mercury thermometer in arched glazed frame 10-110°; dial 28-31" has brass and glass frame; turned ebony knob below moves brass register hand; blue-metal reading hand; pink spirit in level with signature on disc plate and with brass and glass frame.

Goodison 1977,324-5 records many Gattys including this one without dates; and Andrew Gatty, Dublin, FL 1786-1824.

3400 PRI085 BAROMETER - BANJO

JAS NEILL & CO BELFAST

L 1016. 1865-1880. F.

Mahogany(?); elaborately carved top and bottom; glass mercury thermometer in stem; glazed silvered dial.

Thermometer scale 10-100°; dial scale 28-31"; blue metal and brass hands; both thermometer and dial are glazed, the thermometer in a frame carved with flowers top and bottom, the dial in a brass ring; there is an ivory knob below the dial to adjust the marker hand.

Dates from Burnett & Morrison-Low 1989,153.

1394 PRI023 BAROMETER - BANJO

Neill & Sons Belfast

L 980; W 225. Mid 19 C. G.

Rosewood veneer with mother-of-pearl; scroll pediment; hygrometer; silvered dial; ivory knob; spirit level.

Inlay in form of continuous wood branch surrounded by mother of pearl; flightless bird under tree in centre; scale on dial 28-31", "Stormy MUCH-RAIN RAIN Change FAIR SET-FAIR Very-Dry"; hygrometer on top - scale 20-0-20 "DRY DAMP"; thermometer missing; spirit level on bottom; brass bracket behind with pulley mechanism, but glassware missing; back panel

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detached.

Burnett & Morrison-Low 1989,153 gives single date 1846; Goodison 1977,344 quotes clock in Baillie dated 1818.

3528 PRI088 BAROMETER - BANJO

F. PORRI DUBLIN WARRANTED

H 965; MxW 254. Mid 19 C. G.

Mahogany(?); scroll top; space for hygrometer; thermo-meter 10-140°; dial 28-31"; spirit level with signature.

Sketch obtained from owner; this, although drawn with good detail, does not show a hygrometer under the pediment; the thermometer is on a base with an arched top; the spirit level is surrounded by a disc on which the signature has been inscribed.

Goodison 1977,350 lists an undated F. Porri Dublin banjo barometer with a scroll pediment, and other Porris in London and Leicester, including Benjamin Porri London FL 1834-41.

2605 PRI039 BAROMETER - BANJO

F. PORRI DUBLIN

H 1075; MxW 314. Mid 19 C. G.

Mahogany; flat top; hygrometer gone; glass mercury thermometer 10-110°; silvered dial 28-31"; spirit level.

The circular cut-out for the hygrometer is above the arched glazed frame for the thermometer and its silver-metal scale plate; below this is a convex mirror; the frame and glass of the barometer dial are gone; the spirit level is set in a signed silver-metal plate and has a brass-bound rectangular frame and glass on top.

Goodison 1977,350 lists an undated F. Porri Dublin banjo barometer with a scroll pediment, and other Porris in London and Leicester; including Benjamin Porri London FL 1834-41.

2616 PRI050 BAROMETER - BANJO

A. Prince Waterford

H 1125; MxW 300. c1839. R.

Mahogany, light wood edge; scroll top, brass urn; hygrometer, thermometer, convex mirror, dial, level.

All the plates are silvered; hygrometer in a brass glazed housing; glass mercury thermometer 10-110° in arched glazed frame; dial 28-31" has brass and glass frame; turned ivory knob below moves brass register hand; blue-metal reading hand; pink spirit in level with signature on disc plate and with brass and glass frame.

Burnett & Morrison-Low 1989,154 note that Abraham Prince is referred to in Westropp in 1839.

2615 PRI049 BAROMETER - BANJO

Spear Dublin

H 1090; MxW 305. 1791-1837. F.

Mahogany, inlay edging; scroll top with brass urn; thermometer -20-130°, hygrometer 20-0-20; dial 28-31".

Glass mercury thermometer in arched glazed frame has silvered plate; below this is the hygrometer in a brass cylinder housing with cracked glass on top; the dial has a brass glazed frame; both hygrometer and dial plates are silvered; below the dial is a turned ivory knob to adjust the brass recording hand; the reading hand is of blue metal.

Dates from Morrison-Low 1989,135.

2632 PRI067 BAROMETER - BANJO

Tedeo Dublin

H 946; MxW 263. 1830-1850. R.

Mahogany, light wood edge; scroll top with urn; hygrometer, thermometer, level; mirror gone; scale 28-31".

Glazed hygrometer on top; below this is a red spirit thermometer in a glazed case with a rounded top; below this again is a wooden fluted ring frame for the missing mirror; then the glazed silvered dial with one brass hand remaining; ivory knob below; in the rounded bottom a glazed spirit level, with the signature above and below it on a silvered disc.

Estimated dates given in Banfield 1991,214.

2631 PRI066 BAROMETER - FITZROY

BAIRD & TATLOCK, GLASGOW & LONDON

H 1188; W 212. Late 19 C. R.

Carved oak glazed case; glass J-Tube, bulb on short limb; scale 27-31"; storm glass; thermometer -19-120°.

Glass/mercury thermometer on boxwood scale plate; two brass pointers to barometer scale for "SET 10AM YESTERDAY" and "SET 10AM TODAY"; with printed details for a "RISING" and "FALLING" reading; the storm glass is a mounted cylinder vessel containing colourless liquid.

"A curiosity and no prognosticator of weather" according to Turner 1983,facing p256 - "a popular and inexpensive instrument suitable as an indicator."

Baird moved to London in 1890, Brian Gee, Bulletin 27,1990,33.

3670 PRI098 BAROMETER - FITZROY

(T. Mason Optician 5. Dame St. Dublin [label])

No measurements available. 1900-1916. A.

"Mercury barometer, including Admiral Fitzroy's Remarks, in Oxford frame"; T. Mason label on back.

There is a thermometer, also by Mason, under the glazing.

The label, which includes a pair of spectacles with eyes in them, reads: "WITH CARE Delicate Glass Instruments T. Mason Established 1780 Optician 5. Dame Street. Dublin"; the thermometer is reported to look much later than the barometer.

The instrument was bought at an Allen and Townsend auction in the 1940s for 2/6.

Dates from Morrison-Low 1989,131.

3669 PRI097 BAROMETER - FITZROY

(Robinson, Grafton St Dublin)

895x153. 1845-1884. F.

Includes remarks about the weather by Admiral Fitzroy; signature on "wooden temperature guage".

Not in perfect condition.

Dates from Morrison-Low 1989,133.

2630 PRI065 BAROMETER - FITZROY

M.E. SOLOMONS, OPTICIAN, 19, Nassau St., DUBLIN.

THOMAS MASON 5 DAME STREET, LATE PARLIAMENT STREET, DUBLIN

C 888x136x50. Late 19 early 20 C. G.

Mahogany glazed case; glass J-tube; scale 26-31".

Solomon signature attached to front; Mason Trade Card on reverse; gauze covers top of bulb on short arm of the J-tube; simple instrument without storm glass or thermometer; but with "ADMIRAL FITZROY'S RE-MARKS", "LONG FORETOLD

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LONG LAST, SHORT NOTICE SOON PAST" and other legends and instructions on the base board behind the instrument below the scale.

Mason 1900-15; Solomans 1856-1905, Morrison-Low 1989, 131, 135; instrument illustrated in Turner 1983, opp.p.256.

2570 PRI205 BAROMETER - PORTABLE

Unsigned 782 (Negretti & Zambra?)

L 958; Se 19x19; CiHsD 38. Late 19 C. G.

Oxidised brass; white-metal scale 20-31" adjusted by knob; thermometer 10-120°; brass tripod; leather case.

The tripod is telescopic and the instrument hangs from its centre; the cylinder cistern cover has a knob at the bottom to adjust the mercury (which, with the tube, is now gone), and has a (cracked) glass cylinder window above it, held between discs by three brass rods; the scale, set in one side of the square section housing, is adjusted by a brass knurled knob and read by a vernier; the thermometer is near the bottom.

4486 PRI283 BAROMETER - STICK

LIGHT HOUSES IRELAND J. BUCKLEY DUBLIN

H 910; MxW 116. 1832-1859. R.

Shaped mahogany base; single ivory or bone scale plate 27-31" with slider; circular cistern cover.

The instrument, when seen, was in a distressed state; the figuring on the scale plate was very worn and it was detached, as was the curved mahogany rod over the mercury tube, and the cistern cover; the title of Light Houses Ireland changed to Commissioners of Irish Lights in 1867.

Dates from Morrison-Low 1989, 121.

2571 PRI206 BAROMETER - STICK

HUNT. FECIT

L 960; MxW 130. Early 19 C. G.

Mahogany; broken pediment; hinged glazed white-metal scale plates 27-31" with thermometer (gone) 30-100°.

Top is incomplete; there is a hatched pale wood inlay down the sides of the shaft; the barometer scale has a hand-operated slide 2-10; the cistern cover is circular.

Burnett & Morrison-Low 1089, 149 list Hunts in Cork from 1792-1895; this looks early; the instrument came from Cork.

2604 PRI037 BAROMETER - STICK

Lynch Dublin

H 1000; MxW 169. Early 19 C. G.

Mahogany; flat top, two urns; turned pillars at sides of silver-metal plates 28-31"x2; fluted cistern cover.

Latter has quarter sphere on top, and curved tapering bottom; plates have inscribed: "Very Dry Set Fair CHANG- Mch.. Rain Storm" on one and "Ext..Cold Set Froft FROST -ABLE [to correspond with CHANG-] SNOW Mch..Snow Tempeft" on other; the right hand plate has a brass slide marker; the mahogany plate housing has two curved urns below as well as above.

The instrument was restored by Aubrey Broklehurst, London.

Morrison-Low 1989, 128-9 lists Lynches from 1767-1844.

2575 PRI210 BAROMETER - STICK

MASON. 6, Essex Bridge Dublin MASON ESSEX BRIDGE DUBLIN

L 975; MxW 121. 1827-1844. A.

Oak; flat tiered top; ivory plates 27-31", arched glass cover; stem thermometer; ebony urn cistern cover.

Glass plate cover and frame broken, and thermometer gone, but ivory scale remains, 20-110° "FAHRENHEIT", 0-40° "CENTIGRADE"; ivory turned knob below plates to move slide 1-10; adjust knob below (missing) mercury; some ebony inlay including two kites at the sides of the cistern; signature in capitals on top of thermometer scale, the other on the register plates.

Dates from Morrison-Low 1989, 130.

2614 PRI048 BAROMETER - STICK

B.. Roncheti 51.. Spear St MANCHESTER

H 955; MxW 144. Late 18 C. R.

Mahogany, stippled inlay surround; broken pediment, brass urn; brass plates 27-31" with spirit thermometer.

Tube, cistern, and cistern cover gone; hinged frame to register plate with glass missing; slide 1-10 for scale; thermometer on register plates has red spirit indicator and 10-100°; circular back to cistern housing.

Goodison 1977, 354 notes this was probably Giovanni Battista Ronchetti, uncle of Lewis (Luigi Antonio) Casartelli, recorded at 15 High Street, Manchester, in 1785.

Goodison 1977, 354, records a stick barometer signed Bap. Roncheti, 15 High St Manchester, details as here.

4168 PRI191 BAROMETER - STICK

(Spear Dublin)

No measurements available. Late 18 early 19 C. R.

Mahogany; flat layered top; glazed silvered plate with thermometer; ivory knob below; circular cistern cover.

Reputed to have belonged to Charles Stewart Parnell at Avondale House, in Co. Wicklow.

Burentt 1989, 135 records two Richard Spears - I from 1791-1814 and II from 1818-1837.

2666 PRI074 BAROMETER - STICK

(Spencer & Son, Dublin)

No measurements available. 1864-1886. F.

External tube; thermometer on register plate; circular cistern cover; details from sketch by owner.

Dates from Morrison-Low 1989, 136.

1127 PRI015 BAROMETER - STICK

SPENCER & SON 19 GRAFTON ST DUBLIN

L 910; MxW 110. 1866-1883. A.

Mahogany; rounded top; circular cistern cover; ivory scale 27-31 with vernier glazed; thermometer in front; ivory knob on front to control vernier.

Dates from Morrison-Low 1989, 136.

1437 PRI017 BAROMETER - STICK

SAML. YEATES. 89 Dame St. Dublin.

L 970; MxW 139. 1811-1826. A.

Mahogany; broken pedestal top, brass urn; silver-metal plates 28-31", hinged frame; circular cistern cover.

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Frame on top of register plates is glazed; the scale plate has a vernier slide 1-10.
The instrument was restored by Aubrey Brocklehurst, 124 Cromwell Road, London.
Samuel Yeates (1762-1834) was the first of the Yeates instrument makers.

2607 PRI041 BAROMETER - STICK

YEATES & SON 2 GRAFTON STRT DUBLIN

H 875; MxW 85. 1840-1864. R.

Mahogany; round top; ivory plates 27-31", with glass mercury thermometer 20-120°; half-sphere cylinder cover.

Ivory slide 1-10 with brass knob on scale plate; brass fittings including a knob below the cistern to adjust the mercury.

Assumed to be George Yeates & Son, dates Morrison-Low 1989,139.

2608 PRI042 BAROMETER - STICK

Unsigned

H 920; MxW 87. Mid 19 C. G.

Mahogany; round top; ivory plates 27-31", with glass mercury thermometer 30-120°; cylinder cover gone.

The latter had a circular back; ivory slide 1-10 on scale plate; brass fittings including a knob below the cylinder to adjust the mercury; similar, but not identical to, Yeates & Son instrument 2607, PRI041.

2279 PRI165 BATTERY - LECLANCHÉ

YEATES & SON DUBLIN (moulded into the glass)

B 78x78; H 127; ToD 75. Mid to late 19 C. G.

Outer glass container only; square section becomes circle with lip on top; rises up off perpendicular.

2636 PRI071 BILL & LETTER HEADS

Various signatures.

Various sizes. 1904-1914. S.

From three firms: Philip Harris & Co. Ltd, Dublin; Dr J. Lizars, Belfast; & Joseph M. Maiben & Co., Dublin.

These came from the Municipal Technical Institute, Belfast:

"HEAD OFFICES & WORKS, 144 & 146, EDMUND STREET, BIRMINGHAM. 179, GREAT BRUNSWICK STREET, DUBLIN BOUGHT OF Philip Harris & Co Ltd MANUFACTURERS OF CHEMICAL & PHYSICAL APPARATUS. Contractors to the ADMIRALTY, INDIA OFFICE, NATIONAL BOARD OF EDUCATION, THE DEPARTMENT OF AGRICULTURE & TECHNICAL INSTRUCTION, IRELAND. &c. COMPLETE LAB-ORATORY FURNISHERS." - bill 26:9:1904.

Another similar, but without the Head Offices details, dated 13:12:1904 - both have illustrations of "LABORATORY FURNITURE", "PHOTOGRAPHIC APPARATUS", "CHEMICAL & PHYSICAL APPARATUS MAKERS", & "SURGICAL INSTRUMENT & APPLIANCE MAKERS".

"179-182, GREAT BRUNSWICK ST., DUBLIN. BOUGHT OF PHILIP HARRIS & CO., Limited SCIENTIFIC INSTRUMENT SPECIALISTS (PHYSICS, BOTANY, CHEMISTRY, ETC., ETC..) - bill dated 14:3:1907.

"8 Wellington Place, Belfast, To J. Lizars, Dr. Manufacturing Ophthalmic Optician." - bill Oct. 1909.

"JOSEPH M. MAIBEN & CO., Manufacturers of Physical, Electrical and Mechanical Instruments [31 EDEN QUAY, crossed out] 11, WESTLAND ROW [stamped on], DUBLIN The Only Irish Firm in the complete Laboratory Furnishing Trade. OUR INSTRUMENTS, APPARATUS, and IRISH- MADE PURE CHEMICALS are at present in use in all Laboratories in the Royal College of Science, Dublin." - post card with stamp date 27:8:1912.

Two other post-cards - one dated 15:3:1913 with the "13 EDEN QUAY" replaced with "11, WESTLAND ROW", and the other dated 12:7:1913 without the address changed. "THE ONLY COMPLETE LABORATORY OUTFITTERS IN IRELAND JOSEPH M. MAIBEN & CO., Manufacturers and Importers OF SCIENTIFIC INSTRUMENTS CHEMICAL, PHYSICAL, MECHANICAL, BACTERIOLOGICAL, &c., &c. 11. Westland Row, DUBLIN. ANALYTICAL CHEMICALS OF THE HIGHEST GUARANTEED PURITY. LABORATORIES COMPLETELY EQUIPPED Contractors to ROYAL COLLEGE OF SCIENCE, DUBLIN. " " SURGEONS, " TRINITY COLLEGE, DUBLIN. QUEEN'S UNIVERSITY, BELFAST. UNIVERSITY COLLEGES, DUBLIN, CORK AND GALWAY. DEPT. OF AGRICULTURE AND TEC. INSTS. MUNICIPAL TECHNICAL SCHOOLS DUBLIN, BELFAST, CORK, GALWAY, LIMERICK, DERRY &c, SOLE CONTRACTORS FOR IRELAND TO COMMISSIONERS OF NATIONAL EDUCATION." - bill dated 20:10:1914.

Note: the card dated 27:8:12 includes the message: "DON'T place your order for Renewals for any Laboratory Requirements this term until you have our quotation." and goes on to give its "GUARANTEE" of service and other details.

2633 PRI068 BILL & LETTER HEADS

Various signatures.

Various sizes. Various dates.

Collection of originals and photos: includes Del Vecchio; Grubb Parsons; Masons; Robinson; Spear; Yeates & Son.

Many Irish and English originals from the Municipal Technical Institute, Belfast, dating from the early 20 Century, together with photographs of earlier Irish examples - including:

"DEL VECCHIO, 26, WESTMORELAND-STREET, & 186 & 187, GT. BRUNSWICK-ST, THE OLD ESTABLISHED PRINT, MAP, AND LOOKING-GLASS WAREHOUSE. CARVING AND GUILDING." photo.

"Sir Howard Grubb, Parsons & Co., FORMERLY SIR HOWARD GRUBB & SONS, LTD., OF DUBLIN & ST. ALBANS. Astronomical Instrument Makers, Optical Works, Walker-Gate, Newcastle-on-Tyne. LONDON OFFICE 56, VICTORIA STREET, S.W.1.", dated 3:5:1927 - original.

"MADE & SOLD by James Lynch Mathematical Philofophical and Optical Instrument Maker at the Sign of the ROYAL SPECTACLES Capel Street DUBLIN" - photocopy of disc.

"SEACOME MASON, OPTICIAN, MATHEMATICAL AND PHILOSOPHICAL INSTRUMENT MAKER To his Excellency the Lord Lieutenant and the Irish Court, His Grace the Duke of Leinster, The Most Noble the Marquis of Kildare, and the Right Hon. Lord Seaton, Commander of the Forces, 11, ESSEX BRIDGE, DUBLIN..." dated 25:7:1857 - photo.

"ESTD. A.D. 1780 SPECTACLES MADE ON SCIENTIFIC PRINCIPLES AND ADAPTED TO EVERY CONDITION OF SIGHT... THOMAS MASON, OPT-ICIAN, 11, ESSEX BRIDGE, DUBLIN, Mathematical & Philosophical Instrument Maker TO HIS EXCELLENCY The Lord Lieutenant and the Irish Court." - photocopy.

"ESTABLISHED A.D. 1780. THOMAS H. MASON, OPTICIAN, Mathematical and Philosophical Instrument Maker, 5 & 6 DAME STREET (NEAR THE CASTLE) OPTICAL LANTERNS AND SLIDES, LABORATORY SUPPLIES, SPECTACLES MADE ON SCIENTIFIC PRINCIPLES, AND ADAPTED TO EVERY CONDITION OF SIGHT PHOTOGRAPHIC APPARATUS AND MATERIALS..", dated 18:2:1933 - original.

"PHILOSOPHICAL APPARATUS REPAIRED PURE Chemical Tests AND REAGENTS. POLYTECHNIC MUSEUM, AND Gallery of Art, Science, Mechanism, & Amusement 65, GRAFTON-STREET, DUBLIN. Bought of JAMES ROBINSON, PHILOSOPHICAL ARTIST AND OPTICIAN.", dated 1860 (to Lord Dunraven) - photo.

"RICHARD SPEAR, OPTICAL, MATHEMATICAL, & PHILOSOPHICAL Instrument-Maker, 27, COLLEGE-GREEN, DUBLIN", dated 1829 [last number unclear, could be 1822] - photo.

"Memo From YEATES & SON, MANUFACTURERS OF SPECTACLES, OPTICAL & SCIENTIFIC INSTRUMENTS, ELECTRICAL BELL & TELEPHONE SUPPLIES, PHOTO APPARATUS & MATERIALS. WITH WHICH IS INCORPORATED THE CURTIS OPTICAL & PHOTO CO., 2, GRAFTON STREET, DUBLIN Established 1728.", dated 14:8:1911 - original; with

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seals of Trinity College & Port & Docks Board; showing 11 "HIGHEST AWARDS" prize medals 1835, 38, 41, 44, 47(all RDS), 51, 67, 72, 82, 85, 90.

2303 PRI177 BURNER

FLETCHER, RUSSELL & CO. LTD., WARRINGTON

BD 71; H 114; TuD 16. Late 19 C. G.

Brass; leaf design on base; wire hemispherical grid below tube; wider top (D25) on tube, with wire grid.

2284 PRI170 BURNER

T. WHARTON'S VICTORIA TAPER REGD. 28 SEP. 1847. NO.1210

BD 85; H 146; TuD 13. Registered 1847. S.

Brass; decorated base; leaf handle; sleeve with 18 holes around; tube fits into this; detachable top.

Base weighted with ceramic material under the elaborate decoration; there is no gas input, so presumably something burns in it; the bottom of the tube is now blocked up, but a grill pattern shows through the bottom cover.

4423 PRI257 BURNER - SPIRIT

Unsigned

BD 56; MxD 98; H (+Li) 132. Mid to late 19 C. G.

Glass; hemispherical bottom; tapering ground-glass joint on top centre; wick in sleeve; turned brass top.

2628 PRI063 CAMERA LUCIDA

Unsigned

MnL 312; C 265x89x39. Late 19 C. G.

Brass; G-clamp; pivot; expanding pillar; turning prism housing and two hinged rectangular frames on top; case.

Housing and frames in blackened brass; one frame is empty, the other is glazed; fitted mahogany case.

4181 PRI233 CHEMICAL FLASKS - CONTAINERS FOR CHEMICALS

[Label on two jars] JAMES J. MURPHY & CO. LTD CORK LADY'S WELL BREWERY HOPS PALE MALT

BD 120, H 242; BD 91, H 260; BD 83, 190 (x2). Late 19 early 20 C. G.

One egg-shape on curved base; one large, two small cylinders with rounded tops, ground glass stoppers below.

The two large containers held sodium metal, which was destroyed for safety reasons; the other two still contain brewery samples; all sit on their stoppers - the egg-shaped container would have had a cork or rubber stopper, the others have ground glass stoppers.

From the North Monastery Cork collection.

2280 PRI166 CHEMICALS - SET

Chromsalz, Platinsalze, Vanadsalze, Thalliumsalze

Cs 318x188x28, 237x172x28. Mid to late 19 C. G.

Five sets; 30 tubes each of Chromium, Platinum, Vanadium, and Thallium chemicals; 40 of Copper chemicals; in black cases.

First set includes: Chromium metal, Chromic salts; Potassium, Sodium, and Ammonium Chromate and Bichromate; Basic and Normal Lead Chromates; Silver Bichromate Peligot's Salt; Chromocyanide of Potassium; etc; Copper set includes: Kupfer, oxyd, carbonat (Malachit), ..Essigs Kupferoxyd; etc. etc.; some chemicals have spilled and damaged two of the cases and the paper lists of contents; only 29 Chromium tubes remain.

2626 PRI060 CIRCUMFERENTOR

Cave Dublin

DID 132; L 205. 1729-1749. FL.

Brass; silvered compass dial, seven points and fleur-de-lys; vertical scale 0-90-0-90-0°, horizontal 10-360°.

Glazed, with turned lid; two side arms numbered "5" and "6"; parts detached when seen; owner notes that the signature engraving can be recognised as the style of an Irish engraver, though his name is not known.

Dates from Morrison-Low 1989,122.

4029 PRI127 CIRCUMFERENTOR/SURVEYING CIRCLE

Cave Dublin

CrOD 345; DID 134; W 377; SgH 136. 1729-1749. FL.

Brass; divided outer circle 10-360°; folding double line and window sights; glazed circumferentor compass.

Central circumferentor has an outer circle (W17) which is read by projections beyond the sights; the 10-170° half has three different readings for each 10° section - e.g. 170 350 10, 160 340 20, etc.; the outer circle has four spokes meeting in a central disc (D86); on this sit the folding sights; on these again is the compass (glass cracked) which is decorated with a fleur-de-lys at North and seven other directions with their names engraved in the segments "North Weft" to "North Eaft"; the compass has two scales, one on the vertical side of the raised edge 0-90-0-90-0°, and the other on the horizontal top of this edge 10- 360°.

Dates from Morrison-Low 1989,122.

2585 PRI219 CLINOMETER - ABNEY LEVEL

STANLEY GREAT TURNSTILE HOLBORN LONDON

L 119; SD 58; Se 16x16. Late 19 early 20 C. G.

Brass and oxidised brass; prism in square tube; semi-circle scale; revolving vernier and spirit level.

Push eyepiece focus in tube; scales on semicircle 90-0-90 and 60-0-60; the spirit level can be seen when viewing through the tube due to the prism; the vernier and spirit level are turned by means of a four-spoke wheel.

Although called an "Abney Level", this should be classified as a clinometer.

See Brown 1982a,41.

4449 PRI237 CLOCK - WATER DRIVEN "FREE" PENDULUM

Unsigned but by the 13th Earl of Meath

No measurements available. c1906. R.

Free pendulum water driven clock, in the gatehouse of Kilruddery, Bray, Co. Wicklow, seat of the Earls of Meath.

Extensive details of the clock, with numerous illustrations, are given by Allan Mills, Bull SIS, No.39,1993,3. He calls it "an incredible scientific instrument". While serving as an officer in the Irish Guards in the Boer War (1899-1902), the son of the 12th Earl of Meath conceived a clock using a "free" pendulum - one which swung freely without being obliged to control a train of gears - the escapement - leading to the hands, and which received its maintaining power (to overcome air resistance and bending losses in the support) from a brief impulse of constant force applied at the lowest point of its swing. Unusually, he used the flow of water as the sole source of power for maintaining the pendulum, turning the hands and striking the hours. By 1906, having returned home, he had succeeded brilliantly in making his clock, which was "probably a better time keeper than Big Ben!". He became the 13th Earl of Meath in 1929, and died in 1949. The escapement of the clock was the only

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part bought in and was made to his design by Chancellor of Grafton Street, Dublin - this escapement being controlled indirectly by the pendulum.

1015 PRI153 COLORIMETER

F.E. Becker W. & J. George Ltd. Succrs. 33-37, HATTON WALL, Hatton Garden, LONDON, E.C.

B 235x156x28; H 254; VD 34. Early 20 C. A.

Black wood base; six brass pillars; glass sample vial.

White tile on base; three sets of two pillars; two sets have bridge with four circular grooves to support glass vessel; only one of these remains, with "100ccm" mark and exit tube at base; one clamp from back (tallest) pillar with sleeve to hold vessel; incomplete.

Dates from Anderson 1990,10-11.

2306 PRI179 COLORIMETER

PH. & F. PELLIN PARIS FRANCE

B 153x129x27; H 389; VD 26. Post 1900. R.

Brass, oxidised brass, and glass; base holds mirror pivots; above, two sample vials; viewing tube on top.

A knob can rotate the mirror to give best light through the sample vials; latter are of glass with silver-metal rings around bottom; knobs behind raise or lower these vials around hexagonal tubes; scales behind for sample and reference readings 0-60; prism system above the tubes allows comparisons to be made through a viewing tube on top, through which can be seen two frosted semicircles to be equalled.

Date, Brenni 1988,4; details, H.A. Flaschka et al Quant-itative Analytical Chemistry, Barnes & Noble, 1969.

4425 PRI259 COLOUR BOX

Manufactured by CHARLES ROBERSON & Co., 99, Long Acre, London.

244x96x43. c1883. D.

A mahogany case contains, on top, a tray of colour blocks and, on the bottom, a ceramic mixing tray.

Twenty six blocks remain, a few little used, with the Roberson & Co crest and address and, on the back, the name of the colour (e.g. CARMINE LAKE, BURNT SIENNA, PRUSSIAN BLUE); the mahogany tray holding these retains some printed names: SEPIA, Y. OKER, ULTRAMAR., PRU. BLUE, INDIAN RED., VERMILION., CR. LAKE., BT. SIENNA., BR. MADDER.; this tray lifts out and, underneath, is the ceramic mixing tray containing six mixing indents; it is signed on the back.

In the case is a Memorandum: "GOVAN PARISH SCHOOL BOARD, MEMORANDUM, From Archibald Macfie Head Master Church St. Public School, To Master Hugh McHoul 16th [corrected from 17th] Augt: 1883 I have the pleasure of forwarding to you the prizes and certificates won by you at the late Science and Art Examinations I am yours truly Amacfie".

In the lid of the case is a label: "COLOUR BOX AWARDED BY THE DEPARTMENT OF SCIENCE AND ART" with "SUGGESTIONS ON THE USE OF COLOURS" giving these details, and signed as above.

3653 PRI090 COMPASS

Unsigned

HsD 43; CD 50. Mid to late 19 C. G.

Silver watch-case housing with convex glazing over white face; seven points and fleur-de-lys; snake-skin case.

The compass face has eight more unmarked directions; the case is hinged and lined with red velvet.

3652 PRI190 COMPASS

Unsigned

Hs 103x102x26. Mid to late 19 C. G.

Hinged mahogany case housing; glazed dial with brass ring; white face with 15 points and fleur-de-lys.

Circumference of face divided 0-90-0-90-0°.

2283 PRI169 COMPASS

Unsigned

D 164; H 33. Mid to late 19 C. G.

Oak housing in two parts dove-tailed; brass-bound glass top; paper rose, 32 points, 0-90-0-90-0 and 10-360°.

2584 PRI218 COMPASS - PRISMATIC

BARKER & SON MAKERS LONDON 1918 BARKER'S PATENTS

HsD 50, W 26. 1918. S.

Patents 29677/10, 14083/13, 110002/16; brass and oxidised brass; hinged glazed lid; card floats in oil.

The glass disc in the lid has a line sight engraved on it; the floating card has scale 20-360°; the glass top of the compass rotates and has scale 1-36; hinged prism; ring handle.

Listed as "Military Liquid Prismatic Service Compass" in Watts 1927,112.

2665 PRI073 COMPASS - PRISMATIC

F-L NO 195425 1917 J.B. BROOKS & CO. LD. 1911 [on case]

HsD 51; W 20; CL 94, W 35. 1917. S.

Brass and oxidised brass; mother-of-pearl disc dial, 0-340° and 10-360° (mirrored); glass disc top; leather case.

Around the side of the housing is a scale 1-34 and 16 compass points; the glass top to the dial chamber can be turned, and has a mark which can be positioned in any direction; the prism and the lid of the compass are hinged, and the lid has a glass disc with a line diagonal; the dial can be clamped in place and has a red arrow pointing to 0 on the scale; ring handle; in a shaped leather case with strap; war issue.

2583 PRI217 COMPASS - PRISMATIC

ELLIOTT BROS STRAND LONDON. D.F.F. MacCarthy [owner]

HsD 70, W 17. Pre 1886. A.

Oxidised brass; hinged line sight and prism; green card 10-360°; lid has segment cut-out with inserted glass.

Elliott Brothers were on the Strand until 1886, Crawforth 1988,8.

0628 PRI130 COMPASS - PRISMATIC

(Troughton & Simms, London)

HsD 71. Late 19 C. G.

Oxidised brass glazed cylinder housing; hinged sight and prism.

1855 PRI028 CROSS STAFF HEAD

Unsigned 1915 (Owner was Viscount Doneraile, Co.Cork)

H 119; HdD 49, L 62; C 91x69x59. 1915. S.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass; turned pillar screws into heptagonal head with two double line and two double line and window sights; case. Pillar screws into staff head for packing in wood case, which has a label reading: "The Viscount Doneraile, Doneraile Court, Co. Cork, Ireland."; the case also has 1915 written in pencil on it, as well as being scratched on instrument.

3671 PRI099 DIAL

R L McC 1934 [Robert Lyle McClintock] LONG 7½W LAT 55N

BW 640; H 300; W 244; De 153. 1934. S.

Cast concrete; bronze inserts; octagonal base; angled block with semicircular indents at top and top sides.

The front face has, at the bottom, a double arc with hours 9-12-6 "SUMMER TIME" and a central pin gnomon on a bronze disc; the indents at the sides have parallel hour markings VI VII to XII on the left, and VI V to I XII "A.S.T." on the right, the gnomon here presumably being the bronze reinforced corners with the block; the top indent has hours marked 6-12-7 "G.M.T.", and the gnomon is a central bronze plate (153x83); the block sits on an octagonal base, with a weathered inscription.

This dial, and others in the private collection, were made by Colonel Robert Lyle McClintock, R.E., C.M.G., D.S.O, who served with the 2nd Q.V.O Sappers & Miners in Bangladore, India.

4450 PRI264 DIAL - HELIOCHRONOMETER

W. HOMAN GLASGOW 20 RENFREW ST

D 164; GnsH 79. Early 20 C. G.

Brass; disc divided in hours 1-12 (x2); two perpendicular gnomons, each with a pin-hole and part of analemma.

The only divisions on the main disc are the hour divisions, but a small plate attached to a rotating tapering plate underneath is divided into minute, five minute and ten minute divisions 0, 10, 20, 30, 40, 50, 60; this small plate can be screwed on using any two of twelve holes on the plate below; under the later is a small quadrant to allow the instrument to be inclined; the upper part of the analemma (January to March and September to December) has its pin hole on top, while the bottom part (March to September) has the pin hole on the bottom; a thread gnomon has been inserted in the top pin hole, presumably also meant to be passed through the bottom pin hole, but surely this is wrong, and the time should be told by the spot of sunlight passing through one hole onto the opposite gnomon?

Homan not listed in Bryden 1972

4392 PRI252 DIAL - HELIOCHRONOMETER

PILKINGTON & GIBBS LIMITED PRESTON ENGLAND

D 235; Sg 165x98x28. Early 20 C. G.

Oxidised brass; outer time and date ring; inside revolving dates and central compass; line sights.

The outermost divisions are minutes marked 5, 10, 15 etc.; inside these are hours IIII-XII-VIII, then the months with dates 5, 10, 15, 20 etc.; a concentric disk revolves inside this outer ring with dates and months, and in the centre is a compass; revolving separately from these two circles is an open rectangular box with its long sides concave and with line sights on its short sides; a pointer on this reads the time on the outermost minute scale.

1111 PRI002 DIAL - HORIZONTAL COMPASS (MAGNETIC)

C. ESSEX & CO London Entered at Stationers Hall.

D 59. 1824-1828. W.

Turned ivory housing with screw-on lid; open gnomon on "floating card" with magnet below; hours IIII-XII-VIII.

Outside the hours are 32 compass points and, beyond these, a brass ring surround; the needle has a jewelled (agate) bearing; the variation of the magnet below the card from North would correspond with the 1820s date.

Dates from Crawforth 1988,8.

3743 PRI116 DIAL - HORIZONTAL PEDESTAL

(J. Alment Dublin)

No measurements available. 1767-1788. F.

Reported by a descendant of John Alment to have been in the possession of a (named) Dublin inhabitant.

This may have been the same dial recorded by the reporter's father as being in the window of Mason's shop "off Dame Street, towards the Castle".

Dates from Morrison-Low 1989,120.

2622 PRI056 DIAL - HORIZONTAL PEDESTAL

John Bate Dubn Fecit Capt Willm Robt Adire Ballymenogh. LAT 54d=55" 1750

200x200; GnH 135. 1750. S.

Brass; hours IIII-XII-VIII; gnomon insert with face.

The outside of the dial has minutes inscribed: "15 30 45 60 15..."; at the centre is a four-point compass design, with seven directions inscribed outside it; between the hours and the compass, each hour is divided into eighths, the long half-hour lines ending with a decorative motif; the gnomon has a curved insert like the profile of a small animal with a human face near the top, looking away from the gnomon.

3676 PRI105 DIAL - HORIZONTAL PEDESTAL

LATITUDE 53.40N PR.BRACKEN FECIT A.D 1822

D 330. 1822. S.

Slate; just over half remains; central compass design; hours IIII-XII-[VIII?]; ex Carrigglas Manor, Longford.

The hours are around the outside; inside they are divided into quarters; then compass points S SW W NW and a fleur-de-lys at North are engraved in a wide band (there appears to be a sun, with eight triangles on a circle, between SW and W); inside this is the eight-point compass design, with lines between the point triangles; at the opposite side to hour XII is a masonic compass and rule sign, with "F.M.A.[?]" below it.

The owner, whose family bought the lease of Carrigglas Manor, held by Trinity College Dublin, when the Newcomen family (who owned the Manor in 1822) became bankrupt in 1827, brought the remains of the dial with her when she moved house.

2460 PRI186 DIAL - HORIZONTAL PEDESTAL

(PETR BRAD[Y] 54 DE Nor La A.D. 1826.)

D 36; W 7. 1826. S.

Blue slate; circular; gnomon gone; central eight-point compass; hours 4-12-8; National Museum record.

(Source: Cootehill district; Co. Cavan); two recessed mouldings with two concentric circles between them; divisions hours to quarters; compass card design of hatched triangles; inscription in Irish letters, which seems to read: "coibn aga go [missing] da"; (latitude and date taken from sketch, not otherwise recorded).

2463 PRI188 DIAL - HORIZONTAL PEDESTAL

(Engrd. by Michl. Callinan Aug.t The 28th 1842)

D c356. 28.8.1842. S.

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Slate; shape not recorded; gnomon gone; well engraved; for "Lat.d 52-42 North"; National Museum record.
(Source: Townland Corofin; Parish Killinaboy; Barony Inchiquin; Co. Clare); no further details recorded, except that the owner proposed covering it with glass and using it as a small table.

3739 PRI114 DIAL - HORIZONTAL PEDESTAL

SYLVESTER COONAN LATITUDE 53 JULY 1850

c229x229 (9" square). 1850. S.

Slate; square; outside roman hours, divided underneath by quarters and halves; compass design in the centre.

According to the sketch, the hours go from IX, through VI, VII to XII, then I to VII, ending in another VII; the compass design has long arms inscribed N E S W, with four unmarked shorter arms dividing them, and a central circle with eight more shorter lines; at two corners are the inscriptions: "THE SUN TO SHINE BY DAY", "THE MOON TO RULE BY NIGHT".

The reference records that a Patrick Coonan held 50 acres of land in the townland of Rathcoffey North from his landlord, John Aylmer, in 1850; Sylvester may have been his brother; in 1939, the dial, then minus its iron gnomon ("pointer") was built into the wall of farm buildings by its present owner.

Journal of the County Kildare Archaeological Society, Volume XVI, No.3, 1981/82, 272-3.

4432 PRI234 DIAL - HORIZONTAL PEDESTAL

Edwd Croker Esq CURRIGLASS Anno Domini 1817 DEUS ALITEOS

285x285; GnH 104. 1817. S.

Square slate; brass gnomon 50.5°; hours IIII-XII-VII; small compass between IIII and VII; decorations.

In the corners are a two-handled goblet above a shield, with the motto, a harp, nothing, rays or sunbeams; all the points on the small compass are labelled except North; the gnomon is open-work, not solid; the dial is mounted on a stone pedestal.

3677 PRI106 DIAL - HORIZONTAL PEDESTAL

JAMES KENNY, Owner. OLDTOWN. MICHL DUNNE MAKER. 1824

267x261x5; GnH 127, L 121. 1824. S.

Slate; square; outer border of triangular hatches; hours 4-12-8; bronze gnomon with decorative insert.

At the corners of the square, between the hatched border and the circles containing the hours, are decorative panels, a bird and branch at hour 5, a foliate device at hour 12, and a mermaid with comb at hour 7; the signature is at the fourth corner, beyond the point of the gnomon; the edge of that corner is chipped, and there is minor chipping elsewhere.

1123 PRI011 DIAL - HORIZONTAL PEDESTAL

A TOPOGRAPHICAL HORIZONTAL SUN DIAL CONSTRUCTED BY EDMUND FAHEY, CARNAKIB

D 504. c1845. SI.

Slate; times from Headford 12.00 to Greenland 9.36.

On the outside are engraved the hours VIII-I and XI-IV; inside these are divided into minutes, five minutes, quarter, half, and hours; inside these divisions, towns are engraved on radial lines, from HEADFORD, through DUBLIN, EDINBURGH, LONDON, GREENWICH...CAIRO, NEW GUINEA, W. AUSTRALIA, SYDNEY...NIAGRA, ST. JOHNS N.B., LABRADOR, ESQUIMAUX, GREENLAND, to HEADFORD again, with corresponding times for each place; inside again are three sets of three circles, with engravings, for example: "SUMMER SOLSTICE THE BLOSSOM IN SUMMER THE WORLD GOING ROUND"; between the sets of circles are engraved twice: "CHRONOMETER LONDON 36' FASTER TRIA JUNCTA IN UNO"; inside again are engraved: "WATCH SLOWER WATCH FASTER" with time adjust figures and months; in a circle inside this is the signature, and, in the centre, a compass design with 36 compass points; on the outside edge, between the hours VIII and IV is an inscription in script which is difficult to read, but looks something like: "udin muthin yirrulu lil"; the gnomon is missing.

1124 PRI012 DIAL - HORIZONTAL PEDESTAL

(Attributed to Edmund Fahey) rev rich walsh pp 1845

D 407. 1845. S.

Slate; similar to 1123 PRI011; radial towns outside; time and date adjust, then hours and compass inside.

On the outside is a decoration of spots and crosses; then are the radial towns, from HEADFORD, DUBLIN... BERLIN CORFU CABUL RIO JANIERO TRUXILLO QUITO DEMARARA JAMAICA IS...EZQUIMAUX GREENLAND to HEADFORD again, with corresponding times; inside again is the time adjust with dates and months, having: "WATCH SLOWER WATCH FASTER" engraved outside these twice; inside are the hours VIII-I and IX-IV, with the "rev rich walsh pp" between IV and VIII; inside again are four circles with engravings: "VERNAL EQUINOX SUMMER SOLSTICE AUTUMN EQUINOX WINTER SOLSTICE" with date 1845; in the centre is an eight-point compass; the gnomon is missing.

2667 PRI075 DIAL - HORIZONTAL PEDESTAL

(JOHN GALWAY, KILTORKAN MAY 5 1843)

No measurements available. 1843. S.

Slate; "well engraved giving correct latitude and a declination of 16:7"; not mounted; details from owner.

The owner notes that Kiltorkan is a townland close to Ballyhale(?), South of Kilkenny, and is noted for its fossil vegetation; he notes: "I feel that it should be in Kilkenny but Rothe House did not seem interested, so where??" - Charles Mollan suggested the National Museum!

4035 PRI136 DIAL - HORIZONTAL PEDESTAL

Johannes Lewis Dublin Fecit Latt 53°20

W 308; GnH 175. 1679-1693. FL.

Brass; octagonal; hours IIII-XII-VIII; outer circles divided 10 20 30 40 50 60; gnomon with curved insert.

Inside the hours are divisions into eighths; there is no central compass design.

Two other Lewis horizontal pedestal dials, Ex0113 and Ex0502, have the same latitude, but they are square, and have more elaborate decorations.

Dates from Morrison-Low 1989,128.

2625 PRI059 DIAL - HORIZONTAL PEDESTAL

Lynch Dublin

200x200. Late 18 early 19 C. G.

Brass; octagonal; hours IIII-XII-VIII; eight-point compass design in centre; gnomon missing.

Various James Lynches operated from 1767 to 1844, Morrison-Low 1989,128-9.

4485 PRI133 DIAL - HORIZONTAL PEDESTAL

James Lynch Dublin

W 197. Late 18 early 19 C. G.

Brass; octagonal; very worn; no gnomon but for 54°42'; hours IIII-XII-VIII; central compass design.

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The central compass has eight points; the hours are divided into eighths inside the Roman figures, and into twentieths outside. Various James Lynches operated from 1767 to 1844, Morrison-Low 1989,128-9.

2624 PRI058 DIAL - HORIZONTAL PEDESTAL

Lynch & Son DUBLIN W

W 206. 1808-1825. F.

Brass; octagonal; hours IIII-XII-VIII; eight-point compass design at centre; simple curved gnomon insert.

Outside concentric circles are divided into twenty divisions per hour; then into quarter hours, with the half-hour lines continued inwards to end in trefoils; the numbers are next and, inside these, concentric circles are divided into quarter hours and eighths, with the half-hours elongated and ending in spears; the "W" is stamped below the "I" in Dublin, and is either a mistake or the inscription was never completed.

Dates from Morrison-Low 1989,129.

3740 PRI115 DIAL - HORIZONTAL PEDESTAL

CHRISTOPHER McCANN AD 1852

W c229 (9"). 1852. S.

Slate; octagonal; hours IV-XII-VIII on the outside; quarters and halves within; central compass design.

The central design is in the form of a cross with the four arms made up of squat triangles in the centre, with long triangles outside, with labels N E S W; beyond and between the WN and NE points are six squat triangles; and between WS and SE are three, making a total of eighteen; between hours IV and VIII are inscribed: "Of clocks and watches I'm the gurt(?) as you may plainly see/When glowing sol doth condescend to shed its rays on me".

The reference records that there were several McCann families in the Carbury area of North County Kildare in the 1850 period; a local tradition indicates that Christopher McCann was a schoolmaster, who may have taught in the National Schools which were in existence in the nearby townlands of Cadamstown and Johnstown Bridge.

The present owners found the dial in the ruins of a farm building in Thomastown, Enfield, Co. Kildare.

Journal of the Co. Kildare Archaeological Society, Volume XVI, No.3, 1981/82, 272-4.

2623 PRI057 DIAL - HORIZONTAL PEDESTAL

J. Margas from LONDON now in Capel Street DUBLIN

D 223; GnH 146. 1761-1767. A.

Brass; "LAT 53D 20N"; "30 60 30..." minutes inscribed outside; hours IIII-XII-VIII; central compass design.

Latter has four points, but with seven directions inscribed around it; elaborate curved gnomon inset, like that for the Bate dial 2622 PRI056, but without the face profile; the outside of the dial is divided into twenty divisions per hour; inside the numbers, the hours are divided into halves, quarters and eighths, with the half-hour divisions elongated and ending in trefoils.

Dates from Morrison-Low 1989,130.

2436 PRI182 DIAL - HORIZONTAL PEDESTAL

(D. Martin Sculp. James Waddel Dromore Lat. 54°32" 1598)

250x220x12. 1798 (Faked to 1598). S.

Purplish slate; almost square; gnomon gone; central compass; hours IV-XII-VIII; National Museum record.

(Source: Townland Dromore; Parish Warrenpoint; Barony Iveagh Upper; Co. Down); incised concentric circles, with divisions hours to quarters, largest D 220; compass card design of incised triangles in three concentric circles showing 32 compass points; "James Waddel" in SW corner; "Anno Domini 1598", with the 5 made out of an original 7 in SE corner; "D. Martin Sculp" in shallower lettering on S margin.

3401 PRI086 DIAL - HORIZONTAL PEDESTAL

(Mason Dublin)

No measurements available. Mid 19 C. G.

Bronze(?); square; curved gnomon insert shaped like the number 6; hours IIII-VIII; central compass.

1126 PRI014 DIAL - HORIZONTAL PEDESTAL

Mason Efsex Bridge DUBLIN

MxD 178; H 115. 1809-1883. A.

Corroded brass; octagonal; open work gnomon with S insert; hours VIII-XII-III; central compass points.

Latter NE, E, SE, S, SW, W, NW, with the base of the gnomon hiding the N; gnomon 53.5° from vertical.

Dates from Morrison-Low 1989,130-1.

3674 PRI103 DIAL - HORIZONTAL PEDESTAL

(Jo[?] Mason, Esx Bridge, Dublin)

W 159. 1809-1822. F.

Bronze; octagonal; hours IIII-VIII; central compass design; metal gnomon with S-insert.

Now set in concrete on a Victorian chimney pot.

The Mason initial is unclear - but looks as though it may be "Jo", and Jonathan Mason is listed alone in Morrison-Low 1989,130 in 1809, 1810-12, and 1818-1822.

4034 PRI134 DIAL - HORIZONTAL PEDESTAL

RD. MELVILLE Fecit. A.D. 1840. Latitude 54 36 North

460x330; DlsD 239, 118, 116. 1840. S.

Slate; large central dial, hours IV-XII-VIII, central compass design; four smaller dials in corners.

The hours of the central dial are divided inside into quarters; the four corner dials are marked: "Morning NEW YORK N America", "Afternoon ALEXANDRIA Egypt Africa", "Evening BOMBAY Asia", "Night SYDNEY Van Diemens"; all gnomons gone.

These details are very similar to those given for the Melville dial sold at the Trudder House Sale on 3:10:89, 2337 SAL020, but that dial did have gnomons (four replaced).

3877 PRI120 DIAL - HORIZONTAL PEDESTAL

ROBERT McCLINTOCK Dunmore RICARDUS MELVILLE Fecit AD 1843

540x465. 1843. S.

Slate; large central and four subsidiary dials for "BENGAL", "SYDNEY", "ALEXANDRIA", "NEW YORK"; cracked; incomplete.

The dial is cracked across its centre, is missing its large central gnomon, and one of the four smaller bronze gnomons; the others are at angle c56.5°; the dial is marked "Latitude 55°7'. North"; there is a compass design in the centre; a double circle contains the hours IV-XII-VIII, and outside this is a circle of geographical locations (OD352), including Dublin, Baghdad, Tehran, Nashville and many more; the small dials (D118) are at the corners; there is much engraved detail, mostly difficult to read due to weathering, lichen growth, and bird droppings; at two sides are corrections for different times of the year, JAN - JUNE and JUL - DEC, with a note of "Clock too slow add. Clock too fast sub."; the dial is set on a concrete double base plinth

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by Colonel Robert Lyle McClintock, presumably made in the 1930s, with the inscription around the table below the dial: "- WORK - WHILE IT IS DAY FOR NIGHT COMETH WHEN NO MAN CAN".
For details of Richard Melville (Melvin), see Clarke 1989,210-6.

3673 PRI101 DIAL - HORIZONTAL PEDESTAL

(La 52½N. Daniel O'Connell Hazelfield.)

D 235. Mid to late 19 C. G.

Slate; central eight-point star; several concentric circles; hours 4-12-8; solid metal gnomon.

The hours are around the outside, with divisions under them in twelfths, below this in quarters, then in halves; there is then a gap to two concentric circles, with full lines to the hours; and progressively smaller lines down again to twelfths; the pins holding the gnomon are rusty; though "the dial itself is perfect".

The maker was the great-grandfather of the present owner; a good sketch was supplied; the son of the maker (whose dates are not known) was Patrick O Connell 1874-1956; his son was Daniel O Connell 1906-1971; and the present owner was born in 1959; the maker would thus seem to be a different person from the Dan O'Connell who made two other recorded dials in the mid 19th Century - 2445 NMD094 and 3672 PRI100.

3672 PRI100 DIAL - HORIZONTAL PEDESTAL

Constructed FOR COL. THOS. PEPPER Ballygarth Castle ENGRAVED BY D. O Connell

c610x610. c1845. S.

Slate; with three small subsidiary dials.

"Horizontal Dial, Geographical Clock, and Perpetual Almanack."; the square dial plate has four depictions of the World at its four corners, showing "CIRCLES", "ZONES", "PARALLELS", and "MERIDIANS[?];" between two outer double-line concentric circles are segments containing the months, each with three lozenges on the outside giving the zodiacal sign, the sunrise and length of day; with the dates, dial slow or fast and the time adjustment on the inside; within this are five minute, quarter hour, half hour, and roman hour divisions, V-XII-VII; inside this is the description of the dial and for whom it was constructed, with a rampant lion crest and "N.LAT." and "W.LON.[?]" figures (can't be seen); in the centre is a small 32-point compass; the open-work silver-metal gnomon has a small base, and the angle turns more steeply above this; it has a double S-shaped insert; the base of the gnomon is surrounded by the central compass and the three subsidiary dials; that opposite the compass has other cities around its edge: "...Teneriffe DUBLIN St Helena London Paris.."; that on the left has seven radial double lines with dates, e.g. 1 8 15 22 29; that on the right has year dates around the outside 1845-1863, with numbers in an inner ring; the gnomons for these are missing; the signature is at the left side of the cities dial. The dial belonged to Ballygarth Castle, Julianstown, Co. Meath.

Another similar dial, dated 1853, is in the National Museum collection at Daingen (2445 NMD094).

2449 PRI183 DIAL - HORIZONTAL PEDESTAL

(Cet Cadron Hourlogh Solerius par T Rowen fecit)

D 395; Sis 160; W 10; GnH 145, W 100. Mid 19 C. G.

Purplish slate; octagonal; iron gnomon, double scroll insert; hours 4-12-8; National Museum record.

(Source: Townland Newtowndaly District; Co. Galway); eleven incised concentric circles, some enclosing decorative mouldings, divisions from hours to quarters; months marked between fourth and fifth circles; other symbols include: I I O W a f t f I O W f I O f w; 1 12 10 428 115 13 4 14 5 28 20 31 3 30 6 13 15 11 24; 4 9 15 12 5 40 4 20 4 6 3 0 1 10 12 16 14 6 0; also inscribed: "OPIFER PER ORBEM DICUR" and (on back) "5 JOHN PANLY".

3154 PRI078 DIAL - HORIZONTAL PEDESTAL

Latitude 53 24 Scott Maker Dublin Erected by The Corporation For Improving the Port of Dublin

D 305 (12"). Early 19 C. G.

Bronze; hours IIII-XII-VIII; open gnomon, no insert.

Includes several divided circles for different time divisions, two enclosing "SUN TOO SLOW SUN TOO FAST".

Fennell 1963,34 lists a James Scott, Grafton Street, Dublin, as a "Longitudinal watchmaker" with dates 1800, 1806, and 1820, becoming James Scott & Sons by 1824; Morrison-Low 1989,134 lists David Scott, Mathematical Instrument Maker, 14 Stafford Street, Dublin, 1825-38.

A Joseph Nicholls was apprenticed to David Scott, Mathematical Instrument Maker, 16:2:1803, W. Stuart PC.

2461 PRI187 DIAL - HORIZONTAL PEDESTAL

(Lat. 54 48 N. I. SMITH 1829 N. HOLLAND)

D 350; W 5. 1829. S.

Blue slate; circular; gnomon gone; central eight-point compass; hours 4-12-8; National Museum record.

(Source: Cootehill District; Co. Cavan); encircled by four concentric grooves in two pairs; divided from hours to quarters; central compass with four direction labels N E S W, and eight triangles, the alternate ones only hatched; the "N. HOLLAND" is engraved near the circumference of the inner groove - the "I. SMITH" and date between the hours 4 and 8, the more usual place for the signature; a chip at the left-hand-side is broken off.

3402 PRI087 DIAL - HORIZONTAL PEDESTAL

(Spear Dublin)

No measurements available. 1791-1837. F.

Bronze; octagonal.

Dates from Morrison-Low 1989,135.

3399 PRI084 DIAL - HORIZONTAL PEDESTAL

(R. Spears, 27 College Green, Dublin LAT 52 40)

No measurements available. 1812-1842. F.

Bronze(?); octagonal; S and omega gnomon insert; roman hours; months and "too slow" "too fast" adjustments.

Central compass.

The reported signature is "R. Spears", which could be correct, since the firm became "Spears & Co. in 1838".

The owner (letter 1:8:90) notes that it was purchased in Dublin a few years ago "and the dealer, though not forthcoming, told me it came from County Limerick", made specifically for a garden there; the latitude would support this.

Dates from Morrison-Low 1989,135.

2439 PRI181 DIAL - HORIZONTAL PEDESTAL

(Constructed by Patk. Spelman, Cahergal, LATe 53.28 1869)

D350; W 5; GnH 159. 15:9:1869. S.

Slate dial and gnomon; circular; central compass design hours IIII-XI,I-VIII; National Museum record.

(Source: Townland Cahergal; Parish Cargin; Barony Clare; Co. Galway); eight incomplete concentric circles D 325-192, with divisions hours to twelfths; N S E W around gnomon slot; six-point star in centre; cock inscribed at NE of star; signature in

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space left by incomplete circles, with the features of a face above it, surrounded by crescents; the gnomon is a solid triangle; date given: "September 15th, 1869".

2453 PRI184 DIAL - HORIZONTAL PEDESTAL

(Engraved by E. Troy A.D. 1830 Latitude 52°48" North)
280x280x10. 1830. S.

Grey stone; square; gnomon gone; central eight-point compass card; hours IV-XI, I-VIII; National Museum record.
(Source: Townland Park; Parish Aghnameadle; Barony Ormond Upper; Co. Tipperary); outermost incised circle D 275; then numbers, then divisions to quarters; N pointer ornamented with diamond pattern and C-curves; various instructions inscribed - e.g. "Add or sub. as the signs are or the sum or diff. gives the time shewn by a well regulated clock or watch.", with corrections for the first and another day each month; other inscriptions: "Add the Moon's shade if among the morning hours, or subtract its complement [sic], if amg. the evening hours, to, or from, the time of the moon's southing, the sum or difference gives the hour of the night. E.T." [in S corner]; "...s age in days Xd by 0.8 gives the time of her southing in hours. If less than 12 it is afternoon [sic], if more the excess is the hr. in the forenoon." [in W corner]; time corrections, e.g. Jan. 1 +3'35", Jan 21 +11'29"... Apr. 1 +4'0", Apr. 15 0'0"...Oct.1 -10'22", Oct. 21 -15'17".

1866 PRI031 DIAL - HORIZONTAL PEDESTAL

D Voster Corke Fet 1751 Non rego nisi regar.
280x280. 1751. S.

Brass; hours I-VIII and IIII-XII; compass points NE, E, SE, S, SW, W, NW; gnomon with elaborate curved insert.
The inscription can be translated: "I rule not if I be not ruled", or "I also am under authority".

3678 PRI107 DIAL - HORIZONTAL PEDESTAL

(Willm Walker, Dublin. Fecit.)
D 241. Late 18 early 19 C. F.

Bronze; octagonal; roman numerals; no further details available.
Morrison-Low 1989, 138 lists William Walker from 1775-1804, and (presumably) his son W, Walker, from 1820-1826.

2456 PRI185 DIAL - HORIZONTAL PEDESTAL

(Lat.52" 1837 Hugh Bill Wh) [Reported maker Hugh White]
340x330x10. 1837. S.

Light grey stone; square; gnomon gone; centre 16-point compass; hours IV-XI, I-VIII; National Museum record.
(Source: Townland Ballingorraun; Parish Cullenwaine; Barony Clonlisk; Co. Offaly); outer incised circle D 315; divisions to quarters; central compass design of triangular points, each decorated with fine parallel lines; the inscription is a jumble of letters and figures, both roman and arabic, with the only intelligible parts as recorded above; but a file note says it was made by Hugh White, Ballingraun [sic], Monegall.

4038 PRI138 DIAL - HORIZONTAL PEDESTAL

YEATES Grafton Street Dublin
D 374; GnH 270. 1843-1858. G.

Bronze; circular; hours IIII-XII-VIII; central compass design; towns listed; heavy gnomon with curved insert.
The hours are divided outside and inside into quarters "15 30 45 60"; inside the inner divisions are inscribed towns, from "CAPE COMORIN BOMBAY" to "EASTER ISLAND"; inside these are the months of the year with dates; then the "TOO FAST TOO SLOW" adjustments, and the central eight-point compass; the gnomon angle is c.53°20".
Assumed to be George Yeates; dates from Morrison-Low 1989, 139.

4036 PRI139 DIAL - HORIZONTAL PEDESTAL

Yeates & Son 2 Grafton Street Dublin
W c152. 1840-1864. G.

Bronze; octagonal; hours IIII-XII-VIII, divided outside into 20ths; central compass; curved gnomon insert.
The hours are divided inside into eighths; the central compass design has eight points; the gnomon angle is c.51°25".
Assumed to be George Yeates & Son, dates from Morrison-Low 1989, 139.

3668 PRI096 DIAL - HORIZONTAL PEDESTAL

(Lat 52°52' Made by Yeates & Son Dublin)
305x305. Mid to late 19 C. G.

Material not reported; on a granite plinth which may not be the original; more details needed.

1118 PRI006 DIAL - HORIZONTAL PEDESTAL

Made by Yeates & Son, Dublin Blacksod Point Lighthouse Latitude 54° 6'
D 305; GnH 181. c1875. G.

Bronze; circular; hours IIII-XII-VIII; central compass; equation of time; days of month; divided to two minutes.
The central compass design has eight hatched triangle points; outside this is the equation of time "SUN TOO SLOW" "SUN TOO FAST", with the number of minutes adjustment needed for each day of each month; there is a fleur-de-lys between the X and the II of the XII, to allow for the thickness of the open gnomon.
This was one of fifty or so dials ordered from Yeates & Son for Irish lighthouses - see also 1119 PRI009 and 2164 PRI010.

1119 PRI009 DIAL - HORIZONTAL PEDESTAL

Made by Yeates & Son, Dublin Black Rock Black Sod Lighthouse LATITUDE 54° 4'
D 305. c1875. G.

Bronze; circular; hours IIII-XII-VIII; central compass; equation of time; days of month; divided to two minutes.
One of the fifty or so dials ordered from Yeates & Son for Irish lighthouses; this one has had its gnomon cut out, and has three knobs below to embed into a support - for more details of the design, see 1118 PRI006

2164 PRI010 DIAL - HORIZONTAL PEDESTAL

Made by Yeates & Son, Dublin TEARAGHT LIGHTHOUSE 52° 4'
D 305. c1875. G.

Bronze; circular; hours IIII-XII-VIII; central compass; equation of time; days of month; divided to two minutes.
One of the fifty or so dials ordered from Yeates & Son for Irish lighthouses; for more details of the design, see 1118 PRI006.

4037 PRI137 DIAL - HORIZONTAL PEDESTAL

Unsigned Hollywood Long 9°54' Lat. 51°49' 1844
497x242; Fr 518x260; DisD 105. 1844. S.

Slate; hour dial with solid gnomon and two compass designs with pillar gnomons at side; many inscriptions.

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The instrument is in a mahogany frame; the three dials are at one narrow side; the rest of the surface is covered with many inscriptions, including a list of towns - "Hollywood Tralee Limerick Cork Waterford DUBLIN Belfast Holyhead Glasgow Edinburgh...Amsterdam" with time adjustments: "PLACES Having Noon Minutes Before Hollywood Minutes"; months; zodiac signs; many scales - sunrise, altitude, etc.; one corner replaced.

3679 PRI108 DIAL - HORIZONTAL PEDESTAL

(Vita ut umbra 50D,41m, 1785)

D 273. 1785. S.

Bronze; circular; roman numerals; no further details available.

2477 PRI198 DIAL - MINER, HEDLEY

JOHN DAVIS & SON DERBY. LTD 961

L 264; CpHsD 123; C 313x226x132. Late 19 C. G.

Brass; circumferentor face with two spirit levels; double line and window sights on pivoted circle.

Adaptation of the circumferentor by H.M. Inspector of Mines, John Hedley, in 1850, who commissioned Davis & Son to manufacture it; the rocking sights allow horizontal angles to be taken without obstructing the compass, and these sights could be replaced by a telescope; this example is an improvement on earlier models; it has a small vertical circle at one pivot outside the housing (glass now cracked) with scale 0-30-0 and 0-40-40-0, to give the orientation of the sights; which have two circular hole and cross-wire sights as well as the line and window sights; there is a silvered horizontal circle 10-360°, with vernier, under the compass, which has tangent and clamping screws; the compass has scales 10-360(upper) and 10-80° (x4), a needle clamp, and two spirit levels at right-angles; a disc cover fits over the compass; the sights fold down to allow the instrument to be stored in its fitted mahogany case; which contains a brass heart-shaped plumb-bob and a candle; it also contains a pay envelope dated "12 NOV 1966" from "Castlecomer Collieries Ltd", indicating that it was indeed used in a mine, until fairly recent times; an enamelled plaque on the inside of the lid reads: "JOHN DAVIS & SON (DERBY) LTD DAVIS DERBY [the last two words sharing one D] ALL SAINTS WORKS, DERBY."

Turner 1983,236-7 records that John Hedley commissioned his dial from Davis & Son of Derby in 1850.

3879 PRI122 DIAL - PEDESTAL

ROBERT LYLE McCLINTOCK DUNMORE 1935 LONG; 7½W LAT; 55N

PtH 1235; TaD 510; PW 535; DiD 332. 1935. S.

Cast concrete double-step plinth to octagonal table; angled octagonal plate; bronze disc and sighting gnomon.

The angled plate revolves, so that the sighting hole on a perpendicular bronze arm can be aligned with the sun; the back part of this is broken off and missing, but it rests on a small revolving bronze disc with the months engraved "JAN." to "DEC."; the larger bronze disc has a part of its edge divided to adjust for SUMMER TIME, GREENWICH ", SOLAR "; the concrete octagonal plate has cast hours 3-12-9; on the base of the plinth are arabic[?] inscriptions; on the side of the table "QUASI UMBRA TRANSIT VITA NEQUE UMBRA SINE LUCE."; on the sides of the angled stone holding the plate "R.L. McC" and "1935"; under the plate "QUI A TEMPS A VIE".

3882 PRI125 DIAL - PEDESTAL

R L McC [Robert Lyle McClintock] 1936

PtH 1073; MxH 1690; PW 511; VeDi 193x243; HoD

l459x355. 1936. S.

Cast concrete; bronze inserts; horizontal, vertical, and angled dials, latter with hours above and below.

The square plinth base has an unclear inscription; the octagonal table has an inscription on the top: "TIME AND TIDE WAIT FOR NO MAN" and, on its sides: "DAWN WILL COME EVEN IF THE COCK DOES NOT CROW" and "LAT: 55N LON: 7.30W"; on the angled stone is the signature: "R L McC 1936"; on its front face is the vertical dial, with bronze hours 6-12-6 "A.S.T" and gnomon at angle c34°; on this stone is a limb secured by a bronze plate and bolt leading to the large octagonal angled dial; on top is engraved: "SUMMER TIME" AND "LA VIE EST Vaine UN PEU D'AMOUR UN PEU DE HAINE ET PUIS - BONJOUR!", with "DUNMORE"; the screw hole for the pin gnomon remains with bronze inserts to the concrete hours 6-12-9; underneath is engraved: "GREENWICH MEAN TIME", and "LA VIE EST BREVE; UN PEU D'ESPOIR, UN PEU DE REVE ET PUIS - BONSOIR!"; the horizontal dial rests on a wedge on top of the limb, and has bronze inserts to the concrete hours 7-12-6 "GMT"; its bronze gnomon has angle c56°.

3881 PRI124 DIAL - PEDESTAL

R L McC [Robert Lyle McClintock] 1939

PtH 1205; TW 510; PW 629. 1939. S.

Cast concrete; double-step plinth to octagonal table; angled octagonal plate with rotating sighting gnomon.

Around the dial plate are bronze insert hours AM 5-12-9 PM, with inscriptions: "LAT:55N" and "LONG: 7.30W"; the bronze rotating gnomon has a base plate (L513,W76) with, at one end, a fan arc with divisions for "SOLAR TIME" "G MEAN TIME" AND "SUMMER TIME"; it has two perpendicular arms (H322&225), the smaller with a sighting hole, and the larger with an engraved analemma, with figure-of-eight curve and months, from "DECR" on top to "JUNE" on the bottom; the plinth has an octagonal bottom, and then a square base, with the inscription: "OMNES VULNERANT ULTIMA NECAT."; on the octagonal table is inscribed: "AUF DEN ABEND SOLL MAN DEN TAG LOBEN."; on the angled stone is the signature: "R L McC 1939"; under the plate is an arabic[?] inscription.

3850 PRI117 DIAL - UNIVERSAL INCLINING

WM. NELSON, FECIT, DAME ST. DUBLIN.

W 252; De 132; H 30; C 292x257x120. 1852-1862. A.

Heavy brass; hinged half-octagon base with magnetic needle; hours VI-XII-VI; short curved gnomon.

Between the halves of the base are two racks which could be used, with a suitable insert, to vary the angle of the dial; a needle point between hours VIII and VII holds a blue steel magnetic needle with an agate bearing; the hours are marked on a raised fence around the edge, and have lines down the sloped inner edge of the fence running towards the centre of the dial; each hour is divided on the inner sloped edge with longer lines for the half hours, intermediate lines for the quarters, and small lines for five minute intervals; the squat gnomon seems likely to be incomplete, and either has a vertical extension broken off, or there was a needle set into a hole on its curved inner edge; the instrument is now in a hinged oak box, with the inscription outside: "Specimens[sic] Spars & Fossils" - clearly not original.

Dates from Morrison-Low 1989,132.

3880 PRI123 DIAL - VERTICAL

R.L. McC. [Robert Lyle McClintock] DUNMORE 1936

558xc700. 1936. S.

Cast concrete plate; hours 7-12-6, with hour 12 off-centre to the left; bronze pointed gnomon.

The plate has the additional inscriptions: "G.M.T." and "TIME SO COMPLAIN'D OF WHO TO NO MAN SHEWS PARTIALITY BRINGS ROUND TO ALL MEN SOME UNDIAM'D HOURS"; along the top is a further inscription in bronze: "55N DECL 4°SE 7.30W"

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3155 PRI079 DIAL - VERTICAL

A South Vertical Dial declining West 26° FOR THE LATITUDE of Shrule BY Pk MacKeague, Oct. 1878
439x435. 1878. S.

Slate; wood frame; IX-XII-VI; three centre, four corner dials.

The largest of the three central dials gives differences in time between Shrule (noon) through Dublin (12.11), Rome (1.10), Dunedin N.Z. (MIDNIGHT), etc; the right hand dial is for "A.D. EPACT" giving values between 1879 and 1897; the left hand dial gives "MONTHS NOS. FOR COM. YR. FOR LEAP YR."; the main dial gives months around the outside, then some dates - e.g. 1 8 15 23 29 for May, then a "clock slower [faster] than dial" ring, with values in the next ring; then there is a ring of quarter hour divisions, then of half hour divisions, and then hours VIII-XII-IX; the corner dials are inscribed; "DAY & NIGHT EQUAL. SPRING BEGINS MAR.21 12 HRS. 6 MIN." (top left); "LONGEST DAY IN THE YEAR SUMMER BEGINS JUN.21. 16 HRS. 46 MINS" (top right); "SHORTEST DAY IN THE YEAR WINTER BEGINS DEC.21 7 HRS. 19 MIN." (bottom left); "DAY AND NIGHT EQUAL AUTUMN BEGINS SEP.23 12 HRS. 6 MIN." (Bottom right); the gnomon, which was at an angle from opposite hour XII towards hours II to III, was replaced with a wooden one, and most of this is now gone.

The dial was made by the great-grandfather of the owner.

2299 PRI173 DIFFRACTION APPARATUS

Abbé's Diffraction Platte Carl Zeiss Jena

76x25; C 92x39x18; CrsD 6. Proposed 1876. PC.

Glass slide with three circular silver inserts of fine grids; red leather-covered case with blue lining.

Card notes: "This accessory was proposed by ABBÉ in 1876. It is ideal for practically demonstrating that microscopic images are generated by diffraction in the object, that different objects of the same diffractive properties yield identical images under equal optical conditions, and that the aperture of the objective determines the content of the microscopic image."

4231 PRI250 DIVIDERS - PROPORTIONAL

F. BARKER & SON LONDON 1916 494

L 167; W 14; CL 189, MxW 24. 1916. S.

Brass with steel tips; central slide and clamp; scales for circles, lines, plans and solids; red leather case.

The shaped case is covered in red leather, and is lined with blue silk and velvet; the point of one of the longer two steel tips is broken.

4467 PRI279 DIVIDERS - WINGED

W & C [or G] WYNN W B

L 400; R 348; W 130 Early 19 C. G.

Iron; one fixed arm with a pivot on top for the other arm, and a curved arc wing; screw clamp on the second arm.

The screw allows the second arm to be clamped at any angular position from 0 to 90°; the WYNN signature is on the winged arc, while the WB, in larger font, is on the fixed arm.

Clifton 1995,307 lists a John Wynn in London between 1795 and 1814.

4398 PRI226 DRAWING INSTRUMENTS - SET

ASTON & MANDER LTD 1915 ASTON 1917 ASTON & MANDER LTD

C 460x194; Ru 152x35. 1915-1917. S.

Roll-up leather wallet contains eleven assorted instruments, pens, dividers, compasses, parallel rule.

The instruments are made of brass, steel, ivory and ebony; there are three pens with ivory handles; one ebony and brass parallel rule; three stand-alone compasses or dividers; a set of dividers can accept three other clip-in components.

2581 PRI215 DRAWING INSTRUMENTS - SET

[On one pen] DIXON & HEMPENSTALL RUSTLESS

[Pen] L 31; D 5. Late 19 early 20 C. G.

Assorted collection in four cases; ivory and white-metal pen; compasses; dividers; pens; scale; perforator etc.

Largest number in mahogany case (345x112x62) with "COL. R.H. SANKEY, R.E. 1879" on lid, and with two trays - including proportional dividers inscribed "Linien" "Kreise", beam compass brackets, perforator of ebony and white-metal with ivory ink disc and four serrating discs; one case with "ROWNEY LONDON" inside lid, with scale "United Metal Engineering Co Ltd Newcastle on Tyne"; pairs of compasses "ACKSON BROS" and "Richter".

4395 PRI254 DRAWING INSTRUMENTS - SET

[On one pen] HARLING [On another] L G monogram [On case - owner] Louis F. Giron Aug 2nd.. 1904

C 190x139x20. 1904. S.

Red leather-bound hinged case with blue silk and velvet lining contains thirteen assorted instruments.

Two pens have ivory handles; the rest are all metal, and include compasses and dividers; six are stand alone items; a set of dividers can accept three other clip-in components; the final item is a screw-top cylinder; the silk inside the top of the case can open up to allow documents to be placed under it.

4396 PRI255 DRAWING INSTRUMENTS - SET

[On case] W.H. HARLING MATHEMATICAL INSTRUMENT MANUFACTURER, 47, FINSBURY PAVEMENT, LONDON.

C 190x139x25. Late 19 early 20 C. R.

Red leather-bound hinged case with blue silk and velvet lining contains fourteen assorted instruments.

Two pens have ivory handles (one signed "HARLING LONDON"); one pencil lead cylinder is ivory; the rest are all metal, and include compasses and dividers; six are stand-alone instruments; a set of dividers can accept three other clip in components; the final item is a push-top metal cylinder; the silk inside the top of the case can open up to allow documents to be placed under it.

William Henry Harling moved to this address in 1890, Downing 1988,54.

2277 PRI163 DRAWING INSTRUMENTS - SET

Unsigned

C 169x78-64x34-25; ScMxL 304, W 18.

Early to mid 19 C. G.

Tapering wood etui; fish-skin cover; 10 instruments, including brass and ivory sector and parallel rule.

Variety of straight and inclined scales on sector, including "Tan", "Sin", "Num", "C,L,Pol"; Parallel rule cracked; other instruments - compasses, dividers, and pens.

3878 PRI121 EQUATION OF TIME

1935 [Unsigned but by Colonel Robert Lyle McClintock]

535x398. 1935. S.

Cast concrete; bronze inserts; months "JA" to "DE" in central double line, curve with minute corrections.

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The curve rises up first, with corrections "3 9 14 13 9 4 0", then down "0 3 4 3 0", then up "0 3 6 4 0", then down "0 5 10 14 16 15 11 5 3", and finally up "0 3"; on top is the inscription: "EQN OF TIME", on the bottom left is "SUN FAST - - SUBT 1935"; on the upper right "SUN SLOW - - ADD".

4459 PRI273 EXPOSURE METER

Watkins Exposure Meter Patent Sole Makers, R. Field & Co. Birmingham.

H 62; MxD 37. c1900. R.

Brass cylinder housing; cap on internal chain at one end; glass disc on other; three moving divided rings.

The meter is described in Turner 1989,329: "This is an example of an important class of photographic exposure meter, the tintmeter. In this class the time is measured for a piece of sensitive paper to darken to a standard tint when exposed to light falling on the subject. The exposure is then found, in the present case, from the rotary calculator. The actinic paper is in the form of a disc that is placed behind a blue glass at one end; this is called the actinometer. The other end has a pull-off cap attached to the cylinder by a chain, which forms a half-second pendulum to time the darkening of the sensitive paper. The calculator has indicators marked: P, D, A, E, standing for: speed of plate, diaphragm f numbers, light and enlarging. The Watkins 'Standard' exposure meter was patented in 1890 (No 1388) by A Watkins of Hereford."

3657 PRI140 FLEXIBLE CURVE - BROOKS'

BROOKS'S PATENT [On case] BROOKS' FLEXIBLE CURVE (Patented).

L 225; W 37. Late 19 C. G.

Flexible iron bar has six brass brackets on which pivot brass arms, joined at five points to make a wvw shape.

The pivots are quite stiff and allow the iron bar to be bent into an infinity of curved shapes; the curve is contained in a cardboard case.

A leaflet with the curve identifies it: "Pattern B has a steel strip, and any shape given to it is retained by means of the stiff-hinged linkwork attached to the tabs..."

3767 PRI228 GLASS TRAY

Unsigned

BD 106; TyD 184, H 112; EdH 32. Mid 19 C. G.

Glass; disc base and stem to shallow tray with raised edges; also a small glass saucer (D101,H22).

From the North Monastery Cork Collection.

1389 PRI020 GUNNER'S CALLIPERS

Spear, 23 Capel St.. Dublin

L 304; W 49. 1793-1809. A.

Brass; hinged; two blue metal points; angular scales at hinge, pointed fingers; Guns, Proof and Service scales.

Scales at hinge 1-10 with pointed finger and "Inches", 0-180, and 180-0; at other side, short scale 1-32 and 1-42 with pointed finger and "Shot"; linear scales 1-12 "Inches" with mistake (9.11.10.12), diagonal scale 1-12, "GUNS" 1/2-42 on one limb; on other "IRON GUNS" 1-42, "Proof" 1.0-25.0, "Service" 0.11-17.0, 10-100 "L"; on other side "BRASS GUNS" 1-42, "Proof" 1.0-31.8, "Service" 0.8-21.0, 20-100 "L".

Dates from Morrison-Low 1989,135.

2967 PRI076 HYDROMETER - SIKES

No 8821 SIKES'S HYDROMETER BATE No 21 Poultry LONDON Maker to the REVENUE of the UNITED KINGDOM

L 170; C 187x70. 1824-1847. A.

Brass; scale 0-10; eight (of nine) weights 20-90; stem cap; broken ivory-scale 30-100° thermometer; mahogany case.

Latter damaged and lined with black velvet; the glass thermometer bulb is broken, the ivory scale is signed: "LOFTUS LONDON"; some of the weights are signed: "BATE"; the instrument itself has "SIKES 8821" stamped on the stem.

Dates for Robert Brettell Bate from Clifton 1995,22.

0993 PRI144 HYDROMETER - SIKES

BUSS, 33, Hatton Garden, London. 18653

L 170; BuD 40; C 244x106x53. 1866-1895. A.

Gilt brass; nine weights; one cap for top of stem; in mahogany case with ivory backed thermometer and slide rule.

Thermometer bulb broken, scale 30-90°; ivory slide rule has white-metal cross bars at ends and is signed: "BUSS MAKER 33 HATTON GARDEN LONDON"; scales 10-PROOF -25; 20-40; 35-55; 30-80//20-30 on one side; 50-30; 55-70; 70-75; 30-5, on other

Dates from Crawforth 1988,5; serial no 1642 at this address 0533 IDG021 suggests that this example dates nearer to 1895 than 1866.

3726 PRI111 HYDROMETER - SIKES

SIKE'S HYDROMETER BUSS, 33, HATTON GARDEN, LONDON [Label] 48, HATTON GARDEN. READJUSTED BY BUSS

L 173; BuD 40; C 249x107x52; Ru 227x34; Th 226x24.

1866-1895. A.

Mahogany case; gilt/brass; slide-rule; thermometer.

The hinged mahogany case has an ivory signature plaque on top, and a boxwood rectangular inlay; the inside is lined with blue silk and purple velvet; the hydrometer has a sphere bulb, with a scale above 0-10, and is signed: "SIKES 23638 BUSS. 33 HATTON GARDEN. LONDON."; there are seven (originally nine) weights 10, 20, 30, 40, 60, 70, 80, signed: "BUSS 23638"; the rectangular cap weight is missing; there is a brass-bound boxwood brewer's slide rule, signed: "BUSS MAKER 33 HATTON GARDEN LONDON"; the thermometer is missing but its copper-bound ivory scale remains, with scales 20-100° on one side, and 20-110° on the other, signed: "BUSS LONDON" and "BUSS 33 Hatton Gardten LONDON".

Dates at 33 Hatton Garden 1866-1895, at 48 Hatton Garden 1896-1914, Crawforth 1988,5.

2291 PRI171 HYDROMETER - SIKES

SIKES'S HYDROMETER FARROW & JACKSON GREAT TOWER STREET LONDON 18695

L 165; BuD 38; C 248x112x52. 1871-1897. R.

Gilt brass; eight weights; no thermometer nor slide rule.

In mahogany case with red lining; signature stamped on paler wood plaque on lid.

The firm lasted from 1871-1897, then became a Limited Company, Downing 1988,45.

2613 PRI047 HYDROMETER - SIKES

SIKES HYDROMETER M. JORDI & CO. DUBLIN NO 39543

L 161; BuD 36; C 204x95x53; ThS 182x22.

Early 20 C. G.

Gilt brass; scale 0-10; nine disc brass weights 10-90 and stem cap; ivory-backed thermometer 30-100°; mahogany case.

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Weights and cap on ivory pegs in fitted case lined with purple velvet and silk; glass mercury thermometer; signed on top of case lid: "SIKES HYDROMETER M. JORDI & CO DUBLIN"; on thermometer and hydrometer: "M. JORDI & CO. DUBLIN"; the serial number is on the stem of the instrument and on each of the weights.

Not in Burnett & Morrison-Low 1989; 0711 NMD010 has address on lid "31 LOWER ORMOND QUAY" and has no.15605.

2629 PRI064 HYDROMETER - SIKES

SIKE'S HYDROMETER T. MASON 21 PARLIAMENT ST DUBLIN

L 157; BuD 36; C 203x92x55. 1884-1895. A.

No43003; gilt brass; scale 0-10; nine weights 10-90; stem cap; lined mahogany case; thermometer missing.

The signature is on an ivory plaque on top of the case, below the Royal arms; case is lined with red silk in the lid and purple velvet in the base; space for missing thermometer; instrument itself is signed: "T. MASON DUBLIN No43003 SIKES P5"

Dates from Morrison-Low 1989,131.

4227 PRI245 HYDROMETER - SIKES

Unsigned - numbered 915

L 102; BuD 23; C 118x55x32. Mid to late 19 C. G.

Miniature; gilt brass; nine disc weights 10-90; glass mercury thermometer; magnifier; leather bound case.

The thermometer reads 30-80° [F]; the small magnifying glass is in a wire frame with a twisted handle; the rectangular weight for the top of the stem (which reads 0-10) is missing; the hinged case has rounded corners, is covered with dark red/black leather and lined with blue velvet and silk.

With the instrument is a small booklet "SIKES' TABLES OF THE CONCENTRATED STRENGTH OF SPIRITS WITH DIRECTIONS FOR THE USE OF HIS HYDROMETER ESTABLISHED THROUGHOUT THE UNITED KINGDOM FOR ESTIMATING THE DUTIES ON SPIRITUOUS LIQUORS By Act of Parliament, 58 Geo. III., cap.28"; printed by "TURNBULL AND SPEARS EDINBURGH".

2664 PRI072 HYDROMETER - SIKES

Unsigned SIKE'S HYDROMETER No.300 SIKES P 51°

L 154; BuD 35; C 201x97x52. Second ¼ 19 C. G.

Copper bulb; brass limbs; scale 0-10; in fitted mahogany case; four (of 10) brass weights; thermometer gone.

The upper scale limb is loose; the circular weights - 10,30,50,70 - are on ivory pegs in the case, which has an ivory plaque on top "SIKE'S HYDROMETER", and is lined with red silk and purple velvet; there is space in the case for the missing thermometer; the low serial number (300) suggests that this is a fairly early example, and this one is unusual in having a copper bulb.

2301 PRI175 HYDROMETER - TWADDELL

Thomson Skinner & Hamilton Glasgow (Twaddell [sic] No1)

L 229; RsD 20; BuD 30; ScHsD 6. Late 19 C. G.

Glass; mercury weight; pear-shaped bulb; paper scale 0-24, hand-divided and signed.

Also a smaller hydrometer (L146,CyBuD19) in cylinder goblet (BD65,H152,CyD43).

A card with the Twaddell hydrometer notes: "Degrees Twaddell (a) are converted into specific gravity (x) relative to water as follows $x = 1 + (a \times 0.005)$." and describes it as: "Griffen's improved form".

Anderson 1990,84 lists a catalogue of Thomson, Skinner & Hamilton, dated 1914.

2292 PRI180 INHALER

GODFREY'S PATENT CHLORIDE OF AMMONIA INHALER AD 1680

BD 58; H 113; MxD 78; ToOD 62. Mid 18 C. G.

Glass; disc base; vertical elliptical vessel; ground top; signature and phoenix "TRADE MARK" fused in glass.

Ambrose Godfrey (c1685-1756) was the son of Ambrose Godfrey Hanckwitz (1660-1741/2), operator to Robert Boyle (1626-1691); Hanckwitz was noted for the manufacture of phosphorus, and is said to have monopolised the European market in that commodity; the firm, which later became Godfrey & Cook, manufacturing chemists, was established in 1680 and continued until about 1862, with a Golden Phoenix Trade Mark.

A note supplied by D. Thorburn Burns, with the reference R.E.W. Maddison, "Boyle's Operator: Ambrose Godfrey Hanckwitz, F.R.S.", Notes and Records of the Royal Society, 1954,11,159 runs thus: "The Golden Phoenix Laboratory in Maiden Lane was set up by Boyle's Chemical Operator Ambrose Godfrey Hanckwitz in 1707. The date 1680 set over the doorway and on the bill head probably refers to the date of the first preparation of phosphorus and the deposition with the secretaries of the Royal Society of a paper by Robert Boyle, 'A Method of Preparing the Phosphorus of Human Urine'. Hanckwitz eventually set up as a manufacturing chemist and had virtually the monopoly in making phosphorus because of his mastery of the technical requirements of the process. Ambrose Godfrey Hanckwitz's two sons, Ambrose and Boyle, dropped the name Hanckwitz. The business continued under the name of Godfrey and Cook and remained on the site until 1862 when it was demolished to provide the site for the present Roman Catholic Church of Corpus Christi. The business was acquired by Savory and Moore Ltd 1916."

Burns also supplied a copy of a receipt from the Golden Phoenix dated 1836: "Godfrey and Cooke, Chemists, London. Southampton Street, Covent Garden, and Conduit Street, near Bond Street. Established in the Year 1680. ALL FAMILY ORDERS ARE EXECUTED IN SOUT-HAMPTON STREET."

R.B. Pilcher, "Boyle's Laboratory", Ambix 17,2,1938.

4174 PRI232 KEY

J.G. MERNE.

W 81, H 58; HaD 13. Mid to late 19 C. G.

T-shape; cylindrical wood handle with rounded ends; tapering metal arm, rectangular insert in sleeve on end.

The key is designed to turn a rod ending in a solid rectangle, reminiscent of a Hook's joint rod; while not a spectacular "instrument", this is significant as only the second occurrence of Merne's signature, the other being the Woulff bottle (4173 NMC243), thus the key widens his repertoire of instruments, presumably being part of a much larger artefact.

From the North Monastery Cork collection.

0788 PRI016 KINORA

THE Kinora REGISTERED TRADE MARK PATENTED THROUGHOUT THE WORLD BY KINORA LTD LONDON HAMLEY'S LONDON

BD 225; H 447. c1900. G.

Mahogany; metal pillar; three lens front; 11 film reels.

Turner 1983,304 records that the Kinora was a form of peepshow devised by an American, Herman Casler, in the 1890s, and was a smaller version of his mutoscope.

Harley 1988,25 records that the mutoscope was a coin-in-the-slot machine which flicked pictures past a rubber finger to show them in action when the handle was turned; the kinora was the home version of the mutoscope; this had picture reels of about 600 photographs, showing about ten pictures per second, so the reel lasted about a minute; the company produced

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pictures of "objects so lifelike as to border on the marvellous"; personal movies could be made at the Biograph Studios, 107 Regent Street, London - "This is the only method by which the actual gesture, expression, smile and other characteristics can be reproduced"; by 1909 a camera for amateur use was available, and the kinora remained popular with wealthy people until Pathéscope and Kodak introduced inexpensive home movies on narrow-gauge film in the 1920s.

4220 PRI246 LAMP - CANDLE

Unsigned

BD 125; H 368. Mid to late 19 C. G.

Turned pewter base and pillar; internal spring for candle; on top, silver plated elliptical reflector and chimney.

The hole on top of the pillar is narrower than the diameter of a normal candle; thus the spring keeps the flame opposite the apex of the elliptical reflector since only the melted part of the candle can rise through the hole; it seems likely that this was used with a microscope although it could also be used as a domestic reading lamp.

4228 PRI247 LAMP - OIL

W.C. HUGHES OPTICIAN BREWSTER HOUSE 82, MORTIMER RD. KINGSLAND RD. N LONDON

BD 97; H 255. 1883-1900. R.

Japanned metal; circular base; tapering body with flap; oil tank behind with wick pipe to body; cowl on top.

There is a small drawer in the base; a lever on top of the base raises a brass plate to allow the light to be seen through a blue glass disk (chipped); a brass knob and bar behind the body alters height of the (missing) wick.

William Hughes was at this address from 1883-1891, although Brewster House is listed only from 1892-1900, Downing 1988,66..

4229 PRI248 LAMP - OIL

LANCASTER'S PATENT No. 1365 THE RUBRALUX

B 150x140; H 284. 1915. P.

Japanned metal; tapering rectangular body; hinged orange and red glass panes, and metal flap; glass globe.

Two handles at the back; the orange pane is hinged at the left of the body, the red, which sits on top of the orange, on the right; and the metal flap is hinged from the top, and can be clamped in any position between vertical and horizontal.

Presumably this lamp was for use in photography, and the Lancaster refers to J. Lancaster of Birmingham, well known as suppliers of cameras.

3666 PRI094 LENS - BULL'S EYE

Unsigned

B 65; MnH 125; LeHsD 41. Mid to late 19 C. G.

Brass disc base and pillar with expanding insert; on top of the insert is a right-angled rod ending in the lens.

The plano-convex lens is held in a brass ring frame.

3662 PRI093 LENS - BULL'S EYE

Unsigned

BD 80; MnH 195; LeHsD 75. Mid to late 19 C. G.

Brass disc base and pillar to pivot for sliding rod having a knob at one end and the lens at the other.

The plano-convex lens is held in a brass ring frame.

3661 PRI141 LENS - BULL'S EYE

Unsigned

BD 100; MnH 285; LeHsD 78. Mid to late 19 C. G.

Brass disc base and pillar; on this is a sliding sleeve for a right-angled bar with a universal joint to the lens.

The plano-convex lens is held in a brass ring frame.

3680 PRI109 LENS SYSTEM

('C' - Grubb - PATENT 2716.) [Thomas Grubb]

No measurements available. 1840s. PC.

Brass bound; cased; on display at Guinness Hop Store 1989-90 Exhibition "Through the Brass Lidded Eye".

Recorded also in The Irish Times 3:2:90 "An Eye For Cameras", which states that it was made in the 1840s by Thomas Grubb.

1853 PRI026 LENS SYSTEM

A [Thomas] Grubb PATENT. 3842

L 59; MxD 64. Mid to late 19 C. G.

"T. Grubb's Aplanatic"; brass bound; push-in two-aperture piece has four discs to vary one aperture (away from lens).

Lens element unscrews; red leather-covered, purple velvet-lined hood.

British Patent 2574 1857 - see Kingslake 1989,28.

4424 PRI258 LENSES - MICROSCOPE

SEIBERT PHOTOGR. ½ ZOLL

SEIBERT PHOTOG. 1 ZOLL.

SEIBERT No 1

SEIBERT PHOTOGR. ¼ ZOLL.

H 31; C 54x54x39. Late 19 C. G.

Four brass-bound lens systems in black leather-covered case with purple silk lining and mahogany support.

The case also contains two small washer-like apertures.

Brachner 1985,150 lists Wilhelm Carl Seibert & Krafft as exhibiting microscopes between 1873 and 1900; they were in Wetzlar and Berlin in 1877.

Turner 1989,130 lists a Seibert 1/6 immersion lens with a microscope dated 1892.

Lorentzen 1994,78 lists Wilhelm & Heinrich Seibert, Wetzlar, between 1887 and 1903.

2480 PRI201 LEVEL - SPIRIT

A.G. THORNTON. MANCHESTER A.G. THORNTON PARAGON WORKS PRACTICAL MANUFACTURER KING STREET WEST MANCHESTER.

L131; H35; TuD18; C143x48x23. Late 19 early 20 C. G.

Brass cylinder; glass spirit tube inside; lined case.

Cylinder housing has some oxidised brass and has two legs at extreme ends; windows top and bottom allow instrument to be used either way up; in black paper-covered case with blue silk and velvet lining; the longer signature is on the inside lid of the case in gold.

Brown 1982a,24 records an A.G. Thornton transit theodolite, dated c1900.

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2475 PRI196 LEVEL - TELESCOPIC

COOKE'S PATENT No 12175 REVERSIBLE LEVEL

L 343; H 167; TuMxD 51; CpD 94; C 387x212x172.

Early 20 C. G.

Brass with black enamelling; tribach base; compass below, two spirit levels above tube; rack and pinion focus.

Base has tangent and clamping screws; instrument revolves around tribach and the compass is read with a reflecting prism; the larger spirit level is parallel to the tube, and the smaller is at right-angles to this at the objective end; objective focus; hinged objective lens flap; in fitted mahogany case.

T. Cooke & Sons No6547c1910, 15624c1920, Brown 1982a, 25&27; Cooke, Troughton & Simms 1922, Bennett 1987, 209.

2476 PRI197 LEVEL - TELESCOPIC

JOHN DAVIS & SON DERBY LTD. 3074

L 348; H 177; TuMxD 58; C 393x211x143.

Late 19 early 20C. G.

Brass and oxidised brass; base disc with screw thread; four level screws; two spirit levels on top of tube.

The level screws are in a four-armed element above the base disc; a platform above holds two supports for the tube; on the latter is a large spirit level parallel to it, and a small one at right-angles at the objective end; rack and pinion eyepiece focus; objective lens hinged flap missing; eyepiece lens missing; in fitted mahogany case, with a Trade Card: "JOHN DAVIS & SON (DERBY) LTD., Manufacturers of MINING, SURVEYING, ENGINEERING & MATHEMATICAL INSTRUMENTS. MINERS SAFETY LAMPS Meteorological Instruments This Instrument was last overhauled [not filled in] All Saints Works, DERBY."; another card on lid reads: "THIS Instrument has left our Works in perfect adjustment. Immediately upon receipt the same should be examined, and if found to be damaged should be shown to the Railway Company, and also advised to us; if neglected we cannot accept responsibility."

Turner 1983, 256 gives No 216 date c1880, but notes that Hedley commissioned his dial from firm in 1850.

2474 PRI195 LEVEL - TELESCOPIC

Mason Dublin MASON ESSEX BRIDGE DUBLIN [Trade disc]

L 303; H 193; TuMxD 51; CpD 86; C 431x129x126.

Third ¼ 19C. G.

Brass and oxidised brass; two disc four screw base; compass below, two spirit levels above tube; rack and pinion focus.

Above the base is a platform with the compass in the centre; two supports from this hold the tube, which has a long spirit level parallel to the tube on top, and a small spirit level perpendicular to this at the objective end of the tube; hinged flap objective cover; eyepiece focus; base screws off; in fitted mahogany case which contains a hinged mirror (34x19) and clip-on bracket, and a longer eyepiece lens system which does not seem to fit this instrument; the glass and liquid are missing from the small spirit level.

Masons were at Essex Bridge from 1809-1883, Morrison-Low 1989, 131; this looks closer to the end of this period.

2472 PRI193 LEVEL - TELESCOPIC

SPENCER & SON, GRAFTON STREET. DUBLIN. P.T.C.

L 332; H 182; TuMxD 55; C 375x225x120. c1884. A.

Brass and oxidised brass; two disc four screw base; bubble and spirit levels below and above tube.

For trade label, see 2473 PRI194.

Above the base is a platform with the circular bubble level in the centre; two supports from this hold the tube, with the linear spirit level on top, parallel to the tube, but cracked and missing its liquid; rack and pinion eyepiece focus; in fitted mahogany case, with trade card having the "19, GRAFTON STREET" address stroked out and "23 NASSAU STREET" inserted in red; the "P.T.C." presumably refers to the original owner.

Firm moved to 23 Nassau Street in 1884, Morrison-Low 1989, 136

4428 PRI263 LEVEL - TELESCOPIC

TROUGHTON & SIMMS LONDON

MnL 380; W 67; C 512x146x123. Late 19 early 20 C. G.

Oxidised brass; two disc four screw base; bracket to tube; crossed spirit levels; fitted mahogany case.

Rack and pinion eyepiece focus; objective lens hood with flap; one long spirit level on top of tube, with a short one at right angles; case had a crest in the top centre but this is now missing.

2574 PRI209 LEVEL - TELESCOPIC

TROUGHTON & SIMMS LONDON FROM G P TO D P 17 OCT 1903

L 387; H 176; C 425x213x184. c1903. S.

Brass and oxidised brass; tribach base; compass 10-360° under telescope, long and short spirit levels above telescope.

Short spirit level at right-angles to long one; rack and pinion eye-piece focus; hinged objective lens flap; tube and compass can revolve around base, with tangent and clamping screws; three-arm element, with screw thread centre hole for missing stand, takes and secures the points of the level screws; cross hair element in circular brass box; blue metal plumb-bob; in fitted mahogany case.

2573 PRI208 LINEN PROVER

P. FRITH

H 34; CyD 25. 1829-1837. R.

Brass; removable cylinder cover; square aperture at base; two supports to housed magnifier; slide lens flap.

Signature difficult to read - could be FRITH or PHITH, but FRITH most likely as an instrument making firm of that name is known.

Clifton 1995, 106 lists Peter Frith in London from 1829 to 1837.

2572 PRI207 LINEN PROVER

37 NEILL BROS BELFAST

H 25; W 11. 1850-1863. F.

Brass with thin blue metal plate on main element; two hinged arms - one for magnifying glass and one for eye-hole; a surprisingly effective magnifier.

Dates from Burnett & Morrison-Low 1989, 152.

2587 PRI221 LINESMAN'S DETECTOR

SIEMENS BROS. & CO 644 M 1900

Hs 90x87x56. 1900. S.

Mahogany housing; silvered disc face with scale 70-0-70; blue metal needle; three brass contacts and ring on top.

Ivory discs between the contacts labelled "I" and "Q".

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Used for the routine checking of telegraph and similar circuits to indicate the polarity of the current and give a rough indication of its magnitude; a simple moving magnet instrument which uses gravity as the restoring force. Illustrated and described in Stock 1983,17.

1116 PRI007 MARINE AZIMUTH INSTRUMENT

T.L. AINSLEY SOUTH SHIELDS

L 149; W 68; H 128; C 194x171x91. 1858-1886. W.

Brass and oxidised brass; shaped base for curved vane, revolving mirror and white disc and two shades; case.

The instrument has four short feet (one a replacement) and a teat to fit onto a marine compass; a vertical wire runs from the base to the top of the curved vane, which has a central line sight, with pin-holes at top and bottom, and a larger hole above the centre; two trunnions on the base hold the rotating plane mirror, which has a white glass disc with a central black dot on its reverse; at the front are supports for pivoted glass shades in green and very dark red; on the other side of the vane is a screw-off cylindrical counterweight which hides the signature; there is a mahogany case.

The instrument was used on the ship "City of Dortmund".

Dates from Crawforth 1988,3.

3737 PRI112 MARINE AZIMUTH INSTRUMENT

JOHN LILLEY & GILLIE LTD UNIT QED (WILSON & GILLIE)

Sp 183; L 226; H 95. Early 20 C. G.

Brass; Y-shaped base with front frame; two supports for angled lens, revolving prism, and two pivoted filters.

The cast brass base has vertical feet on the ends of the Y-limbs; in front of the Y is a frame to view the ship's compass; in front of the frame is a (loose) plate with an curved front; the back of the base is also curved; in the middle of the base is a level screw; between the curved vertical supports is a spirit level; near the top of the supports is a framed magnifying lens (Hs39x39); above this are supports for the axis of the viewing prism, whose top is cut off and protected by a brass plate; the prism is turned by means of two knurled knobs on the ends of the axis, each with an engraved arrow mark to the edge; in front of the prism are a light grey and a dark grey semi-circular filter, on pivoted mounts; one of the curved supports is marked "1.5" and the other "15", and "15" is also engraved below the base and on the underside of the front curved plate.

2482 PRI203 MICROMETER SCREW GAUGE

BROWN & SHARPE Mfg. Co. Providence R.I. U.S.A. No 45 PAT. NOV. 6 1884 PAT. DES. 30,1902

L 151; C 329x329x85. Early 20 C. G.

White-metal; arc with conversion tables; side screw.

In case with other engineer's instruments, including a pair of white-metal Brown & Sharp dividers, the Starrett micrometer screw gauges 2481 PRI202, and an unsigned vernier callipers; in a mahogany case with five compartments lined with green velvet

Similar Brown & Sharp micrometer screw gauges offered in Pye 1914 and 1926 catalogues (p.3).

2481 PRI202 MICROMETER SCREW GAUGE

STARRETT MICROMETER MANUFACTURED BY THE L.S. STARRETT CO. ATHOL, MASS. U.S.A.

[on case] Nos 2, 226 & 525A

L 103, 145, 208. Early 20 C. G.

Three; white-metal, two with some black enamelling.

Two of the micrometers are in boxwood cases with sliding tops, stamped with the maker's details as above; all have concave arcs for the item to be measured, and the screw micrometer on an arm at one side of the arc.

Contained in case with Brown & Sharpe gauge and dividers - see last entry.

2471 PRI192 MICROSCOPE - COMPOUND

Bancks, 440. Strand, LONDON From J.P.W. to A.C.

Sp 130; H 295. 1796. A.

Brass; folding tripod foot; pivot above foot; mirror rack and pinion focus; six objective lenses on carousel.

Mirror mount in semicircle frame just above the pivot foot, but mirror now gone; vertical limb; stage gone; transverse bracket from the top of the limb to hold the tube at the objective end; tube tapering to objective, cylindrical upper half, missing eyepiece lens ring on top; "From J.P.W. to A.C." on tube near eyepiece; Bancks signature on one limb of foot.

The microscope came from the Zoology Department, Trinity College, Dublin.

Date from Clifton 1995,16.

1012 PRI150 MICROSCOPE - COMPOUND

Ane Mon Hartnack & Prazmowski Bezu, Hausser & Cie sucr Paris

H 250; TuSvD 30; C 280x143x102. 1881-1896. R.

Brass; tube sleeve on bracket from pillar; case.

Replacement black U-shaped foot; similar to Hartnack microscope 1011 PRI149, but optics missing; five-aperture diaphragm detached from bottom of fixed stage; revolving mirror on bracket below stage; sleeve for tube on right-angled bracket on top of pillar; coarse push focus at eyepiece; fine focus by knurled knob on top of pillar; fitted mahogany case.

Payen 1985,177 gives Bézu-Hausser from 1881-1896.

1393 PRI024 MICROSCOPE - COMPOUND

F. DAVIDSON & CO. 29 GRT. PORTLAND ST LONDON W

No measurements available. Late 19 early 20 C. G.

"Patent microscope"; in case; with Rofs ¼" objective; also with "microtelescope".

Weather glass in Turner 1983 (236,opp256) by Davidson & Co dated between 1890 & 1910.

1011 PRI149 MICROSCOPE - COMPOUND

E. Hartnack, Place Dauphine, 21 Paris.

H 239; TuSvD 30. 1864-1872. R.

Brass; black U-shaped foot; pillar for fixed stage, five aperture diaphragm; bracket on top for tube sleeve.

The sleeve is on a right-angled bracket on the top of the pillar; coarse push focus at eyepiece; fine focus by knurled knob on top of pillar; diaphragm below stage; revolving mirror on bracket below stage.

Anderson 1990,38 records E. Hartnack catalogues at this address from 1864-1872.

1125 PRI013 MICROSCOPE - COMPOUND

KNOTT & CO. LIVERPOOL

H 400. 1873-1901. W.

Brass; Y-shaped foot; two-sided mirror; substage condenser; pivoted at stage; four objectives; two eyepieces.

Objectives are labelled 1m [sic], 0.25m and 0.125m, one unmarked; two brass objective cases; moving stage not working;

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original screw for fine focus missing.
Dates from Crawforth 1988,10.

1013 PRI151 MICROSCOPE - COMPOUND

Unsigned

TuL 116, D 25. Late 19 early 20 C. G.

Brass; mounted horizontally in sleeve on mahogany base, with clips for slides; push focus in sleeve.

2627 PRI061 MICROSCOPE - COMPOUND, DRUM

Unsigned

No measurements available. Mid 19 C. G.

Brass; circular base; cylinder with cut-away for rotating mirror; fixed stage; support for push-focus tube.

Also an unsigned brass compound microscope with a black U-shaped foot, revolving mirror and stage on pillar; fine focus knob on top of pillar, which has supports to a sleeve allowing push coarse focus of the tube.

Drum microscopes described in Turner 1989,86-91.

1014 PRI152 MICROSCOPE - COMPOUND, DRUM

Unsigned

BD 48; H 149; ED 22. Mid to late 19 C. G.

Brass; cylinder on base with window cut away for mirror; fixed stage; top of cylinder holds tube.

Push focus; mirror rotated by knob on side of cylinder.

4458 PRI272 MICROSCOPE - COMPOUND, GOULD

Cary, LONDON

H 235; MxTuD 23; C 171x147x50. c1825. R.

Brass; screws into centre of mahogany fitted case; tapering and cylindrical tube; rack and pinion stage focus.

The pillar screws into the lid of the case, and it has rack and pinion stage focus; at the top of the pillar is a limb at right angles to it leading to the nose piece of the tube, which increases in size for about half its length and then becomes cylindrical; a pin near the base of the pillar holds a rotating convex mirror; the circular stage has a spring to hold ivory sliders for specimens (two sliders remain, each for four specimens, though two are missing from one of them); the mahogany case has one side missing, and is lined with green/blue velvet; the accessory tray comes out; accessories include four objective lenses and one lieberkuhn.

Part of an original leaflet remains, with a diagram, and a list of accessories, several of which are now missing; the leaflet is headed: "A NEW IMPROVED SECOND SIZE Compound and Single MICROSCOPE. MADE AND SOLD BY. W CARY, No.181, STRAND, LONDON." "It is adapted for any purpose to which a Microscope can be applied. Its portability and magnifying powers will recommend it strongly to the Naturalist, Mineralogist, and Botanist as it is furnished with sufficient powers for discovering the smallest Animalculae, Crystallizations, Seed-Vessels and Test Objects."

The leaflet on accessories is missing earlier items and reads:

"ceps and Condensing Lens.

4 - A concave Mirror, for illuminating transparent Objects upon the Stage: this turns on its centre to get the light on the Object. [Present]

5 - An Object Box; consisting of a concave Glass, and a plain one screwed over it, by which means any Insect may be contained and viewed alive. This is placed on Stage B.

6 - The Forceps, or Pliers, for holding any Object, by which it may be very readily applied to the focus of the Lens. Applied on Stage B. (There is no No.7)

8 - The Cell which contains the high power - for Test Objects used singly. [Present]

9 - Four Object-Glasses of different Magnifying powers, which may be screwed on at the end of the body, making it compound, or used singly. [Present]

10 - A circular piece of Ivory with one side white, other black for opaque Objects of different Colours and Hues, and Glasses for ditto.

11, 12, and 13 - Are three Ivory Slides, filled with various curious Objects. [Two present]

14 - A dissecting Knife, for Botanical purposes.

15 - A steel Point to hold the Object.

16 - A pair of Nippers, for taking up any Object to be examined, with spoon at end for drop of Water.

17 - A Camel's hair Brush at one end, for cleaning the Glasses, Lenses &c., - the other end is cut pen-fashion, for taking up Fluids, &c., and readily placing them for view on the Glass of the Object Box.

18 - A Lens for throwing light on opaque Objects. Applied on Stage B.

19 - A silver Speculum, with a Lens for opaque Objects, screws under part of Arm.

20 - The Microscope put together for use.

21 - A moveable Stage for placing an Object upon. Applied to the Microscope, on Stage B, fig. 20. 22 - A glass Slide, for drop of Water, for Animalculae, &c. [Present]

Type of microscope invented by Charles Gould in the 1820s; William Cary died in 1825, Turner 1989,75-76.

4226 PRI244 MICROSCOPE - SIMPLE

E. LUTZ PARIS

L 175; LeD 24; MxW 32. Pre 1896. R.

Ebony octagonal tapering handle; on top, brass Y-shaped bracket; plano-convex lens one side; slide clips on other.

Each of the two sides of the bracket has a screw thread which fits the lens, but magnification is achieved only when that away from the slide clips is used; perhaps another missing part screwed into the other side?

Lutz took over from Berthoud (established 1848); Duplouich replaced him in 1896 - Payen 1985,177.

1023 PRI160 MICROSCOPE - SIMPLE

Unsigned

L 68; W 95; LeHsD 17; C 76x32x24. Late 18 C. PC.

Brass; ivory handle and lens housing on arms fold down around bracket with sliding nut for sample; case covered in fish-skin.

Date suggested by owner.

0992 PRI143 MICROSCOPE - SIMPLE

Unsigned

H 46; TuD 24. Mid to late 19 C. G.

Brass cylinder with small hole in one end holds wood lens mount in other end; inside (replacement) spring and glass disc.

2582 PRI216 MICROSCOPE - SIMPLE

Unsigned

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Sp 38; MnH 38; HsMxD 47. Mid 19 C. G.
Brass/oxidised brass; ring on three turned legs with screw thread for biconvex lens in housing; as 2281 PRI167.
Possibly for use as a linen prover.

2281 PRI167 MICROSCOPE - SIMPLE

Unsigned

Sp 37; MnH 38; MxD 47; PrL 25, D 3. Mid 19 C. G.
Brass/oxidised brass; ring on three turned pillar legs (one replaced); screw thread for biconvex lens in housing.
The legs all differ slightly from each other, but only one is shinier and more clearly a replacement; identical to 2782 PRI216; possibly for use as a linen prover.

4438 PRI236 MICROSCOPE/CAMERA/TELESCOPE

F. DAVIDSON & Co. 29, GRT PORTLAND ST. LONDON W.1. [on instrument and case]

L 365; B 330x172; C 397x231x199. Late 19 early 20 C. R.

Oak base holds oxidised brass base of microscope and parallel brass tubes to guide the camera end; oak case.

The arrangement is such that the lens of the bellows camera (which has oak mountings) is also the tube of the microscope whose focus is by double knob rack and pinion; the position of the back of the camera is adjusted as it is attached to steel bars which run into the brass tubes; below the square stage is a revolving mirror; the case contains brass accessories, including: a microscope tube with objective lens - which would allow the instrument to be used as a microscope, rather than a microscope-camera - it is inscribed "DAVON No6"; two micro-telescopes, each incorporating an iris diaphragm - inscribed "THE 'DAVON' (REGD.) MICRO-TELE-SCOPE"; a revolving plane mirror (silvering distressed) with a cover on an incomplete circle sleeve - inscribed "F. DAVIDSON & CO. LONDON"; a weighted expanding stand with a clamp above; a specimen tweezers on a peg; a mahogany photographic plate holder; four objective lens cylinders with three lens systems (the fourth is on the instrument) - "DAVON 1½ IN.", "1 IN.", "2/3 IN.", "½ IN."; a wheel of four apertures.

Weather glass in Turner 1983 (236,opp256) by Davidson & Co dated between 1890 & 1910.

4468 PRI280 MICROSCOPE SLIDES

I.D. MÖLLER Diatomacean Typen-Platte Monobrom Naphtalin.

Sd 76x24; C 98x47x18. Late 19 C. G.

Three glass slides, two with four specimens, one with one, each in a black leather-covered clip case.

The cases are lined with white silk and purple velvet; one of the specimens from one of the four sets is damaged.

A similar case holds a slide "NORMAN PREPARER" "Chin of Man Shewing glands and follicles". Another uncased slide is signed by: H.W.H. DARLASTON BIRMINGHAM PREPARER BIRCHFIELD.

2300 PRI174 MICROSCOPE SLIDES

RICHARD SUTER, 10, HIGHWEEK ROAD, TOTTENHAM

76x25. Mid to late 19 C. G.

Glass; "Stickleback fish", "Head of Common Male (mouth organs)", "Stomach of Frog", "Cirrhosis of Liver".

Some other microscope slides - unsigned.

4469 PRI281 MICROSCOPE STAGE WITH THERMOSTAT

Unsigned

Hs 94x52x13; HID 15. Late 19 C. G.

A brass housing with a central hole incorporates a glass-mercury thermometer and four input-output pipes.

The thermometer is divided 0-100°; two of the pipes lead to the central hole, which appears to have had a glass disc cover, now missing; two of them heat the surrounding housing, the temperature being measured on the thermometer; a copper rod leads from the rim of the central hole beyond the housing.

4021 PRI230 MODEL - DOMESTIC WATER SYSTEM

Unsigned - attributed to P. Cahill, Coalquay

B 494x228x45; H 675. Mid to late 19 C. G.

Wood base; metal; cut-out stove on base; pillar and rod frame hold bath below dual-chamber water tank.

The deep tapering round-ended bath (292x137x95) sits on four claw feet on a rectangle of horizontal bars held by the four vertical pillars from the base; at one side, above the bath, is the water tank, which has glass sides; pipes rise from the kitchen stove to the larger compartment in the tank, and a pipe leads from the smaller to a tap above the bath; there is also a drain below the bath.

A second model, with some similarities, shows the working of a ball cock cistern, having two tanks with cocks on a pipe frame, with a tap between them.

From the North Monastery Cork collection.

Similar to models by P. Cahill - see entries for Mechanical Model - Water Wheel 3748 NMC149 and 4020 NMC238.

1024 PRI161 MORTAR & PESTLE

One signed "I*W* 1731"; one "CHA" (the C above HA)

IW - BD 84, H 86; CHA - BD 88, H90.

One dated 1731. S.

Eight circular section brass mortars plus one pestle (L174,MxD290) - turned brass with double grinding ends.

Card dates them 18th and 19th Centuries.

4465 PRI277 OCTANT

Dollond London

L 461; R 405; W 364. Turn 18/19 C. G.

Ebony, brass, and ivory; curved T insert; ivory scale 0-95; ivory window vernier on brass index arm 0-30.

The instrument is missing its index mirror (although the mount remains), and clamping and tangent screws; the half-horizon mirror mount is detached; no shades remain; the peep-hole set-up is also missing; there are ivory plaques on the curved T inert of the frame and on the back of the instrument; the latter has three brass feet.

1390 PRI021 OCTANT

Unsigned (Anchor symbol on scale; "TCD" on index arm)

L 246; R 208; W 203; C 268x244x85. Early 19 C. G.

Ebony, ivory and brass; curved "T" support; scale 0-95; vernier 20-0; half horizon mirror; fitted oak case.

Reinforced index arm; window with tangent and clamping screws and ivory vernier; second pin-hole sight at half horizon mirror; three filters, green and two reds; ivory plate on curve of "T" and on back of instrument; hole for missing half horizon filters; scale support broken at one side; boxwood handle at back; hole for missing pencil; signature plate missing from case; label on case reads: "PROF. SMYTH, GEOLOGY DEPT, T.C.D."

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2588 PRI222 OPTICAL SQUARE(?)

MEK. G S RIGHT INSTRUMENT No 10424 E.R. WATTS & SON 1916

Hs 125x72x50. 1916. S.

Rectangular metal housing; two brass and oxidised brass telescopes; inside, right-angled and adjustable mirrors.

The eyepieces "HIGH" and "LOW" screw into the housing to view the mirrors; there is a hole at the side for the nearer fixed mirror; a divided drum revolving scale, 500-950, 10-60, alters the moving mirror; a hinged flap on top of the housing has a vertical ivory strip along its length; below the housing is a turned wood handle with a brass sleeve to screw into the housing.

Identification as optical square tentative.

Strangely, this instrument seems not to be included in Watts 1927, which shows simpler optical squares.

0330 PRI001 OPTICAL SQUARE

Unsigned "J. Quigley Navan" scratched on cap

D 55; H 25; C 67x67. c1910. G.

Brass; cylinder housing and cap, two apertures; black inside, adjustable mirror and half mirror; lined case.

Rather similar to box sextant, but with no scale.

Historical Technology 133,1990,113 describes a similar instrument: "...it has a peep hole, two rectangular openings, and contains within, a half silvered mirror.. and a full width mirror. These result in the visual superposition of two lines-of-sight at right-angles to each other."

See also Stanley 1901,427.

0646 PRI102 ORRERY

W & S JONES Holborn London

DrD 223. 1800-1860. A.

Crank operated mechanism in shallow brass drum on pillar; tripod legs; tellurian and lunarium attachments; planets restored.

Dates from Crawforth 1988,10.

2578 PRI213 PARALLEL RULE

ROBSON MAKER NEWCASTLE ON TYNE

603x71; C 642x100x50. Early 20 C. G.

Brass and oxidised brass; two knurled rollers connected by fluted bar; and holding knobs at ends; in mahogany case.

1117 PRI008 PELORUS

Unsigned

CrD 130; SgsH 190. Late 19 early 20 C. G.

Brass; central turned pillar, with pointer arm below; vertical half circle and full horizontal circle; sights.

Instrument incomplete - it now sits on a modern turned mahogany base; the vertical half circle, divided 0-90-0°, is pivoted and can be clamped at various angles to the central pillar; on top of the half circle is the full circle, divided in hours I-XII(x2); above the full circle is a revolving diameter with two perpendicular sights, one a wire in a rectangular window and the other a line in a leaf shaped surround; both sights are hinged

Bennett 1987,189 records: "Also known as a 'dumb card' or 'bearing plate', the pelorus was used for taking magnetic bearings of objects obscured from the standard compass....It consisted of a brass plate, engraved with points and degrees, with sights that could rotate about the centre. The plate rotated within a ring marked with a lubber's point, and the whole was slung in gimbals in a wooden box."

0994 PRI145 PHILOSOPHICAL BUBBLES

ANTHONY MARNONI, Old Wynd

D 12; L 20; CD 78, H 30. 1844-1849. R.

Spirit beads; 12 glass spheres in wood case; "If the Spirits be proof, the Bead will sink to the bottom".

Beads have numbers 22-32 and 34; 22 "Double Whisky"; 25 "Double Rum"; 27 "Double Brandy (?) and Gin"; 28 "Proof Rum and Gin"; 32 "Proof Spirits"; 34 "Weak"; card on inside lid includes: "DIRECTIONS HOW TO PROVE SPIRITS" and notes that the bubbles are: "Made and sold wholesale and retail, By ANTHONY MARNONI, Old Wynd."

Dates from Clifton 1995,179.

4221 PRI240 PHILOSOPHICAL BUBBLES

A. Marmony, PAILSEY, Mathematical Instrument Maker for Proof Spirits.

CD 85; BusD 10. 1844-1849. R.

Spirit beads; 18 glass bulbs numbered 17-32, 34 and 37; in circular mahogany case with black velvet lining.

The top of the case is damaged; a label in the lid gives the maker, and more details: "If it be proof, the Bead will sink to the bottom." - 23 is for "Double Whisky", 25 for "Double Rum", 27 for "Double Brandy and Gin", 28 for "Proof Rum and Gin", 32 for "Proof Spirits" and 34 "Weak".

Dates from Clifton 1995,179.

2580 PRI214 PLANIMETER - AMSLER

DIXON & HEMPENSTALL DUBLIN 67426

L 171; WeD 21, W 11; C 223x53x40. c1925. N.

German silver; pivoted arms; horizontal disc 1-9; moving cylinder 0-9, stationary vernier 0-10; fitted case.

Circular weight for longer arm, engraved 16.274 10in; in black fabric-covered case with purple velvet lining.

The instrument was invented by Jacob Amsler (1823-1912), Professor of Mathematics at Schaffhausen, Switzerland, around 1854 (see Bull SIS, No.35, p.27); this model is identified as Model No.2 and is dated from the serial number; it would have been made by Amsler (Dr Joachim Fischer - personal communication).

4391 PRI251 PLANIMETER - AMSLER

STANLEY, GREAT TURNSTILE, HOLBORN, LONDON. AGENT PATENT No.13567 30495 495

MnL 238; WeD20; C 284x51x35. Early 20 C. G.

German silver; bracket holds expanding arm; second pivoted arm has disc weight; divided disc and drum; case.

The adjustable arm is marked 20.655, 20.669, 21.997 and 21.317; the sides also are marked, e.g. 100 [box] cm, 100 [box] '3/8"=1', 10ac 1:2500; on the end of the arm is a spike with a weight on top; the other pivoted arm ends in a disc weight with a pin clamp below; beyond the pivot is a horizontal disc divided 0-9, a vertical ivoryine drum divided 0-9 and half drum vernier 0-5-10; the black case is lined with purple velvet.

An instruction sheet (provided by Dr Joachim Fischer) shows that this is an Amsler No.4 planimeter.

4437 PRI235 PLANIMETER - AMSLER

[On case] Yeates & Son Ltd 2, GRAFTON ST. DUBLIN [On instrument] 42303 and 303

MnL 239; WeD 20; C 285x50x35. Early 20 C. G.

Brass; bracket holds expanding arm; second pivoted arm has a disc weight; divided disc and drum; case.

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The adjustable arm is marked 20.718 20.731 20.961 21.365 22.036 22.051 on top; the sides also are marked, e.g. 100 [box] cm, 200 ac 6"=1mi; on the end of the arm is a spike with a weight on top; the other pivoted arm ends in a disc weight with a pin clamp below; beyond the pivot is a horizontal ivorine disc divided 0-9, a vertical ivorine drum divided 0-9 and half drum vernier 0-5-10; the black case is lined with purple velvet.
An instruction sheet (provided by Dr Joachim Fischer) shows that this is an Amsler No.3 planimeter.

4466 PRI278 POLARIMETER

JOSEF & JAN FRIC PRAHA 1370

Sp 228; H 395; PrD 21. 1890-1897. PC.

Brass and iron; tripod foot; pillar; trough for (missing) sample tube; ivory rack and pinion vernier.

The cast iron foot (somewhat rusted) is painted black and has two level screws; under the centre of the foot is a screw-in brass knob, presumably to secure the brass pillar above to the foot; at the top of the pillar is a wider disc with a screw thread above, which now has no obvious function, but was perhaps included to allow the foot and pillar to be used for another piece of apparatus; above this is a short rod again ending in a screw thread on which is screwed the nearly horizontal polarimeter sample tube holder with the optics at each end; before the eyepiece is a rack and pinion mechanism to vary the position of a hidden optical component, and its position is read on an ivory scale 0-50 with a vernier, helped by a magnifier and a small disc mirror on a swivel arm. The small factory of the brothers Josef Fric (1861-1945) and Jan Fric (1863-1897) was founded in 1890; after the death of Jan, Josef used the name Josef Jan - Dr Jaroslav Foltá, National Technical Museum, Prague, personal communication.

1016 PRI154 PRISM

Unsigned

L 267; PmSis 43,44,45x197. Late 18 early 19 C. G.

Long glass prism with greenish tint; each end has moulded handles.

2577 PRI212 PROTRACTOR - CIRCULAR

DIXON & HEMPENSTALL, OPTICIANS, 12 SUFFOLK ST., DUBLIN.

OD 158; ID 128; C 197x189x44. Early 20 C. G.

Brass and oxidised brass; silver scale 10-360°; clamping and tangent screws; two hinged pricking arms with verniers.

Glass disc with cross-wires in central brass housing; protractor ring has four spokes; the tangent and clamping screws are on a revolving arm above at right-angles to the pricking arm supports; in mahogany case with blue velvet lining; address on trade label inside lid.

Morrison-Low 1989,123 gives this address from 1904-1922; the firm remained there after 1922.

4031 PRI129 PROTRACTOR - CIRCULAR

Mason Essex Bridge, Dublin

W 187; D 151; C 169x168x18. Early to mid 19 C. G.

Brass; circle (W16) divided 10-360° with four spokes; pivoting central disc, with glass centre, to index arm.

The central disc (D36) is more copper-coloured than the rest of the instrument; the glass centre (D14) has cross-hairs; the index arm has a window vernier reading the divided circle with a pointed index beyond the circle; in a hinged mahogany case. Morrison-Low 1989,130-1 gives 1809-1883 for this address, but old form of s in signature suggests early date.

3654 PRI091 PROTRACTOR - RECTANGULAR

MASON ESSEX BRIDGE DUBLIN

154x43. 1809-1883. A.

Ivory; degree scale 10-170°(x2); inch scales divided in different ways; scale of equal parts and diagonal scale.

The degree measurements are around three tapered edges of the front; on the body of the front are the inch scales - "IN 7/8 3/4 5/8 1/2 3/8 1/4 1/8", with a chord "CHO" scale below 10-90; the scales on the back are divided into "30 35 40 45 50 60" equal parts, and the diagonal scale has upper divisions from 1-19 (with 16 where 15 should be) and lower divisions from 1-10.

For description of similar instruments, see Hambly 1988,115-119; dates from Morrison-Low 1989,130-1.

3655 PRI092 PROTRACTOR - RECTANGULAR

Unsigned

153x42. Mid to late 19 C. G.

Two; boxwood; degree scale 10-170°(x2); inch scales divided in different ways; on back, diagonal divisions.

The degree measurements are around three tapered edges of the front; on the body of the front are the inch scales - "INCH 1/4 1/2 3/4"; a "TENTHS" inch scale is on the fourth edge; on the back are a six inch scale divided in eighths, and a 14 centimetre scale divided in tenths; in the centre is a five inch scale, with one inch, and a half inch, both with diagonal divisions.

For description of similar instruments, see Hambly 1988,115-119.

1114 PRI005 PROTRACTOR - REFLECTING

Cary, London Patent No 340 No 1760

W 145; CrD 56. c1880. R.

Brass; ruled straight edge; semicircular protractor; pin-hole sight and bar to half mirror; larger mirror.

"The motions of the sighting arm, with its 'horizon' glass, and of the index arm are linked, so that, while the former moves over half the angle to be measured, as with a normal sextant, the latter describes the true angle. Lines of sight may thus be marked directly on the paper, or may be measured on the scale. There is also a linear scale of one mile, taking one yard to be the smallest transversal division." - Bennett 1987,154.

Tesseract 41,1993,lot 27, serial no.109 is described: "It is a direct plotting third-circle, designed rather like a sextant, with peep-sight, half-silvered "horizon" mirror, index mirror, divided degree scale engraved on brass, and vernier reading to two arcminutes. However the index/plotting arm moves not only the index mirror and vernier, but also, through a sliding linkage, the peep-sight and horizon mirror. As a result, one can make instantaneous sightings on objects as much as 120° apart, making this neither octant, nor sextant, nor quintant, nor quadrant, but sort of a direct plotting "tridant". The semicircular degree scale is connected to a 4" long linear plotting rule divided every ten units from 0 to 1760, with an interpolation grid divided every one unit. This instrument was the invention of Sir Howard Douglas of the Royal Military College at Farnham, as a combination of Hadley's quadrant and a protractor, enabling observed angles to be plotted directly, without having to read the angular scales."

The instrument is illustrated in Stanley 1890,439, where it is described as "Douglas's Reflecting Protractor", patented by Sir Howard Douglas (No.3461,1811); it combines "the measuring principle of a semi-circular protractor in such a manner that in measuring any angle the index or limb should pass over the whole of the measured angle, so that an angle taken in the field may be at once protracted in actual magnitude without the trouble of reading it off."

Brown 1982a,11 gives c1870 for Patent 286.

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4030 PRI128 PYROMETER - DANIELL

J. Newman, 122 Regent Street LONDON [On Label] Sold by J. LYNCH OPTICIAN 26 Capel Street Dublin
L 149; W 102; PL 148, W 20; CL 169, MxW 141.
1827-1844. R.

Brass; base plate; pivot to arc scale with vernier.

The base plate has a bracket which can be positioned on it by means of two screws; the plate has a raised end with a pivot to an arm which runs down below it at an angle, and bifurcates to hold a silver arc scale 0-35; the Register (see below), held on the bracket and constrained with a bar in front, pushes a knife edge which is spring pivoted to the scale arm and, on the other side of the pivot, has an arm ending in a silver vernier (0-20) to read the arc scale; the instrument is in a triangular hinged mahogany case, in which is pasted the elliptical Lynch trade label; the Newman signature is on the instrument; both case and instrument have the number "53" inscribed.

The instrument was introduced by J.F. Daniell in 1830, and described in the Philosophical Transactions of the Royal Society, Volume 120, 1830, pp257-286 - Chaldecott 1976,44.

The pyrometer, as here preserved, is the "Scale"; missing is the "Register", which would have been a bar of black-lead earthenware, containing a bar of metal; the scale would have measured the difference in expansion of the metal and black-lead, with a porcelain "index" pushed forward to the maximum at greatest heat, and remaining there when the bar cooled; platinum is recommended for the metal, but iron will do for a less perfect instrument.

Clifton 1995,199 gives Newman dates at this address 1827-1856; Morrison-Low 1989,129 gives 1844 as last Lynch date.

4218 PRI238 QUADRANT - HORARY, GUNTER

Unsigned - but made by L.E. Williams

R 127. Mid 20 C. G.

Brass; replica; shadow square at apex; reverse with sinecal quadrant; two pin-hole sights; plumb bob.

This type of horary quadrant was first described by Edmund Gunter in 1623, and it was used for determining time, as well as for the solution of astronomical problems. It remained popular until the early nineteenth century (Holbrook 1992,67). The design of the front is almost identical to that illustrated in Bion 1758,opp.194, and to the Elias Allen (1630) example in the Whipple Museum (Bryden 1988,279).

2589 PRI223 RAILWAY CURVES

Unsigned

No measurements available. Early 20 C. G.

Mahogany case contains a collection of curves, plus a few "French" curves; formerly the property of R.E. Cross.

Name from Watts 1927,195-6.

4394 PRI253 ROD - GAUGING

J. LONG MAKER 43 EASTCHEAP LONDON

L 1528; D 5. Late 19 early 20 C. R.

Brass-bound boxwood rod in six screw-together sections; scales of 0-400 "IMPL GALLONS" and 0-60 inches.

Presumably for determining the volume content of a vat in brewing or distilling.

Joseph Long was at this address from 1885, Downing 1988,78.

4470 PRI282 SCALE

J TREE MAKER LONDON WD 333 1/2500 [Owner] J S HUTCHISON

80x26. 1826-1851. R.

Ivory rectangle, with central gap for additional scale; long sides divided 1-10, short 1-0-1, central one not numbered.

The divisions are each divided in tenths, thus 100 divisions measure 80mm, and do not correspond to either imperial or metric divisions; all four sides of the rectangle are bevelled, as is one side of the long central gap; the scale was broken at one end, and has been repaired with two silver clips, each engraved J S HUTCHISON; the War Department sign (W D with the arrow head) is engraved twice; on the back, someone has used the blank ivory to try out some geometric and foliate designs.

Clifton 1995,281 lists two James Trees, rule makers, with dates 1826-1851.

4461 PRI224 SCALE - ENGINEERS'

ENGINE DIVIDED CARY LONDON [Owner's name on back] J.F.D. MAC NEECE.

313X33. Late 19 early 20 C. G.

Three boxwood scales ranging from "2 FEET TO 1 INCH R.F. 1/24" to "6 FEET TO 1 INCH R.F. 1/72".

Each scale has two bevelled edges, suitably divided to the R.F. value, that on one side of each scale being twice that of the other side - i.e. 2,4 feet, 2½,5 feet, and 3,6 feet; the backs of the scales are undivided.

Another scale, also signed "CARY LONDON" (175x33) has scales of "YARDS 100,000" and "YARDS 200,000".

4462 PRI274 SCALE - ENGINEERS'

ENGINE DIVIDED DIXON & HEMPENSTALL DUBLIN

320x32. Early 20 C. G.

Boxwood with two bevelled edges with divisions 2-96 (x2) marked 1/8, and 10-90 (x2) marked 1/16; the back of the scale is undivided.

There is also a "DIXON & HEMPENSTALL" 12 inch rule with the inches divided in different ways on both sides and both edges

4460 PRI038 SCALE - ENGINEERS'

[On scales] ENGINE DIVIDED NEGRETTI & ZAMBRA LONDON [On case] LUTZ Y SCHULZ BUENOS AIRES

309x32 & 50x33; C 342x62x44. Early 20 C. G.

Mahogany case contains six long and six short boxwood bevelled scales 1/300 to 1/2000, with relevant divisions.

The case, which is lined with blue silk and indigo velvet, has an unsigned brass plaque on the top of the lid, and the Royal crest above a scroll "NEGRETTI & ZAMBRA SCIENTIFIC INSTRUMENT MAKERS LONDON" on the silk on the underside of the lid; the LUTZ Y SCHULZ is on an ivory plaque on one long side of the bottom of the case; all the scales are marked "METRE", and all but the long 1/300 are varnished; the 1/300 has "AKL" scratched on it, and the 1/1000 is engraved with the letters "C.S.B."; the set comprises 1/300, 1/400, 1/500, 1/600, 1/1000, 1/2000, both long and off-sets; the backs of the scales are undivided.

4230 PRI249 SCALE - MARQUOIS

ELLIOTT BROS 449 STRAND LONDON [Owner's name] W.F. COCKBURN

314x297x104. 1864-1886. A.

Boxwood right-angled triangle only remains; one bevelled edge and two sides marked with a trefoil index matrix.

Scales introduced by Captain Marquois c1780, Hambly 1988,120; dates from Crawforth 1988,8.

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2601 PRI036 SECTOR

W. ELLIOTT 268 HIGH HOLBORN LONDON

L 160 & 305; W 18 & 35. 1840-1849. A.

Two boxwood arms with scales parallel and inclined to arms; brass disc hinge.

Dates from Downing 1988,42.

3656 PRI135 SECTOR

Unsigned

305x18 (Open). Mid 19 C. G.

Two ivory arms with scales parallel and inclined to the arms; brass hinge with extensions to support arms.

4420 PRI239 SECTOR - ISOGRAPH

TRADE STANLEY MARK LONDON

[Open] L 613; W 33; DiD 50. Early 20 C. G.

Two unmarked boxwood rules, each with one bevelled edge, are joined by a hinge with a divided disc 0-180°.

One of the rules is screwed to a short brass arm, in turn screwed to the divided disc; the other, attached to the other brass arm, is free to rotate, and the angle between the rules can be measured on the disc.

A label which was with the instrument called it "Stanley's Improved Isograph" although this is not featured in Stanley 1890 or 1901, so presumably its date is later; it is, however, illustrated in Hambly 1988,110, where it is described as: "Isograph designed by W.F. Stanley to provide an adjustable set square giving the corresponding angles so often required in architectural and mechanical drawing."

4425 PRI243 SET SQUARES

Unsigned

L 566 & 578; W 285 & 255. Late 19 C. G.

Two right-angled mahogany triangles, one isosceles, with bevelled edges on the outside, and brass handles.

1112 PRI003 SEXTANT

H.G. Blair & Co Cardiff & Barry

R 168; W 210; C 249x229x129. 1876-1888. R.

Oxidised brass; triple circle frame; silver scale 0-110; seven shades; mahogany handle; fitted mahogany case.

The index arm has a window vernier 0-10, a pivoted magnifier, and tangent and clamping screws; one set of four shades is rectangular in shape with a rounded corner, and the other set of three is circular; the original telescopes are gone.

Crawforth 1988,4 gives dates for H.G. Blair, Cardiff.

1854 PRI027 SEXTANT

Unsigned

R 51; L 64; W 77. Mid to late 19 C. G.

Brass; miniature; scale and window vernier on index arm unnumbered; index and horizon (gone) mirrors; peep hole; for demonstration purposes?

2576 PRI211 SEXTANT - BOX

C. Cummins, 148 Leadenhall St. London.

D 125; HsW 32; C 169x162x87. 1846-1851. R.

Brass and oxidised brass cylinder housing; scale 0-150; index arm moved by top knob; pivoted magnifier; case.

Two telescopes; two filters; shaped wood handle below; fitted mahogany case; unusual due to its very large size.

Dates for Charles Cummins from Clifton 1995,74.

1113 PRI004 SEXTANT - BOX

West, 92 & 93 Fleet St. London. [Owner] Jno. A. Smith.

D 77; W 40; CD 87. 1849-1852. A.

Brass; cylinder housing; two-draw telescope; silver scale 0-150, vernier and magnifier; two glass shades.

The instrument is protected by a screw-on cylindrical lid; the telescope is stored within the instrument but is pulled out for use; the index arm, with its vernier, is moved by a knob on top, and a pivoted magnifier used to read the scale; underneath the housing is a slide plate which, when pushed back, releases the two pivoted shades, green and dark red; the instrument has a tight-fitting circular leather case with buckle and strap.

Dates from Clifton 1995,294.

4463 PRI275 SLIDE RULE - BREWER'S

J. LONG MAKER 43 EASTCHEAP LONDON.

L 326, W 49. Late 19 early 20 C. R.

Boxwood with brass end bindings; two sliders; with a variety of scales on both sides and on one edge.

A booklet, which does not refer to this rule, nor to 4464 PRI276, gives the "Description and Use OF THE SLIDING RULE FOR Gauging, Ullaging, Valuing, and Reducing Spirits..." and is signed "JOSEPH LONG, Manufacturer of Sikes's Hydrometer, Gauging Rules, etc., etc. To the Indian Government, H.M. Board of Ordnance, English Colonies, etc., etc. 43, EASTCHEAP, LONDON."

Joseph Long moved to this address in 1885, Downing 1988,78.

4464 PRI276 SLIDE RULE - BREWER'S

J. LONG MAKER 43 EASTCHEAP LONDON

226x34. Late 19 early 20 C. R.

Boxwood with brass end bindings; single slider; with a variety of scales on both sides, but not on the edges.

Joseph Long moved to this address in 1885, Downing 1988,78.

4414 PRI256 SLIDE RULE - SPIRAL

LILLY'S IMPROVED SPIRAL SLIDE RULE, PATENT No. 28603, 1912.

[On card] DIXON & HEMPENSTALL, 12, SUFFOLK STREET, DUBLIN.

D 342. 1912. S.

Plywood disc with white spiral scale 10-100 and two brass divided arms 0-9; circle scale 0-99 around edge.

Instructions on back, and on Dixon & Hemenstall leaflet with the instrument; designed and patented by Dr Walter E. Lilly (1867-1940), Assistant to Thomas Alexander, Professor of Engineering in Trinity College, Dublin, 1887-1921 (see Mollan 1995,30); it corresponds to a straight slide rule 30 feet 0 inches long.

To carry out a multiplication, say 65x27, place one of the brass arms A at 100, and the other B at 65, which is on mark 8 on the arm; now place arm A at 27 (which at the same time rotates B by an equal amount); the 27 is on mark 4; adding 8 to 4 gives 12, so the answer is on mark 2; the reading of arm B at mark 2 is 1775, the required answer.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

The card with the instrument records that it is: "To be obtained from Messrs. DIXON & HEMPENSTALL, 12, SUFFOLK STREET, DUBLIN...Records to four significant figures, and is equivalent to a complete table of four figure logarithms. In Cardboard Case, Post Free, PRICE 10/-."

1020 PRI158 SPECTROSCOPE - DIRECT VISION

W Ladd London

L 52; D 15. c1869. R.

Brass tube with brass cap; fixed slit, each side held with two screws; invented around 1869.

Chemical News Mar 19 1869: "Mr. W. Ladd of BEAK STREET, REGENT STREET, has invented a small pocket spectroscope, which is, without exception, the most powerful for its size we have ever seen. It consists of a lens, a system of direct vision prisms, and a slit. The system of prisms, containing 3 flint and 2 crown, is about 3/4" long, and the whole only occupies a tube about 1/2" wide and 1 3/4" long.

Ladd was at Beak Street from 1861-1872, Crawforth 1988,11.

1018 PRI156 SPECTROSCOPE - DIRECT VISION

Spectroscope Ed LUTZ Paris

L 496; PvH 335; D 31&45. Pre 1896. R.

Brass; iron tripod foot; expanding brass pillar to pivot; side telescope and reference prism missing.

Telescope and collimator unscrew from prism housing; small knob moves plate to adjust slit; bracket for external prism at slit end; rack and pinion focus; knob at side to move telescope along spectrum.

Lutz took over from Berthoud (established 1848); Duplouich replaced him in 1896 - Payen 1985,177.

1019 PRI157 SPECTROSCOPE - DIRECT VISION

Dr. Manuel A. Velasquez

L 96; TuD 17. Late 19 C. G.

Brass with oxidised brass ends; reference prism can cover half slit; plain mirror on pivot on side arm; case.

Slit adjusted with knurled collar; cap covers slit and small reference prism; in black cloth-covered wooden case with purple lining; legend typed on label: "ESPECTROS-COPIO DE MANO".

1021 PRI159 SPECTROSCOPE - DIRECT VISION

WINKEL-ZEISS GOTTINGEN No 1632

L 95; TuD 16. c1920. PC.

White metal with black metal bracket for parallel side arm to project wave length scale - 400-700.

Slit adjusted by collar knob; scale at eyepiece end 5-0-5.

Date suggested by owner.

2276 PRI162 SPECTROSCOPE - DIRECT VISION

Unsigned

L84; MxD 21 Late 19 early 20 C. G.

Brass cylinder housing; caps at each end; oxidised brass eyepiece housing; four screws to adjust white-metal slit.

0495 PRI142 SPECTROSCOPE - MICRO

Unsigned - attributed to Baker

H 148; TuD 23,31&34; MiD 30. Fourth ¼ 19 C. G.

Brass and oxidised brass tube; side arm with mirror; slide table, one clip; similar to Sorby-Browning model.

Rack and pinion on central oxidised brass part of tube moves position of slit with respect to eyepiece; knob on opposite side adjusts slit width; slide-in bar at side of upper brass eyepiece housing tube moves prism in or out of the light path; sleeve at the bottom of the tube for attaching to microscope.

Attribution by owner - presumably Charles Baker, who worked from 1851-1909, Clifton 1995,14.

2298 PRI172 SPECTROSCOPE - MICRO

John Browning. London.

L 136; MxD 40; TuD 15; C 200x58x56. c1868. PC.

Brass; eyepiece tube, slide focus; knurled ring to adjust slit; prism over half opening; microscope sleeve; mahogany case.

1017 PRI155 SPECTROSCOPE - TABLE

Unsigned

L 495; TH 165; H 230. c1870. PC.

Iron tripod foot with three brass feet; tapering brass pillar to table; scale 0-320° and vernier for telescope.

Table of oxidised brass with brass scale; oxidised brass cylinder with windows for prism (present).

Date suggested by owner.

2304 PRI178 SPECTRUM

Unsigned - but by Walter N. Hartley.

253x102. c1890. PC.

Glass photographic plate with spectrum and "349 N/1000 Salicylaldehyde semicarbazone in H₂SO₄".

Card notes: "Original spectrum plate from W.N. Hartley, Dublin, circa 1890."

Hartley lived from 1846-1913, J. Burnett in Mollan 1990,39.

2282 PRI168 SPINTHARISCOPE

SPINTHARISCOPE W. CROOKES 1903 R& [sic] J. BECK. LTD.

L 34; D 24; CL 47, D 31. 1903. S.

Brass cylinder housing; top lens unscrews; scintillation disc on base; in leather-covered cylinder case.

An incomplete circle knob on the base revolves a little screw inside, but this does not appear to have any effect on the disc, which rests on the bottom of the cylinder housing below the lens.

2478 PRI199 STEAM ENGINE INDICATOR

DOBBIE McINNES LTD GLASGOW DESIGN No1 PATENTED IAD15245 57 BOTHWELL STREET GLASGOW

C 278x170x156. c1925. R.

Black piston housing; stainless steel cylinder; case.

Piston housing attached to hinged side of mahogany case with the piston joined via pivoted arms to a pen which records the pressure on a (missing) chart on the neighbouring stainless steel cylinder drum; this is revolved via a string over two pulley wheels; the case contains two extra springs and a brass stop-cock; a sheet in the inside of the lid gives "Vac. lbs. Press lbs. Spring" and includes: "THE 'McINNES-DOBBIE' PATENT STEAM ENGINE INDICATOR. LARGE SIZE INSTRUMENT, For speeds to 250 Revolutions per minute...SOLE MAKERS DOBBIE McINNES LTD., Indicator Makers to the British Admiralty,

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

57 BOTHWELL STREET GLASGOW. Greenock, South Shields, and 9 Billiter Square, London...."; a boxwood hinged leaf inside the lid makes a compartment for the missing charts and has a pasted sheet of instructions.
Clarke 1989,231 notes that firm changed name to Dobbie McInnes & Clyde Ltd about 1925 - see 2479 PRI200.

2479 PRI200 STEAM ENGINE INDICATOR

DOBBIE McINNES LTD GLASGOW DESIGN No 1 PATENTED IAD 15253 DOBBIE McINNES & CLYDE, LTD., 57 Bothwell Street

C 278x170x156. c1925. R.

Black piston housing; stainless steel cylinder; case.

Essentially identical instrument to 2478 PRI199, but with six springs and no stop-cock; the "DOBBIE McINNES and CLYDE" is on a sheet pasted inside the lid, with addresses: "57 BOTHWELL STREET, GLASGOW C.2., Liverpool, South Shields and London", and is numbered on this label, and on the instruction label in the chart compartment, "No. 628".

Similar serial number to 2478 PRI199, but different firm name, indicates c1925 - Clarke 1989,231.

4426 PRI260 STENCIL PLATES - ENGINEERS

[On colour tin] HUNTLEY. BOORNE & STEVENS READING

C 245x143x57. Late 19 C. G.

A mahogany case contains a collection of thin brass stencils, and a cylinder tin containing black colour.

A label in the lid reads: "STENCIL PLATES ENGINEER'S CONTENTS 7 Sets Alphabets 4 Sets Figures 24 Various plates AVOID TOO MUCH INK OR BRUSH TOO WET".

4454 PRI268 STEREO VIEWER

SWAN'S PATENT CLAIRVOYANT

W 192; H 97; MnDe 119. Late 19 C. G.

Hardwoods; two lenses on mount opposite green velvet hinged support for photo; push/pull focus.

This is an open frame model, in contrast to Brewster's closed box; the lenses can be pulled out using an ivory knob and two brass runners; the shaped bottom of the frame is also covered in dark green velvet; the photo support can be raised up to leave an open rectangle (to view negatives?); this has been repaired using two metal strengthening corners.

4455 PRI269 STEREO VIEWER

MAN'F'D BY UNDERWOOD & UNDERWOOD NEW YORK PATENTED JUNE 11, 1901 FOREIGN PATENTS APPLIED FOR.

L 315; W 182. 1901. P.

Mahogany and silver metal; eye-frame with two lenses; arm to sliding slide holder; fold-up handle.

The shaped metal eye-frame has brown velvet around the edge which fits on the face, and has incised decorations; it has a part-sun "SUN SCULPTURE U&U TRADE MARK"; between the lenses is a mahogany partition; below this is a mahogany arm on which the slide holder, with two arms and wire supports, can slide; underneath is the turned mahogany handle below a metal pivot.

With the viewer is a box of 36 stereo photos of Japanese subjects, some dated from 1904 to 1906, the box shaped in the form of two book volumes, entitled: "PHYSICAL GEOGRAPHY THROUGH THE STEREOSCOPE VOL-UME I VOLUME II UNDERWOOD & UNDERWOOD".

4456 PRI270 STEREO VIEWER

Unsigned PATD JULY 29 1902

L 330; MxW 181. 1902. P.

Mahogany with silver metal eyepiece frames and handle pivot; face frame and lenses; sliding bracket for photo.

The shaped frame to hold against the face has a red velvet surround, and the two square lenses are in silver metal surrounds; beyond these is a partition, and below it the arm along which slides the photo holder; this has wire supports at the ends of its two arms; underneath is a turned handle on a silver metal pivot; the eye surrounds, and the handle pivot is of brass.

A similar unmarked version does not have the metal

4452 PRI266 STEREO VIEWER

Unsigned

Hs 375x270x260. Late 19 early 20 C. G.

Mahogany housing with two hinged mirrors, two lenses, frosted glass, two revolving knobs, and 31 photos.

In use, the mirrors (under the top of the housing when folded) are opened to illuminate the photos which are held with wire frames (33 in all) and rotated by means of the side knobs; one of the lens frames is chipped; the photos are almost all of Irish scenes, e.g. Dublin, Killarney, Wicklow, Giant's Causeway, mostly unsigned, but two from "GEMS OF IRISH SCENERY - THE EBLANA SERIES by W. LAWRENCE, DUBLIN", and four from "HUDSON'S IRISH SCENERY"; two have American signatures - "GEO. B. NEILSEN 84B FOURTH STREET ROKBURG NORTH", and "Underwood & Underwood Publishers New York London," etc, the only one dated 1903, a delightful photo of Ballindian National School, with the less delightful caption "Erin's little sons and daughters - country school, County Monaghan".

2278 PRI164 STEREO VIEWER

Unsigned

L 146; MxW 184; LesD 32. Early to mid 19 C. G.

Folding mahogany frame; hinged in centre; hinged lens mounting and replacement support; brass stops for card.

4453 PRI267 STEREO VIEWER - BREWSTER

Unsigned

W 194; H 115; MnDe 107. Mid to late 19 C. G.

Shaped walnut frame with hinged flap; frosted glass on one side; two lenses with rack and pinion focus on other.

The lenses have turned wood frames and brass tubes; inside the flap is a brass framed mirror to help illuminate the slides, which are inserted using a slot at the side under the frosted glass viewing panel; two of the four small brass knobs on the outside of the frosted glass frame are missing; otherwise this is a very elegant "de luxe" model of the common Brewster lenticular stereoscope.

For details of Brewster's invention, see Morrison-Low 1984,62.

1856 PRI029 TELESCOPE - REFLECTING

JAMES SHORT LONDON 40/427 = 12.

L 50; TuD 78. c1745. R.

Brass; incomplete; tube cracked; speculum and eyepiece lens system remain; top mirror detached; no focus rod.

No stand; model number 40; serial number 427 gives date; focal length of primary mirror 12".

Date from Turner 1969,100.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1391 PRI022 TELESCOPE - REFLECTING

Thomas Short. Edinburgh No 266/1770..18

MisD 98, 31½, & 27. 1770 or 1776. S.

Brass (presumably) with speculum metal optics; focal lengths 89.5, 15.0 & 10.0 cms.

Correspondence with Gerard Turner - knows of only two other telescopes signed by Thomas, brother of James, one at Armagh Observatory (ARM010 3697) and one at the Science Museum; Thomas was in London from 1768, after the death of James, until 1776 - so the recorded Edinburgh 1770 is more likely to be 1776.

See Turner 1969.

3397 PRI082 TELESCOPE - REFRACTING

(E.M. CLARKE, RODNEY WORKS BATTERSEA, 428 STRAND, LONDON)

No measurements available. 1840-1846. A.

Brass; folding cabriole legs; tapering pillar to pivot for tube bracket; rack and pinion focus; finder.

The owner notes it was bought from Connie Godfrey of Kilmore Quay for £10; it was in bits, but they found all the parts "except the piece that lets it up and down, a curved piece".

Dates of Battersea Works from Clifton 1995,57.

0598 PRI055 TELESCOPE - REFRACTING

Dollond, London

Sp 115; PvH 100; TuMnL 118; MxD 43; LeD 35.

c1820. PC.

Brass; small; wheel of four powers and dark glass; stand can be removed, folded up, and stored in barrel.

The base disc has three folding cabriole legs below and a turned pillar leading to a pivot above, then a slide to slot into a frame on the tube; the pillar unscrews from the base disc, which has a turned edge and screws into the tube, which can contain the pillar and legs; the push focus eyepiece tube has four powers marked 1 2 3 4; the objective lens has a cap.

4139 PRI189 TELESCOPE - REFRACTING

Grubb Dublin 4772

TrSp 1220; PvH 1460; TuL 1675; LeD 127(5"); LeHsD

144. Late 19 C. PC.

Mahogany tripod; green cast-iron curved bracket to pivot for tube; brass-bound objective; eyepiece focus.

The folding tripod, with open tapering legs, has strengthening cross bars near the top; the rotating iron bracket leads to lugs on an octagonal brass ring at the centre of the green metal telescope tube; the brass eyepiece system has tubes of three diameters, and has a rack and pinion focus knob; there are two brass brackets and rings near the eyepiece for a missing finder telescope.

A card with the telescope, on display at Dunsink Observatory in August 1992, suggested date c1898.

2968 PRI077 TELESCOPE - REFRACTING

Unsigned (attributed to Jesse Ramsden)

Sp 287; H 348; HsD 17-62. 1762-1800. F.

Brass; folding tripod stand packs into body; thin eye-piece tube, thick objective tube; snake-skin case.

Attachments missing at join of thick and thin tubes; replacement bracket to attach stand to tube; Stuart Talbot (PC 1990) recognised this as a characteristic Ramsden refractor.

Dates from Porter 1985,35.

3874 PRI119 TELESCOPE - REFRACTING

(J. Watts, 29 Eden Quay Dublin)

LeD 2" Mid to late 19 C. G.

No further details available.

Maker not listed in Burnett & Morrison-Low 1989; Ex0626 is a barograph by James Watts which looks late 19 C.

1865 PRI030 TELESCOPE - REFRACTING

Unsigned

L 352; LeD 51; Cd 77. c1825. PC.

Brass; folds into snakeskin case; folding tripod stored in tube; terrestrial and astronomical eyepieces.

Focal length 430; focusing mechanism incomplete.

0605 PRI062 TELESCOPE - REFRACTING

Unsigned

L 153-413; D 35. 19 C. PC.

Brass; mahogany veneer-covered outer tube plus three draws; object lens shade; sliding eyepiece cover.

3684 PRI110 THEODOLITE - PLAIN

(Potter London)

H 260. Late 19 C. PC.

Brass; telescope on two brackets; engraved "The Marquess of Sligo Westport. Co Mayo"; Sotheby 5:10:89, Lot 404.

"A Potter Brass Theodolite, English, late 19th century, signed 'Potter London', the telescope supported by two brackets above vertical scale, magnetic compass, two spirit levels, horizontal scale, verniers and magnifiers, on staff mount with four levelling screws...engraved 'The Marquess of Sligo Westport. Co Mayo', in mahogany carrying case with accessories"; illustrated; plus Dollond pantograph £500-700.

4033 PRI132 THEODOLITE - PLAIN

Spear Dublin

BD 201; CpD 106; PvH 109; TuL 252. 1791-1837. F.

Brass; circle base; plate turns on this with compass and trunnions to axis of half circle; tube on top.

The base circle has six spokes below and is divided above 10-360°; a knob turns a plate on this, and the plate supports the central compass, trunnions, and one spirit level; the compass glass is cracked; it has a silvered face with a fleur-de-lys and seven other directions; it has two horizontal scales at its edge, the lower 10-80°(x4), the upper 10-360°; the half circle is adjusted by a mechanical knob, and is divided 40-0-90; two Y-brackets hold the tube above the half circle; the eyepiece optics are gone, and the objective optics are focused by a mechanical knob; above the tube is one spirit level.

Dates from Morrison-Low 1989,135.

4457 PRI271 THEODOLITE - PLAIN

Troughton & Simms LONDON Ordnance Geological Survey 4

No measurements available. c1832-1833. PC.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass; two disc four screw base; horizontal circle; two spirit levels; compass; half vertical circle; no telescope.
The brass horizontal circle is divided 0-360°, has a vernier read by a magnifier, and tangent and clamping screws; the spirit levels are at right angles to each other, and the compass is in the centre; two trunnions rise to a pivot for the horizontal half circle divided on silver; on top are two hinged Y-supports for the missing telescope; (description from photograph).
This theodolite was purchased around 1832-1833 for the geological survey which was carried out by the Ordnance Survey before the foundation of the Geological Survey.
Gordon Herries-Davies, History of the Geological Survey, in press, includes photograph.

2302 PRI176 THERMOMETER - GLASS MERCURY

Edward Ahlborn, Hildesheim Walter Carson & Sons, Dublin.
L 292; RsD 11; CySHsD 18. Mid to late 19 C. G.
Capillary tube in wider tube; paper scale 10-212°.
Small pear-shaped mercury reservoir connects to internal capillary tube to read temperature; wider outer cylinder housing holds paper scale with signature, "Fahrenheit Scale", and numbers both sides of capillary.
A card with the instrument notes: "According to J.J. Griffin, 'Chemical Handicraft', 1866 such a thermometer with Fahrenheit's scale cost 2s 3d complete with pasteboard box."

2609 PRI043 THERMOMETER - GLASS MERCURY

Spear 23, Capel Street DUBLIN
HsH(+Ha) 515, W 65. 1793-1809. A.
Mahogany glazed housing; silver-metal scale 10-140°; on top, brass glazed circular hygrometer 20-0-20.
The latter can be removed and has a hinged handle on top; the thermometer has a spherical bulb; the scale is marked: "Freezing Temperate Sumr.. Heat Blood Heat Fever Heat".
Dates from Morrison-Low 1989,135.

4170 PRI225 THERMOMETER - GLASS MERCURY

K. Yeates, 22 Henry St., Dublin
L c300. 1803-1811. A.
Brass back with scale 10-210°; spherical reservoir; on front of long-case clock signed "Chancellor Invt Fecit".
The scale has a rounded top; the clock is in a mahogany case, and has a brass face.
This is the first K. Yeates instrument to be recorded;
Kendrick (1776-1859) was the younger brother of Samuel, founder of the Yeates firm; he had a brass foundry, and did some work as an optician and instrument maker - Morrison-Low 1989,41-2.
Fennell 1963,8 records that Jno Chancellor patented (No.3487) a musical clock in 1811.
Dates of Kendrick from Morrison-Low 1989,139.

2634 PRI069 TRADE LABEL

HARRISS, Optical, Mathematical & Philosophical INSTRUMENT MAKER 8, WICKLOW STREET DUBLIN
Yellow paper; Royal arms "DIEU ET MON DROIT" on top; instruments illustrated below look mid 19 Century? These include reflecting and refracting telescopes, telescopic level and other surveying instruments, transit instrument, compass, and globe.
Not listed in Burnett & Morrison-Low 1989, and no instruments by Harriss found as yet.

2635 PRI070 TRADE LABEL

JOHN SPENCER Optical, Mathematical, Philosophical AND CHEMICAL, INSTRUMENT MAKER, 13 Aungier Street, Near Stephen Street, Dublin.
Browned white paper; illustrations of instruments above: battery of Leyden jars, electric cell, Cuthbertson electrostatic generator, induction coil, refracting tele-scopes, drawing instruments, double barrel air pump, spectacles, compound microscope, telescopic level, stand with rings and chemical retort, thermometer, and theodolite.
Spencer at this address from 1852-1863, Morrison-Low 1989,136.

2473 PRI194 TRADE LABEL

J. SPENCER & SON, Opticians & Scientific Instrument Makers To The Queen, BOARD OF PUBLIC WORKS, AND BOARD OF TRADE, 19, GRAFTON STREET, 23, NASSAU STREET, DUBLIN. PRIZE MEDAL DUBLIN 1865 PRIZE MEDAL DUBLIN 1872.
The "19, GRAFTON STREET" address is crossed out and the "23, NASSAU STREET" inserted in red (the rest of the card is printed in black on white).
On lid of level 2472 PRI193.
A similar trade label 1352 TDE059 is missing the prize medal illustrations.
The firm moved to 23 Nassau Street in 1884, Morrison-Low 1989,136.

3770 PRI229 UNKNOWN GLASS APPARATUS

Unsigned
BD 80; H 225; SrD 76; CyD 48; ToD 53.
Mid to late 19 C. G.
A cylinder on a disc base has a ground glass joint into which fits a sphere with a cap; a tube is held inside.
The cylinder has a chipped pouring indent at the side of its ground glass joint; stuck into this joint is the ground glass joint under the squashed sphere; the sphere has a wide ground glass opening on top with a ground glass stopper cap; cotton[?] holds a cylinder test tube (Dc14,Lc100) within the lower joint such that the open top is in the sphere, and the trunk in the cylinder; the joints are now stuck.
From the North Monastery Cork collection.

3646 PRI227 WEATHER GLASS

Unsigned
L 285; MxW 101. Mid 19 C. G.
Pear-shaped with a flat side; at one end is a glass knob and, at the other, a long pipe bent through 180°.
The bend on the pipe is at its end; the side arm, which should be connected to this pipe, has been broken off; the shape of the glass is rather like a male bed-bottle, though the neck is narrower.
The instrument appears to be a weather glass, donderglas, or baromètre liègeois; it would have been part filled with coloured water, and hung vertically from the knob; they were produced in Liège in the 17th Century.
A different model is illustrated in Turner 1983, opposite page 256, from which details are taken.
From the North Monastery Cork collection.

1142 PRI019 WEATHER INDICATOR

NEGRETTE & ZAMBRA, LONDON. PAT. No 6276/15
D 54. Patent 1915.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Circular ivory dial; three revolving plates, wind direction, barometric reading, number windows; key at back.

The largest plate has divisions for wind direction, S, SW, SE, W, E, DEAD CALM, NW, NE, N; middle plate has barometric readings at sea level 28-31"; centre plate has three windows revealing letters underneath, one for rising, one for falling, and one for steady reading; on the back, these letters are explained from A "SETTLD. FINE." TO Z "STORMY MUCH RAIN.".

A larger (D121) brass equivalent was offered by Historical Technology 121, 1980, 198.

4173 PRI231 WOULFE BOTTLE

IMPROVED. WOULFFS' [*sic*]. BOTTLE DESIGNED. BY JOHN. G. MERNE CORK

BD 86; H 200. Mid to late 19 C. G.

Glass cylindrical bottle with ground-glass top; in this, lid with two vertical ground glass chimney vents.

The lid is stuck in the bottle.

From the North Monastery Cork collection.

Merne is not listed in Burnett & Morrison-Low 1989.

QUEEN'S UNIVERSITY BELFAST - CHEMISTRY - QBC

Belfast BT7 1NN

Telephone 01232-245133

Note: Several of the items in this collection relate to Thomas Andrews (1813-1885), Professor of Chemistry at what was then Queen's College Belfast. He was the first to prove that ozone was a form of oxygen, and he carried out pioneering work on the "critical point" of gases - the temperature above which gases cannot be liquefied.

1030 QBC002 AIR PUMP

Unsigned but due to Thomas Andrews

Sp 1250&586; H 2580; WhD 725. c1867. D.

Hand operated compression pump; wood support; two iron wheels drive piston in iron cylinder with side pipes.

Wheels have six curved spokes; handle to turn them now missing; they turn a V-shaped double bar, with the piston bar connected via two pivots to translate its motion to the vertical.

Also two iron compressed gas cylinders on trunnions.

Date on plaque attached to instrument.

1001 QBC011 AIR PUMP - SYRINGE

Unsigned

MnL 271; TuD 22; AL 128. c1852. D.

Brass; side arm at right-angles at bottom with stop-cock.

Also small silver-metal syringe, which has a ring at end of the plunger.

A card with the display reads: "To obtain very high vacua, the space was filled with CO₂ and pumped out, and remaining traces of CO₂ and water absorbed chemically."

Date on card with instrument.

1005 QBC015 BALANCE - EQUAL ARM

Unsigned

BmL 117; PaD 40; C 129x60x17. c1790. D.

Oval japanned metal case; white metal beam; swan ends; pointer; shears to figure-of-eight ring; brass pans and weights.

Coin shaped weights inscribed: "PRIOR TO 1772"; "GEORG IV DI DEI GRA"; "To The New Standard 1773".

Date given on card with instrument - certainly post 1773.

1003 QBC013 BALANCE - EQUAL ARM

Unsigned

BmL 155; PasD 61; C 182x81x34. c1800. D.

Iron beam; swan neck ends; pointer; shears with figure-of-eight ring hook and tassel; glass pans (not original?); oak case.

Brass weights.

Date given on label with instrument.

2305 QBC034 BLUE GLASS FILTER

Unsigned (belonged to Thomas Andrews)

L 57; HsD 32. Mid 19 C. G.

Ebonite housing with elongation for handle holds blue glass.

A card notes: "Blue glass filter for the detection of potassium in the presence of sodium, circa 1870. Owned by Thomas Andrews."

2294 QBC029 CALORIMETER

Unsigned

CyD 138; H 296. Mid 19 C. G.

Copper cylinder with brass ring on top having screw thread for brass cap.

Cap has central raised sleeve with hook below, and two holes, one now blocked with a cork and sealing wax.

A card with the vessel notes: "Larger bomb calorimeter used to determine the heat of reaction of solids with oxygen or with chlorine. The solid was held on a platinum boat (missing) suspended from the lid of the calorimeter..(which) was immersed in a large volume of water to adsorb the heat of reaction."

Also several smaller calorimeters.

T. Andrews, Philosophical Magazine 1848,32,321&426; see H. Mackle & C. Wilson, Endeavour 30,109,1971,8-10.

2293 QBC028 CALORIMETER

Unsigned

StB 229x223x23; H 338; CysH 218, 203, 160.

Mid to late 19 C. G.

Copper cylinder, wire handle, cork insert; tin cylinder con-tainer; outer copper cylinder, turns on stand.

Mahogany base and two supports to rotation axis for outer cylinder, which has a hinged lid; the tin cylinder, with a cap, fits snugly in this; the central calorimeter fits inside this again.

As used by Thomas Andrews to determine the heat produced during the combination of oxygen with gases (PC - H. Mackle, RIC Congress at QUB, 11:4:90).

T. Andrews, Philosophical Magazine, 1848,32,321&426.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1033 QBC014 CHEMICAL GLASSWARE

Unsigned

Tower BD 143, H 287; Flask MxD 183, H 313. 19 C. G.

Selection of old glassware, including retort, drying tower, and Florence flask.

The drying tower is a cylinder vessel with ground glass side arms below and above, and with a large turned stopper on top (now stuck); the Florence flask has a circular base, a globe, and a neck on top - it was a general container for gasses or liquids.

1008 QBC018 COIL - INDUCTION, RUHMKORFF

MADE BY NEWTON & CO SCIENTIFIC INSTRUMENT MAKERS TO H.M. THE KING, 3, FLEET ST., LONDON NO.1519N.

B 410x198x53; CoL 294, D 108. Post 1901. R.

Mahogany base and supports; ebonite coil housing; ebonite and brass commutator; two brass contacts on top of coil.

Queen Victoria died in 1901.

1029 QBC001 CRITICAL STATE APPARATUS

Unsigned but by Thomas Andrews

H 1080&1270; CyH 260&484, D 58&60. c1869. R.

Andrew's intermediate and final versions; metal bottoms with glass cylinders containing a glass tube on top.

Later version more solid and mounted on a mahogany table and with two metal mounts, though only one glass cylinder remains.

Also some: "Tubes containing carbon dioxide sealed with a pellet of mercury and used in the apparatus for determination of the pressure-volume-temperature relation-ships."

For more information, see the entry for Cumine's critical state apparatus, Ex0305.

T. Andrews, Philosophical Transactions, 1869, Vol.159, 575.

0997 QBC007 DIPLEIDOSCOPE

E.I. DENT'S PATENT MERIDIAN INSTRUMENT 82 Strand & 33 Cockspur St LONDON

H 60; MxW 98; ToD 58. Patented 1843. R.

Brass screw off top over prism system in irregular-shaped oxidised brass housing; base inscribed: "E.J. DENT PATENTEE 155".

Tesseract 16,1987,29 refers to the double-reflecting mirror assembly of the instrument: "When mounted and aligned in sunlight, the momentary coincidence of two images of the sun gives the instant of noon, for regulation of watches."

Turner 1983,37 records that it was the invention James Mackenzie Bloxam, patented on 20 June 1843 (No.9793), as a 'meridian instrument' - it consists of a hollow, right-angled prism, with two sides silvered and one of glass, the meridian transit being known by the coincidence of two images of the sun, one from the top glass and the other from both mirrors; it was put on the market by Edward John Dent in 1843.

1035 QBC021 DISCHARGE TUBE

Unsigned but by Thomas Andrews

L 168-287; D 6-7; FrB 180x125, H 222. c1860. R.

Glass; sealed; 18; discharge through O₂, air, H₂, N₂, CO₂, CO, cyanogen, nitric oxide, nitrogen dioxide; on frame.

Recent wood frame with set of holes on arc behind set of slots on front.

T. Andrews & P.G. Tait, Philosophical Transactions 1860, Vol.150,113.

1032 QBC012 DISCHARGE TUBE

Unsigned but by Thomas Andrews

L 185,175; D 5. c1860-70. R.

Two; for electric discharge in attenuated gases; glass; sealed; bent 2x90° and 1x180°.

Card with tubes notes: "The tubes were filled with oxygen, sealed at one end and the manometer filled with sulphuric acid. Volume changes were noted during the formation of ozone by an electrical discharge and during its decomposition by heat or by the action of other components introduced by breaking a sealed glass bulb." - latter in a cylinder glass flask then attached and later removed by heat sealing; also straight tube (L305,D10&5).

A card notes: "Tubes having fine platinum wires hermetically sealed in opposite sides, used in Dr. Andrews' and Professor Tait's Researches on Ozone." T. Andrews & P.G. Tait, Philosophical Transactions 1860, Vol.150,13.

1025 QBC035 DISCHARGE TUBE

CENTRAL SCIENTIFIC CO. CHICAGO U.S.A. CENCO LABORATORY SUPPLIES APPARATUS CHEMICALS

BD 147; H 563; MxD 131. c1900. D.

Turned wood base; glass tube, bulb on top for roses and leaves in phosphor; top disc and side wire electrodes.

Date on label with instrument.

2287 QBC024 DISCHARGE TUBE

RICH. MÜLLER-URI BRAUNSCHWEIG

B 610x155x15; BsD 65-70; H 297. 1894-1910. F.

Black wood board for six turned wood bases and pillars; six glass flasks, stem and bulbous tops; for minerals.

Board has label marked "SMALLCOIL"; five of the flasks have recent labels: Scheelite CaWO₄ (CaSO₄?); Cuprite Cu₂O; Iceland spar CaCO₃; k? (old label says coral); ??odo-crosite MnCO₃?; these minerals are constrained by glass rods around them on top of central pillars within the discharge tubes.

Brachner 1985,146 records that the firm was founded in 1894, and was active until at least 1910.

1028 QBC038 DISCHARGE TUBE

Unsigned

BD 105; H 370; TuD 54. 1898. D.

Turned mahogany base; vertical glass tube; point elect-rode on side arm, serrated disc in tube centre.

The disc has parallel slits, and is located at an indentation in the tube below half height.

Label with instrument: "W. WEIN 1898".

1009 QBC019 DISCHARGE TUBE - AURORA

Unsigned

L 1145; TuD 46. 1870-1900. D.

Glass cylinder with brass ends; stop-cock and internal sphere conductor; other end has pointed conductor.

Dates given on card with instrument.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2288 QBC025 DISCHARGE TUBE - CROOKES

Unsigned
B 497x123x11; H 171; TuD 76, L 452.
Late 19 early 20 C. G.
Black wood base and supports; horizontal glass cylinder tube with eight-vane "Mill Wheel"; point and disc electrodes.
"For demonstrating the deflection of the cathode rays by a magnet as well as the power of the rays to produce motion" Griffin 1910,961.

1027 QBC037 DISCHARGE TUBE - CROOKES

Unsigned
BD 120; L 280; MxH 245. c1869. D.
Glass; tapering shape; disc electrode at narrow end and maltese cross at wide end; tube below; mahogany base.
Label with name "W. HITTORF".
Date on label with instrument.

1010 QBC020 DISCHARGE TUBE - SPANGLED

AUROLA
Unsigned
L c352; TuD 16; SrsD 24. 1870-1900. D.
Glass cylinder with spherical brass ends and sleeves; internal helix of silver metal discs.
Dates given on card with instrument.

1026 QBC036 DISCHARGE TUBE - THOMSON

Unsigned
L 725; D 21-100. c1897. D.
To demonstrate ratio of charge to mass of electron; glass; disc, two cylinders, and parallel plate electrodes.
Narrowest at disc electrode end; widest at opposite end; on black wood support stand.
Date on label with instrument; name from Griffin 1910, 967.

0996 QBC006 GALVANOMETER

THOS. SMITH INVENTR. 1791
B 240x241; RoD 203; Co 224x48. 1791. S.
Mahogany base; inscribed compass rose 0-90-0-90-0°; rectangular red wire coil; central needle; two contacts.
Historical Technology 106,1973,113 offered an eight-inch compass rose (printed off an engraved copper plate on 8½" square paper) which has this same signature.
Crawforth 1988,14 lists a Thomas Smith at 53 Old Gravel Lane, Ratcliffe, from 1790-1823.

2285 QBC022 GALVANOMETER

Unsigned
BD 107; CyHsD 80; H 63. Mid to late 19 C. G.
Mahogany base; two brass contacts; brass cylinder glazed coil housing; magnetic needle; scale 0-90-0-90-0°.
The needle and scale are above the coil under the glass top; coil is on a wood frame.

0998 QBC008 GALVANOMETER - ASTATIC, NOBILI

Ruhmkorff à Paris
Sp 230; H 298; HsD 167. 1840-1877. F.
Brass base; three level screws; cylinder glass cover; suspended double needle; scale 0-90-0-90° above coil.
Silvered scale around copper disc; crack in glass disc on top of cylinder housing.
Dates from Turner 1983,184-5.

1034 QBC016 GAS GENERATOR

Unsigned
BD 98; H 132; MxD 98. Early 19 C. G.
Early form of Kipp's apparatus; glass cylinder vessel, rounded top, S-side arm, funnel device on top.

0995 QBC005 GONIOMETER - CRYSTAL, WOLLASTON

Robinson, 38 Devonshire St. Portland Place London
B 114x40x6; H 142; DiD 99. 1825-1841. A.
Brass; base has two level screws; trunnion to axis of disc; scale engraved on circumference; vernier.
Dates for Thomas Charles Robinson from Clifton 1995, 235.

1000 QBC010 HYPSONOMETER

MADE AND SOLD BY W. CARY, 181, STRAND. [on directions]
H 268; D 66; CH 250, D 82. Mid 19 C. R.
Brass cylinder housing; thermometer in water cylinder fits in heating jacket; leather case; instructions.
The thermometer has no scale, and is read by a magnifying glass on a double pivot arm; the other part of cylinder housing contains a water flask, a vial of asbestos(?), and a wax candle; the case without the instrument is shorter than the instrument.
A large paper sheet gives instructions; "DESCRIPTION OF THE BAROMETER For Measuring Accessible Heights".
Turner 1983,245 records that the instrument was devised by De Saussure in mid 19 Century.
Clifton 1995,51 lists William Cary at this address from 1821-1890.

2289 QBC026 MEASURING CYLINDER - GAS

Collardeau A Paris 10=100 Cent.cub.
L 421; TuMxOD 55. Mid 19 C. G.
Glass cylinder; scale 0-50 goes down from closed end; top has brass sleeve with three screws to centre.
The open end has a lip; each division, e.g. from 10-20, has subdivisions numbered 1-9, with these divided further into five parts.
The purpose of the three brass screws leading to the centre of the flask above the brass sleeve on top is not known - they don't seem to do anything!
Not in Brieux 1980 nor Payen 1985.

2290 QBC027 PRESSURE VESSEL

Unsigned
L 465; VL 380, MxD 77. Mid 19 C. G.
Heavy glass cylinder, with neck, held between two metal discs and three bars; plus other glass pressure apparatus.

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The first has a double three-limbed metal sleeve on the neck below the upper disc; in the centre of the latter is a screw whose point leads to the single opening in the neck of the flask.

The second pressure vessel is in the form of a heavy glass tube with brass sleeve ends, part of one of which unscrews (L333,MxD39).

The third is a glass globe (D225) with side arms having brass sleeves and stop-cocks (L675).

There are also two heavy test-tubes surrounded by coils.

0999 QBC009 PYROMETER - WEDGWOOD

Unsigned

C 196x119x73; TuL 60, D 24; pellets D 12, L 12.

Introduced 1782. R.

Mahogany case contains thimbles and cylinder clay pellets; pull out brass scale in drawer at side.

Scale, in form of tapering groove, goes from 0-120 and 120-240S.

With published instructions: "DESCRIPTION AND USE OF A THERMOMETER FOR MEASURING THE HIGHER DEGREES OF HEAT FROM A RED HEAT UP TO THE STRONGEST THAT VESSELS MADE OF CLAY CAN SUPPORT" By JOSIAH WEDGWOOD F.R.S. AND POTTER TO HER MAJESTY, Joseph Cooper, London, 1784.

A card in the apparatus notes: "Wedgewood's [sic] Pyrometric Bodies 1784".

Details from Turner 1983,117.

1007 QBC017 REACTION VESSEL

Unsigned

H 144; MxD 152. c1856. R.

Glass electrolysis vessel; squashed pear shape; neck and side arm with ground glass joints.

Used (presumably by Andrews himself) to demonstrate the formation of ozone during electrolysis of water; side arm has glass tube inserted.

T. Andrews, Philosophical Transactions 1856,146,1.

2286 QBC023 SPARK GAP

Unsigned

L 630; GD 175. Mid 19 C. G.

Glass globe contains carbon electrodes; brass sleeves, one to stop cock, other to slide rod and insulated handle.

The globe can be evacuated, or filled with gas; the spark gap distance can be adjusted using the sliding rod attached to one electrode (now stuck); the rod has a turned glass handle.

0774 QBC003 SPECTROSCOPE - PHOTOGRAPHIC, LITTROW

Unsigned

No measurements available. c1900. G.

Cast iron base, central pillar and frame; one brass tube for telescope and collimator; disperse/reflect prism.

Base has three level screws; prism in rectangular iron housing, angle adjusted by micrometer; photographic arrangement at other end, plate can be moved up and down past slit.

1022 QBC032 SPECTROSCOPE - TABLE

W. & J. GEORGE & BECKER LTD. LONDON & BIRMINGHAM 2926

L 515; H 200. c1925. PC.

Black metal; collimator on triangular base; telescope on another on top; circular table with prism clamp.

Silvered circular scale 0-360° with vernier; knobs and clamps in triangles, lower moves prism table, upper moves telescope; telescope and collimator focus by rack and pinion; knob and plate to adjust slit.

Date suggested by D. Thorburn Burns.

1031 QBC004 THERMODYNAMIC SURFACE - MODEL

Unsigned but by James Thomson, brother of Lord Kelvin

B 121x84; H 153. c1869. D.

Grey painted wood model of pressure-volume-temperature surface for CO₂; used by Thomas Andrews in teaching.

James Thomson, father of Lord Kelvin, was Professor of Mathematics at Belfast Royal Academical Institution ("Inst"), and then at Glasgow University; the model was made around 1869 by his son, also James, who was Professor of Civil Engineering in Queen's; it is displayed on a wood base D248, whose centre is covered in red velvet.

Details on card with model.

2297 QBC033 THERMOMETER - GLASS MERCURY

Unsigned - attributed to T. Andrews

L 490; D 6; BuD 8. c1845. D.

The scale, -3-28°, has no white background to make reading easier.

Card notes: "Constructed in Belfast by T. Andrews ca. 1845."

2296 QBC031 THERMOMETER - GLASS MERCURY

Fastré aîné à Paris 1855

L 304; D 5; BuD 10. 1855. S.

With scale 0-32°; there is no white background to the scale to make reading easier.

2295 QBC030 THERMOMETER - GLASS SPIRIT

Secretan - à Paris 1861.. Centigrade.

L 130; D 5. 1861. S.

Glass; red spirit indicator; scale 0-40° with white background to ease scale reading.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

QUEEN'S UNIVERSITY BELFAST - ENGINEERING - QBE

Belfast BT7 1NN

Telephone 01232-245133

3241 QBE019 ABACUS

Unsigned

Fr 370x181x27; BesMxD 25. Late 19 early 20 C. G.

Hardwood frame for 13 sets of two beads above a bar and 13 sets of five beads below, running on ivory rods.

Two of the ivory rods have been replaced with brass rods; the frame is bound with shaped silver-metal strengtheners at the corners.

A card notes that this is a Chinese suanpan in contrast to the usually smaller Japanese soroban, which has only one bead above, and four below, the divider; it notes that the Japanese version uses smaller beads and more rods, and is therefore long and narrow - the smaller construction of the Japanese instrument makes for faster manipulation, while the larger construction of the Chinese abacus makes accidental moving of the beads less likely, and also makes for easier reading.

3240 QBE018 CALCULATOR

MARCHANT MADE IN U.S.A. BLOCK ANDERSON LTD LONDON & CAMBRIDGE [and other towns]

Hs 315x290x194. Early 20 C. G.

Black metal housing; nine sets of nine keys 1-9; ten red keys.

Four sets of keys are white, and five are green; two of the red keys are labelled "ADD" and "CLEAR"; there are nine glazed number windows and a further nine unglazed in the high rounded part of the housing away from the operator, and a further 17 unglazed at the bottom of this raised part; there is a brass handle on front of the housing and two turned wood and oxidised brass handles at the right side.

3236 QBE014 CALCULATOR

Arithmomètre. THOMAS de Colmar A PARIS INVENTEUR No.896

Hs 463x180x93. c1870. PC.

Black brass-bound wood hinged-lid housing; brass top with six 0-9 slides, 12 large and seven small number windows.

There is an ivory and brass handle on the bottom left corner, two rack and pinion knobs at the top corners, and a brass slide knob "ADDON ET MULTON" or "SOUSTON ET DIVISON" towards the bottom left.

A card with the instrument notes that de Colmar was from Alsace, that the instrument was made in Paris about 1836 - it was the first successful commercial calculator, which was designed and first produced in 1820, over 2000 being made between 1820 and 1880. However Stephen Johnston (PC) suggests a date nearer 1870.

Tesseract 30, 1990,2 records that the inventor was Chevallier Charles X. Thomas (of Colmar) in 1820 - his firm was taken over by L. Payen in 1870, who continued to produce his machine.

Historical Technology 117,1978,215 records that S. Tate made the first English versions in 1883 and patented improvements in 1884 and 1903 - C & E Layton then took over his patents and added their own improvements in 1909 which included mounting the face plates, which were horizontal in earlier models, so as to be inclined in the direction of the operator - the basis of the mechanism consists of a series of Leibniz stepped wheels (cylinder having on its outer surface nine teeth of increasing length) coupled to the input register - these are driven from the main crank then driving small pinions each rotated by the number of teeth on the Leibniz wheels for which they have been positioned - the motion is transferred to the hinged plate carriage which must be advanced one place for each significant figure.

3239 QBE017 CALCULATOR

COMPTOMETER MADE IN UNITED STATES OF AMERICA BY Felt & Tarrant Mfg. Co. Patented in Great Britain.

Hs 365x237x102. Patents 1888-1913. P.

Brown metal housing; ten sets of nine keys; side handle.

There are four sets of green keys and six sets of white keys all numbered from 0 9,1 8,2 7...to 8 1; there are also eleven number windows; patents are listed from 17136 1888 to 16036 1913.

Felt & Tarrant were located in Chicago.

3237 QBE015 CALCULATOR

THE MILLIONAIRE MADE IN SWITZERLAND NO4203 Gilbert Wood 75b, Queen Victoria ST. LONDON, E.C.4

Hs 645x284x124. c1900. PC.

White-metal housing; eight sets of keys; 24 number windows.

There are five sets of white and three sets of black keys 1-9, with adjust levers 1-9 and "A M D S"; the mechanism, using a brass cylinder and cog-wheels, can be viewed through the housing.

A card with the instrument records that it was made about 1900, was hard-wearing and precision built, and has all the features found in later but more compact types; it was presented by the Government of Malaya in 1962 by the courtesy of Mr R.B. McVilly; Gilbert Wood is recorded as "Sole Agent for Great Britain".

Tesseract 35,1991-2, Item 48 records: "A true multiplying machine, as opposed to the Thomas de Colmar arithmomètre, for example, which performed multiplication simply by a series of additions, the 'Millionaire' was patented by Otto Steiger of Munich in 1893, and first manufactured, by Egli [Hans W. Egli, Zurich], in 1899.

3243 QBE021 EXTENSOMETER

THE CAMBRIDGE AND PAUL INSTRUMENT CO. LTD. ENGLAND.

W 150; SDiD 49. 1919-1924. R.

An iron pillar holds two pivoted brackets, one for a vibrating tongue, the lower for an ivory scale disc 0-35.

A card gives the details: Cambridge Extensometer - This consists of two separate pieces clamped by means of conical pointed screws into gauge points in the test specimen. The lower piece carries a vertical pillar, at the top of which is a knife edge and a horizontal arm through which operates a vertical micrometer screw fitted with a graduated disc. The upper piece rests on the knife edge and carries a horizontal vibrating arm. A reading is taken by setting the vibrating arm in motion, and gradually bringing up the screw point until it just makes contact with the tongue on the underside of the arm. The correct setting is indicated by the noise and by the damping out of vibrations. The relative distances of knife edge and micrometer screw from the axis of the specimen produce a magnification of extension of five times, and the micrometer head is so divided that each division represents an extension of 0.0001 in. on the test piece. Smaller intervals may be judged by eye.

Dates from Cattermole 1987,xiv.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3232 QBE010 GRAPHOMETER

GRUBB'S PATENT J. HICKS, MAKER. LONDON NO 4 DIXON & HEMPENSTALL, 12 SUFFOLK ST. DUBLIN.

Sq 248x147; H 211; TuD 21. Early 20 C. G.

White-metal set square; vertical oxidised brass tube.

The viewing tube is at the corner of the square, and has a window and angled glass in a rectangular housing at its base, and with a white scale 0-6(X2)? on a black background at its eyepiece; the set square is divided on its middle-length side 15-120(log) and has a pricker on the corner operated by a right-angled lever.

"This instrument is constructed in such a manner that it can be used either as a simple Plane Table for plotting angles, the necessary distances being obtained by direct measurement, or it can be used as a Telemeter combined with a Plane Table, no direct measurements in that case being necessary.

H. Grubb, Transactions of the Institution of Civil Engineers in Ireland XXXI, 1903, 160-162.

3230 QBE008 LEVEL - HAND

Stanley London

L 155; TuHsD 25. Late 19 C. G.

Oxidised brass tube has a spirit level on top, with a mirror for the pin-hole and crossed wire sights.

Thus the bubble is in the centre of the crossed wires, as seen through the pin-hole in the other end of the tube, when the instrument is level.

A card notes that this instrument was first made about 1880, but was superseded by the Abney level.

3234 QBE012 LEVEL - TELESCOPIC

F.M. Moore, Belfast & Dublin.

TuMnL 281; TuMxD49; H 172. 1864-1899. F.

Brass and black enamel; two disc four screw base; crossed spirit levels on tube; rack and pinion eyepiece focus.

Hood and provision for missing lens flap on the objective.

A card notes that the level was used on the survey and construction of the Mourne Aquaduct and was donated by the Belfast City and District Water Commissioners in 1973.

Burnett & Morrison-Low 1989, 152 list the firm in Belfast and Dublin from 1864-99, when it became a Limited Company.

3251 QBE028 LEVEL - TELESCOPIC

T. Street, Commercial Road, Lambeth H.E. HOLST Östergade No.50, KJÖBENHAVN. [on Label]

TuMnL 302; TuMxD 54; H 164; C 336x195x104.

Pre 1882. D.

Brass and black enamel; crossed spirit levels on tube.

Two disc four screw base; rack and pinion eyepiece focus; objective lens flap gone; hinged mirror clips onto larger spirit level on top of the tube.

The trade label reads in full: "H.E. HOLST, den Kgl Marines Compasmager Fabrik og Lager af CHRONOMETRE og UHRE, optiske, mekaniske og meteorologiske Instrumenter, Östergade No.50, KJÖBEN-HAVEN."

The owner's name is on a label: "Benjn. Williamson.C.E. Old Dromore. Mallow."

"Janr 3 1882" is written in pencil on trade label.

Clifton 1995, 209 lists Thomas Street at this address from 1839-1880.

3252 QBE029 LEVEL - TELESCOPIC

A.G. Thornton Ltd Manchester No.356.

TuMnL 350; TuMxD 55; CrD 54. Late 19 early 20 C. G.

Oxidised brass; mounted on brass circle arc with clamp screw; level on top of tube, crossed level below tube, under the eyepiece.

Focus is by objective rack and pinion; objective lens flap; the mounting arc is around 220° with an adjusting screw at one end; by means of the clamping screw on the perimeter, the angle of the telescope can be adjusted to level the instrument using the spirit level on top of the tube.

3250 QBE027 LEVEL - TELESCOPIC

A.G. THORNTON LTD MANCHESTER No502

TuMnL 305; TuMxD 48; H 161; C 480x115x108.

Late 19 early 20 C. G.

Brass and black enamel; one disc four screw base; crossed spirit levels on tube; rack and pinion objective focus now stuck; fitted mahogany case.

3255 QBE032 LEVEL - TELESCOPIC

Troughton & Simms, London

TuMnL 274; TuMxD 49; H 170; C 418x132x120.

Mid to late 19 C. G.

Brass and oxidised brass; two disc four screw base; crossed spirit levels on tube; rack and pinion eyepiece focus; in fitted mahogany case with number pasted inside lid 102.

3249 QBE026 LEVEL - TELESCOPIC

Troughton & Simms, London.

TuMnL 395; TuMxD 47; H 155; C 460x235x177.

Late 19 C. G.

Brass and oxidised brass; two disc four screw base; spirit level on top of tube; eyepiece with drum micrometer.

Latter divided 0-9; rack and pinion eyepiece focus; in fitted mahogany case with hand-written label: "BELFAST WATER COMMISSIONERS RECEIVED 15-5-73."

3235 QBE013 LEVEL - TELESCOPIC

TROUGHTON & SIMMS LONDON

TuMnL 380; TuMxD 56; H 191. Late 19 C. G.

Oxidised brass; two disc four screw base; crossed spirit levels on top of tube; rack and pinion eyepiece focus; provision for missing lens flap on objective hood.

A card with the instrument draws attention to the special adjusting screw under the eyepiece end of the telescope which enables the optical axis to be made perpendicular to the vertical axis, but notes that this screw is unnecessary for most routine work if the instrument is well made, and is usually not included in modern levels.

Donated by Mr S.T. Bratty in 1973.

3254 QBE031 LEVEL - TELESCOPIC

TROUGHTON & SIMMS LONDON

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TuMnL 394; TuMxD 55; H 179; C 426x215x184.

Late 19 early 20 C. G.

Brass and oxidised brass; tribach base and three-arm plate; crossed spirit levels; rack and pinion eyepiece focus.

The spirit levels on top of the tube are both damaged; objective lens flap; screw under tube towards eyepiece end to enable optical axis to be made perpendicular to vertical axis.

A hand-written note with the instrument records that it was owned by James Heron (Diploma in Engineering QUB 1901) and used in his work as a civil engineer on the Great Southern Railway of Ireland 1901-11 - information from Andrew Heron.

3253 QBE030 LEVEL - TELESCOPIC

TROUGHTON & SIMMS LONDON

TuMnL 394; TuMx D57; H 192; C 535x170x165.

Late 19 early 20 C. G.

Brass and oxidised brass; two disc four screw base; crossed spirit levels on tube; rack and pinion eyepiece focus.

Objective lens flap; screw under tube towards eyepiece end to enable optical axis to be made perpendicular to vertical axis; leather case covers fitted mahogany case; owner's name on label under lid: "J.J.S. BARNHILL, M.INST.C.E. LONDONDERRY".

3225 QBE003 LEVEL - Y

NEGRETTI & ZAMBRA LONDON 2312 BELFAST WATER WORKS

TuL 415; TuMxD 50; H 204. Late 19 early 20 C. G.

Brass and oxidised brass; tribach base; compass on limb; spirit level under tube; rack and pinion objective focus.

A reflecting prism reads the compass 10-360°; a screw clamps the angular horizontal position, with another for fine adjustment after clamping.

A card notes that the level was used in the survey and construction of the Mourne Conduit and Silent Valley Reservoir; it was donated by the Belfast City and District Water Commissioners in 1973.

3224 QBE002 LEVEL - Y

Spencer & Son Dublin.

TuL 383; TuMxD 52; H 217. 1864-1886. F.

Brass and black enamel; two disc four screw base; circular bubble level on limb; long spirit level on top of tube.

Rack and pinion eyepiece focus; eyepiece optics gone; the large bubble level (D35) in the centre of the horizontal limb holding the Y brackets is now almost empty.

Dates from Morrison-Low 1989,136.

3247 QBE024 MECHANICAL INTEGRATOR - AMSLER

Elliott Bros..London. J. Amsler No 138

W 228; MxL 358; C 309x286x75. Third ¼ 19 C. G.

Brass; hinged arm, with Amsler disc and ring, revolves two arc cogs turning cog-wheels coupled to pivoted frame.

The horizontal disc on the hinged arm is divided 0-9, as is the vertical ring, which has a vernier; the arc cogs are of different diameters, but each drives an identical cog-wheel (D46), both of which also have the Amsler disc and ring; an arm joins the centres of the wheels, and the frame is pivoted to the centre of this arm; the frame has two tapering arms to a cross-piece joined to two semicircles for white-metal wheels (D47); the fitted mahogany case contains also a brass cylinder weight (H55D34), with a white-metal rod through its centre.

Tesseract 30,1990 offers an identical instrument, described as follows: "109. AMSLER'S MECHANICAL

INTEGRATOR, English, late 19th century, signed "Elliott Bros., 449 Strand London" and "J. Amsler, 109." Made of bright lacquered brass with steel wheels, the elaborate integrator is contained in its original wood case 11½"x 12"x3". It is equipped with three measuring wheels with verniers and recording discs, giving the area, moment, and moment of inertia of any figure. The instrument is complete with counterbalance and two adjustment gauges; it would ride along a rail mounted at the top edge of a large drafting table. One of the most complex mathematical devices, a rare example of Amsler's integrator, in fine condition throughout. \$2850."

Simple planimeter invented by Swiss Jacob Amsler about 1854 - Turner 1983,279.

3223 QBE001 OCTANT

King Bristol C.S.Daude Bristol 1847

R 278; L 325. 1847. S.

Ebony, brass, ivory; scale 0-100, window vernier 0-20; reinforced index arm; curved T insert; horizon glass.

The vernier has tangent and clamping screws; there are two adjusting screws also for the horizon glass; between the index and horizon glasses are three square housings for red and green shades, with the third shade missing; the disc eyesight has two peep-holes, with a hinged flap to cover that not in use; there is a turned ivory pencil top (pencil gone) which screws into the top of the curved insert.

Presumably Thomas D. King of Bristol who exhibited at the 1851 London Exhibition - Hackmann 1985,89; he is listed in Clifton 1995,159 in 1848 and 1853.

3242 QBE020 PLANIMETER - AMSLER

DIXON & HEMPENSTALL. DUBLIN 57923

L 173; C 228x50x38. c1920. N.

Hinged german silver arms; horizontal disc 0-9 and vertical ring, also 0-9 with vernier, between arms; case.

The case is covered in black fibre and lined with dark blue velvet; the disc weight is numbered 59515; one arm has the inscription "ENGINEERING DEPT. Q.U.B." in the same style as the "DIXON & HEMPENSTALL".

The instrument was invented by Jacob Amsler (1823-1912), Professor of Mathematics at Schaffhausen, Switzerland, about 1854 (see Bull SIS, No.35, P.27).

This version is Model No.2, and would have been made about 1920 by Amsler (Dr Joachim Fischer - personal communication).

3246 QBE023 PROTRACTOR

Troughton & Simms, LONDON.

R 83; W 240; C 266x128x39. Mid 19 C. G.

Two; brass; semicircle 0-180 and 360-180°; arm with window vernier pivots from centre ring; mahogany case.

The vernier is divided 15-25-5-15; the central ring is half-covered in brass with a line or an arrow to mark the centre of the ring and the divided semicircle; there are two knobs on the bottom bar below the ring, and a clamping knob on the vernier; the only difference between the two instruments is that one has a centre line in the ring and the other an arrow.

3245 QBE022 PROTRACTOR - CIRCULAR

Lee & Son, Belfast.

D 159; CD 183. 1850-1870. F.

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Brass; four-spoke coggled ring 10-360°; two hinged pricking arms with verniers and clamping arm at right-angles. Circular window with cross threads at circle centre; shaped hinged mahogany case. Dates from Burnett & Morrison-Low 1989,150.

3248 QBE025 SEXTANT

C. PLATH HAMBURG D.R.G.M. 724619 724624/25

R 185; L 242; W 264. 1922. D.

Brass and black enamel; lattice frame; silver scale S 9243 150-0; window vernier 0-10 on index arm; case.

Pivoted magnifier on index arm; index mirror with four shades, horizon with three; three eyepieces, two cylindrical (one with no optics), and one tapered; also single field glass; horizontal wood handle under frame; fitted mahogany case.

A plaque inside the lid reads: "Eingetragene Schutzmarke C. Plath HAMBURG Stubbenhuk 25".

A paper label also records: "Eingeliefert am 6.7.22 Geprüft am 10.7.22".

3238 QBE016 SKETCH PAD & CLINOMETER

HOUGHTON-BUTCHER LONDON - 1915 D.R. CRONE. 8110

Fr 250x185x16; ScD 57; CpD 30. 1915. S.

Boxwood frame and brass enamelled rollers for paper; compass on top; at back, clinometer and screw-in rod.

The clinometer, in the form of a curved T scale 50-0-50°, which can be released by a brass button, is behind a semi-circular transparent window; on the top of the front is a compass with the inscription "LINE OF DIRECTION"; there is also an inch scale 0-6, the first being divided into 10ths and 50ths; below is another scale 0-48 "YARDS 2 INCH = 1 MILE".

A card with the instrument notes that it was used for reconnaissance on horse-back by civilian and military engineers from 1850 - the board is attached to the rider's wrist by a band and axle so that it may be rotated and clamped in any position.

3233 QBE011 SLIDE RULE - FULLER CYLINDRICAL

FULLERS SPIRAL SLIDE RULE STANLEY, Maker, LONDON.

MnL 416; CysD 80,63&50. c1878. D.

Mahogany handle and top disc with three papier-maché cylinders between; one divided spiral, one with tables, one blank.

A long brass index extends from the top disc, with its upper half divided from .02 to .98; from the bottom disc (integrated with the handle) rises a white-metal index ending in a brass ellipse with a central line.

For the operation of the instrument, see 0384 RDS017.

With this example is an instruction booklet "SPIRAL SLIDE RULE", published by "E. & F.N. SPON, 46, CHARING CROSS. NEW YORK: 446, BROOME STREET, 1878. Price Sixpence"; it has an attached label: "MANUFACTURED BY STANLEY, GREAT TURN-STILE, LONDON. W.C. Price 50s."

3231 QBE009 SURVEYING INSTRUMENT - POCKET

GRUBB'S PATENT DIXON & HEMPENSTALL 12, SUFFOLK ST. STATE OPTICIANS, DUBLIN

MnL 90; MxW 35; CpD 20. Early 20 C. F.

Oxidised brass rectangular tapering housing; bubble level and scale 0-60(X2)? seen through eyepiece; compass.

The mother-of-pearl compass disc N-180(X2) is on top of the housing; there are two white-metal flaps over the large end of the instrument, which has a glass window in front of the spirit level; when viewed, the bubble can be seen to be in the centre of the (unclear) scale when the instrument is level.

Described as a "POCKET SURVEYING INSTRUMENT", Grubb notes: "This instrument, which can be carried in the waistcoat pocket, will be found useful not only for rapid survey work, but as a companion in travelling. It can be used as a hand level or gradiometer, for taking the horizontal bearings of objects, or angles between two objects, and for measuring angular heights. The instrument consists of a metallic box...at the smaller end of which is mounted in a revolving collar a square box or tube (the sighting tube), through two opposite apertures in which the object can be viewed when the eye is placed opposite the aperture marked "Eye". If the reflecting covers or flaps be opened and the instrument held so that the larger end of the box is illuminated by sky light, a scale and small spirit level will be seen projected upon the object."

H. Grubb, Transactions of the Institution of Civil Engineers in Ireland XXXI, 1903, 163-4.

3227 QBE005 THEODOLITE - TRANSIT

T. COOKE & SONS, LONDON & YORK N0.5764 1896

TuMnL 282; VcrD 174; HoCrD 170; H 404. 1896. S.

Brass and black enamel; silver scales; tribach base; variation compass on top of tube; side lantern.

The horizontal circle 0-350° has securing screws below, clamping and tangent screws at the side; it has two verniers read by magnifiers; there are crossed spirit levels on the base, one on the side of the vertical circle, and one on top of the instrument across the trunnions; the vertical circle 10-90-0°(x2) also has securing, clamping and tangent screws, two verniers and two magnifiers; focus is by objective rack and pinion, and the objective has a lens hood.

There are some more lanterns in the collection for use with such theodolites when used for astronomical work.

3226 QBE004 THEODOLITE - TRANSIT

Elliott Bros., London. 785

TuMnL 277; VCrD 145; HoCrD 140; H 365. Late 19 C. G.

Brass and oxidised brass; silver scales; two disc four screw base; compass on horizontal circle; side lantern.

The horizontal circle 10-360° has two verniers, a securing screw underneath, and tangent and clamping screws at the side; on the other side is a spirit level and there are spirit levels also on one trunnion support, on top of the tube, and across the trunnions on top of the instrument; the vertical circle 0-90 and 10-80°(x2) has four spokes, two verniers, and is read by two magnifiers; it also has a securing screw, tangent and clamping screws; the tube has rack and pinion objective focus, and an objective lens flap; the eyepiece is missing.

3257 QBE034 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON

TuMnL 275; HoCrD 138; VCrD 141; H 346;

C 372x316x190. Late 19 C. G.

Brass and oxidised brass; tribach base with three arm plate; silver scales, each with two verniers and two magnifiers.

Securing, clamping and tangent screws; horizontal circle divided 10-360°; vertical circle divided 0-90 and 10-80° (X2); spirit levels above horizontal circle and on top of tube; rack and pinion objective focus; objective lens flap.

A card in the case notes that the instrument was repaired and adjusted by Cooke, Troughton & Simms Ltd in June 1949.

3260 QBE037 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON

TuMnL 297; HoCrD 140; VCrD 157. Early 20 C. G.

Brass and oxidised brass; tribach base; compass on horizontal circle; vertical circle disc and not spoked ring.

All the other transit theodolites have rings for vertical circles - this is unusual as it has a filled-in vertical disc, and it has two window verniers with magnifiers rather than vernier arm arcs; there is a spirit level at the side of the compass, above the

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horizontal circle (which has two verniers and two magnifiers), one at the side of one trunnion, and one near the top of the vertical circle; objective focus.

3258 QBE035 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON

O.S.4" TRANS THEOD No6.

TuMnL 239; HoCrD 128; VCrD 114. Early 20 C. G.

Brass and oxidised brass; tribach base; horizontal circle read by two eyepiece micrometers; variation compass.

Securing, clamping and tangent screws; vertical circle read by two verniers and two magnifiers; crossed spirit levels on top of horizontal circle, and one on the side of the vertical circle; objective rack and pinion focus; objective lens flap.

3229 QBE007 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON

TuMnL 307; VcrD 180; HoCrD 167; H 380.

Early 20 C. G.

Brass and oxidised brass; silver scales; tribach base; on three limb bracket; three spirit levels.

The instrument now sits on a modern mahogany base; the horizontal circle 10-360° has securing, tangent and clamping screws, is read by two verniers and two magnifiers, and has crossed spirit levels; the third spirit level is at the side of the vertical circle towards its top, and a screw near the bottom of one of the trunnions allows adjustment; the vertical circle 10-90°(x4) has tangent and clamping screws, two verniers and two magnifiers; tube focus is by objective rack and pinion, and the objective lens is protected by a hinged flap.

3259 QBE036 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON

TuMnL 362; HoCrD 147; VCrD 140. c1920. G.

Two, with slight variations; brass and oxidised brass; tribach base; widened end to tube before eyepiece.

Both have flywheels to balance the vertical circle on the other side of the tube; one has micrometer eyepieces to read both circles, but the other has magnifiers to read the vertical circle; crossed spirit levels on top of horizontal circle, and one on the side of the vertical circle; objective rack and pinion focus.

Firm became Cooke, Troughton & Simms in 1922 - these probably date to around this time.

3228 QBE006 TRANSIT INSTRUMENT

T. COOKE & SONS, LTD LONDON & YORK NO2203 1899

TuMnL 240; HoCrD 145; H 360. 1899. S.

Brass and black enamel; silver scale; tribach base; trunnions to cubic tube support; side lantern.

The horizontal circle 0-350° has securing screws below, and tangent and clamping screws at the side; it is read by two verniers and two magnifiers; there are crossed spirit levels on top of the horizontal circle housing; focus of the tube is by objective rack and pinion; "S.P. & S.LTD." is stamped on the base.

A card notes that the instrument was used on the survey and construction of the Mourne Aqueduct; it was donated by the Belfast City and District Water Commissioners in 1973.

3256 QBE033 TRANSIT INSTRUMENT

STANLEY LONDON 109185 PATENT

TuMnL 250; HoCrD 143; PvH 235. 1917. P.

Brass and oxidised brass; tribach base and three-arm plate; horizontal silver scale 5-360°; trunnions to tube.

The covered scale has two verniers and two magnifiers; there are crossed spirit levels on the circle housing, with clamping and tangent screws; tube focus is by objective rack and pinion; objective lens flap.

A card with the instrument notes that this "RAILWAY TRANSIT" was designed for railroad construction surveys in which vertical angles were seldom required, though there was no real demand for such special designs, and this type of theodolite proved unpopular - a similar type of instrument, with a micrometer for measuring small slopes or gradients, was manufactured in the United States.

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QUEEN'S UNIVERSITY BELFAST - PHYSICS - QBP

Belfast BT7 1NN

Telephone 01232-245133

Note: Many of the instruments in this collection have labels which show the room in which they were originally located, but also letters and numbers (e.g. "F42"), which refer to a note-book catalogue. Although it does not give dates, this catalogue can be most useful in identifying difficult items. It is referred to, when used, as the "Queen's catalogue list".

3187 QBP132 AIR PUMP

Unsigned

TsH 730&1090; Ts 600x446&476x313; PD 287.

Mid 19 C. G.

Mahogany table and six turned pillars to upper table for brass plate; handle pivots half-ring cog for linear cog.

The turned wood and brass handle thus moves the piston up or down in its cylinder; the upper brass fitting and lower reservoir for the manometer are present but the tube is gone; there is a turned wood cover for the plate.

3197 QBP142 AIR PUMP - DOUBLE BARREL

W.E. & F. NEWTON OPTICIANS & GLOBE MAKERS TO THE QUEEN. 3, Fleet St. Temple Bar LONDON

[Newton & Co Trade Label]

B 417x258x58; TH 241; T 240x239; PsD 223&92.

1851-1860. R.

Shaped mahogany base; brass cylinders; accessories.

The base on four feet (one damaged) holds the two brass cylinders and two turned brass pillars to the bridge for the brass and turned wood handle to move linear ratchets on the pistons; it also holds four turned mahogany pillars for the upper smaller table holding the brass plate; in the centre of this is at present a stop-cock leading to a smaller plate; the accessories include the mechanism for the guinea and feather experiment; an elegant turned rosewood mercury diffusion thimble with a glass skirt around the red-painted wood rod below, a pair of Magdeburg hemi-spheres, and a glass and mercury manometer on a brass screw sleeve.

The instrument and accessories are contained in a somewhat distressed boxwood case (639x462x378) with a green trade label "NEWTON & CO. Opticians, Mathe-matical, Philosophical & Astronomical INSTRUMENT MAKERS, GLOBE MANUFACTURERS to her Majesty, 3 FLEET STREET. LONDON. NEAR TEMPLE BAR."

This is a particularly attractive instrument set, providing a pleasant complement to the single barrel air pump 3187 QBP132. Millburn, Bull SIS 20, 1989, 3-6 notes this name for the firm from 1851, changing to Frederick Newton & Co by 1860.

0229 QBP023 AMMETER

AYRTON & PERRY'S DIRECT READING SPRING AMMETER PATENTED 1883

B 133x136; H 128. Patented 1883.

Mahogany base; brass cylinder housing; white scale.

The latter, 0-50, has an arc parallax mirror; the base has two brass screw electric contacts and a small inset magnetic compass.

0269 QBP064 AMPERE APPARATUS

Unsigned (signature plate missing)

B 413x227; H 555. Third $\frac{1}{4}$ 19 C. G.

Mahogany base and turned pillar; two parallel brass horizontal bars ending in mercury cups; circular coil.

The coil is wound, solenoid fashion, around a wire through the centre and is attached to two contacts which fit in the mercury cups on the stand; the brass bars have screw electric contacts on their ends away from the cups; the pillar has an urn-like carved top.

2333 QBP099 ANEMOMETER - ROBINSON

Unsigned

CusD 79; TuD 30; ScDiD 80; C 327x326x99.

Mid to late 19 C. G.

Brass tube; inside, white-metal rod with cog and endless screw from copper cups drives co-central cogged discs.

Outer disc has scale 0-90, with a window to the inner disc, also with scale 0-90; the four cups are on a cross bar with the rod at its centre.

3451 QBP177 ANTI-GRAVITY ROLLER

Unsigned

W 115; MxD 103; Brs 589x24x6. Mid to late 19 C. G.

Double cone wood roller rolls up two inclined iron bars hinged at one end, with a maximum angle of 11.5°

The inclination of the bars can be adjusted by means of two brass level screws (H99, KD23) on brass brackets at the ends of the bars away from the hinge.

0261 QBP056 ARAGO DISC APPARATUS

Made by Yeates & Son Dublin

L 630; WhD 275; H 140. Mid to late 19 C. G.

Mahogany base and wheel; copper disc on spindle; glass plate over disc rests on three small turned pillars.

As 0057 UGP016, but complete with glass disc which is missing from the Galway instrument; this one appears to have only one copper disc, against two (one in quadrants) in Galway.

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0250 QBP046 ATWOOD MACHINE

Unsigned
B 251x251x61; H 239. Mid to late 19 C. G.
Pulley only; mahogany base with four shaped legs; brass frame and four wheels hold fifth wheel on steel axis.

3460 QBP186 BALANCE - EQUAL ARM

Unsigned
BD 51; H 199; BmL 147. Mid 19 C. G.
Turned brass base and pillar; crook on top to suspend the iron shears for the iron beam with swan-neck ends.
There is a pointer between the shears; the pans are missing.

2308 QBP074 BALANCE - SPRING

WATKINS & HILL CHARING CROSS LONDON.
D 315; HsD 109, H 18. 1819-1856. F.
White circle scale; black numbers 1-26 with divisions becoming less; spring in brass housing behind.
Ring hook at back, above housing; black ring below for object to be weighed.
Dates from Clifton 1995,291.

3199 QBP144 BASE

YEATES & SON DUBLIN
B 210x141x16; H 143; PrsD 6. Mid to late 19 C. G.
Mahogany base with circle indent (D92); two brass screw contacts connected to two vertical brass pillars.
The element which should be in the indent (could this be for a Leyden jar?) is missing, and thus the purpose of the instrument, though clearly electrical, is difficult to fathom.

0262 QBP057 BATTERY - DRY PILE, ZAMBONI

Yeates & Son Dublin
BD 193; HsH 475. Mid to late 19 C. G.
Mahogany base; two piles in glass cylinders between brass sleeves; glass globe housing (not original).
Spherical conductors on bent pillars on tops of piles; tall arched brass support rises above piles; glass globe is too large in diameter for groove in base.

3209 QBP154 BELL - GLASS

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST LONDON
B 242x178x22; H 283; GoH 155, MxD 148. Late 19 C. G.
Mahogany base for base of glass goblet; at side, brass pillar to support eight-spoke star with cork spheres.
The latter are suspended on strings from the arms of the star whose centre is held by a brass bar from the top of the turned brass pillar rising from the side of the base.
Baird 1924,400 illustrates a similar instrument: "to show the nodes of a sounding glass vessel".
Firm founded in 1884, Downing 1988,57.

3470 QBP196 BOW

Unsigned
L 680; MxW 88. Late 19 C. G.
Mahogany; ebonite tightening screw and moving bracket for horse-hair; decorated with mother-of-pearl.

2331 QBP097 BREWSTER BANDS APPARATUS

J. Duboscq à Paris.
BD 131; PvH 283; TuL 195, D 48. 1849-1883. F.
Brass; base; expanding pillar; pivot; and optical tube, adjustable slit one end, and hinged glass plates at other.
Angle between latter adjusted by knurled knob and screw; "Brewster's Bands" written in pencil on base.
Dates from Brenni 1988,3-4.

0223 QBP005 BRIDGE - WHEATSTONE

W.G.PYE & CO No 83 1937
B 238x116. Late 19 early 20 C. G.
Mahogany base; ebonite top; brass s-bend bar with 17 holes for ebonite and brass resistance keys.
The 1937 with a Government arrow stamp seems to be a later addition, as No 83 is an early serial number, indicating a turn-of-century date; the resistance bar holes are labelled 10 10 40 20 20 10 4 2 2 1 .4 .2 .2 .1 .05 .05 INF; there are brass screw contacts at each end, and between the 10 and 40 holes; the base has three other contacts and a taper, and is inscribed: "MANGANIN BRITISH STANDARD OHMS AT 15.5° CENTIGRADE".

3166 QBP111 CALORIMETER - JOLY STEAM

W.G. PYE & CO MAKERS CAMBRIDGE
B 282x152x38; H 343; CyH 128, D 105. Early 20 C. G.
Oak base and vertical support for lagged copper cylinder and cap with steam jacket; brass pipe and wood plug below.
The double surface cylinder has a conical bottom leading to either the brass pipe or the wood plug on a pivoting rod; it clamps into the jacket and lagged lid, which has a hole in the top; close to the hole are two horizontal brass tapering rods with brass screw contacts at the back of the vertical support; the base has one brass level screw; there is a wood plug on a string from the support.
For illustration and more details, see Pye 1914,112 or Pye 1926,128.

3173 QBP118 CAMERA - NOVELTY

NOVELTY CAMERA
Hs 96x47x31. Early 20 C. G.
A hinged cardboard housing with windows on two sides holds a prism to make images elongated or shortened.
The housing is of a wine red colour; when a view is seen through the windows, it is either stretched horizontally or vertically, depending which way around the "camera" is held.

3452 QBP178 CENTRE OF GRAVITY TOWER

Unsigned
BksH 90,64,62; TIH 213; MxD 58. Mid to late 19 C. G.
Three turned wood blocks can be slotted into each other; when placed on a wood incline, the tower falls.

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The bottom block has a door carved on it, the middle block has a window, and the top block, which is castellated above, has a cross; when all three are placed on the pin in the centre of the inclined block, the tower falls, but it does not fall when one or two of the blocks are so placed.

3213 QBP158 CHLADNI PLATE

YEATES & SON DUBLIN

Sp 202; P 305x305; PH 167, Mid to late 19 C. G.

Oxidised brass plate secured with a wing nut to a tapering iron pillar on an iron tripod foot.

0118 QBP009 CHRONOMETER - MARINE

BARRAUD MAKER TO THE ROYAL NAVY 41 Cornhill LONDON NO 3074

D 125; C 182x174x170. 1851-1875. R.

Hinged mahogany case; glazed brass housing on gimbals.

The case has a hinge at the clock face, and another on the top above a glass panel; the silvered face has hours I-XII, with hour and minute hands, and a small dial at XII hours for seconds 10-60; there is a second small dial at VI hours: "UP 8 16 WIND 32 40 48 DOWN";

Historical Technology 104,1972,166 notes that No. 957 dates to 1822, and No. 1988, in the National Maritime Museum Greenwich, is given date c.1837.

Clifton 1995,19 lists Hilton Paul Barraud at this address between 1851 and 1875.

3490 QBP216 CLAMP FOR COMPRESSING GLASS

J. DUBOSCQ à PARIS

H 147; MxW 164. 1849-1883. F.

Octagonal boxwood handle holds screw thread; turning this alters the distance between a metal frame and bar.

The screw thread runs through a sleeve in the centre of the long side of the oxidised brass three-sided frame; the end of the screw thread pushes against an iron bar which extends out each side, but not as far as the sides of the frame; the iron bar is held by two sliding pins to the long side of the frame; thus, when the handle is turned, the separation of the frame and bar alters, compressing or freeing a glass insert.

Historical Technology 109,1974,237 calls this apparatus a "STRESS-INDUCED DOUBLE REFRACTION DEMONSTRATION", and notes that a glass bar would be placed between the hooked ends and the iron pressure plate - with no stress, there would be no polarisation of light, but turning the handle and applying pressure would induce double refraction in stressed regions of the glass, and this would be observed by the resulting polarisation of the light passing through. Dates from Brenni 1988,3-4.

3484 QBP210 CLINOMETER - ABNEY LEVEL

SMITH ABERDEEN

L 121; SD 57; MxW 60; C 135x71x37. 1843-51. FR.

Oxidised brass; square section (16x16) sighting tube; silvered half-ring scale 60-0-60; wheel and spirit level.

There is a second subsidiary scale /TO/-10 on the silvered half-ring; the position of the spirit level is altered by means of a four-spoke wheel (D28), to which a vernier is attached by an arm, reading the scale; when viewed, a horizontal line is seen with a reflection of the spirit level at its side, such that the bubble can be brought to the line using the wheel, after which the reading can be taken with the scale and vernier; the instrument is contained in a red leather-covered case with blue silk and velvet lining; it is called "Smith's inclinometer" in the Queen's catalogue list.

Dates of Charles Smith firm from Bryden 1972,56; called "Abney's clinometer" in Stanley 1901,374.

0240 QBP034 CLOCK - REGULATOR

Robt.. Neill BELFAST ASTRONOMICAL CLOCK

FD 326; H 1925. 1805-1840. R.

Large seconds dial; small minutes and roman hours dials; mercury in glass cylinder pendulum in silver metal frame.

Linear scale read with pointer below pendulum (3-0-3); in black wood long case housing.

Dates from Burnett & Morrison-Low 1989,153.

0256 QBP050 CLOCK - REGULATOR

YEATES & SON DUBLIN

C 1353x414x194; DIHsD 307; SmDID 85.

Mid to late 19 C. G.

White face; roman numerals; small seconds dial; brass cylinder weight and pendulum; electrical contacts; black wood, glass-fronted case; brass frame around dial.

0257 QBP051 CLOCK - REGULATOR

Yeates & Son Dublin

C 1345x417x193; DIHsD 325; SmDID 90.

Mid to late 19 C. G.

Silvered face; roman numerals; small seconds dial; brass cylinder weight; double horse-shoe pendulum; in black wood case with glazed front.

2322 QBP088 COIL

YEATES & SON DUBLIN

B 85x43x6; H 95; HssD 53&31. Mid to late 19 C. G.

Brass base and two tapering pillars for ebonite ring; in this, ebonite housing and coil rotate against spring.

Brass contacts above and below the outer ring connect to the coil; presumably there is an iron ring or magnet in the outer ebonite ring and, when a current is passed, the inner coil rotates against the spring attached to one pillar; the strength of the twist can be judged since there is a pulley wheel on top from which a string extends, presumably to be attached to a weight over another pulley wheel.

By comparing this with an apparently identical instrument 1515 UGP093, the outer ring has slipped down the two turned brass pillars - there are screw holes on top of these, but no screws, while in 1515 there are screws which hold the outer ring at the top of the pillars.

0271 QBP066 COIL

Yeates & Son Dublin

H 358; HsD 83. Mid to late 19 C. G.

Brass expanding stand supports coil housing around two parallel discs of glass; contacts on ebonite plate.

For demonstration of Faraday effect on light path; card with instrument calls it "Faraday rotator".

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2329 QBP095 COIL - INDUCTION, MEDICAL

[Battery] THE DURA CELL PATENT MANUFACTURED BY SIEMENS BROTHERS & CO. LIMITED CATTON HOUSE, WESTMINSTER, S.W.

Hs 132x129x123. Late 19 early 20 C. G.

Mahogany housing; battery driven coil; electrodes.

A bundle of iron wires, with a turned wood handle, can be raised or lowered into the centre of the (unseen) coil to adjust the intensity on a scale 1-7; brass fittings and two small coils on top; red and green leads to electrodes, handles, and accessories - including leather-covered pads; the accessories are stored in a side drawer in the housing; the number 36897 is stamped on the housing; the battery could well be original.

3190 QBP135 COIL - INDUCTION, RUHMKORFF

THE COX-CAVENDISH ELECTRICAL CO. LTD LONDON. W.1.

B 630x300x100; H 312; CoHsD 172&95. Late 19 C. G.

Mahogany base; ebonite coil housing; brass and ivory commutator; conductors have ebonite handles and pillars.

Eight brass screw contacts on base, two labelled "MAIN", two labelled "BREAK", and two pairs (which can be shorted with ivory-topped pins) labelled "CONDR".

3174 QBP119 COIL & MAGNETIC NEEDLE

F.E. BECKER & CO 33,35&37 HATTON WALL, LONDON E.C.

B 260x129x19; Co 260x266. 1884-1900. A.

Mahogany base holds a vertical rectangular copper band (W25); top centre is a bracket for two magnetic needles.

The bracket is of brass, and would hold the missing needles either above the band coil or just below its top side; each end of the band has a brass screw contact.

Dates from Anderson 1990,10.

3175 QBP120 COIL & MAGNETIC NEEDLE

Unsigned

BD 76&78; H 153. Late 19 early 20 C. G.

Two; mahogany base; brass pillar with needle point on top; around this, rectangular copper wire, brass cups.

The latter are on the ends of the wire, such that a current would go around the copper wire coil when they were connected to a source, and the missing magnetic needle would thus be deflected.

3494 QBP220 COLOUR SPINNER

THE RUDIMENTS OF COLOUR BY ROTATION BY JOHN GORHAM M.R.C.S.

CyD 45; H 15; DiD 30; C 178x129x36. Late 19 C. G.

Turned ivory mouthpiece and rubber tube lead to a green metal cylinder with vanes to turn a disc on top.

The disc has a spike on it to hold coloured discs (mostly D93); blowing through the mouthpiece and (replacement) tube turns the hidden vanes in the cylinder to rotate the disc; the instrument is contained in a cardboard case with a green label.

0236 QBP030 COMMUTATOR - RUHMKORFF

Unsigned

B 102x99. Mid to late 19 C. G.

Rectangular mahogany base with brass fittings; ebonite cylinder with two right-angled brass contacts.

The latter engage with, or disengage from, brass springs attached to screw electric contacts on the base; the cylinder has a brass rod to enable it to be turned to make and break the circuit.

2332 QBP098 COMPASS - MARINE

GREGORY & WRIGHT near ye India Houfe LONDON *

Sps 292&301; H 329; HsD 193. 1782-1790. F.

Two wood feet and stand to pivoted brass ring; pivoted to this, brass bowl for compass rose on agate bearing.

Rose in black and white with 32 points and scale 0-90 -0-90-0°.

Dates from Crawforth 1988,8.

0232 QBP026 CONDENSER - VARIABLE, AEPINUS

W.G. PYE MAKER CAMBRIDGE

B 329x126; H 217; PsD 114. Early 20 C. G.

Mahogany base; fixed brass disc on insulated stand at one end; identical second disc moves in brass groove.

The insulated stands consist of brass sleeves at the bottom, glass pillars, brass spheres on top, with horizontal bars to the vertical discs; there are brass screw electric contacts to each sphere; the groove along the middle of the base is made of parallel brass strips, in which the stand for the moving disc can slide, and one of the strips is divided 0-18.

3194 QBP139 CONDENSER BOX

NO 8094 THE DUBILIER CONDENSER CO (1925) LTD. LONDON. W.3.

Hs 432x222x200. 1925. S.

Lidded oak housing; ebonite top; 12 copper switch levers with ebonite handles labelled from 0.001-0.4.

Each lever, when horizontal, connects to two pairs of brass contacts, and is detached from these when raised; the top also has two brass screw contacts; the labels read 0.001, 0.002, 0.003, 0.004, 0.01, 0.02, 0.03, 0.04, 0.1, 0.2, 0.3, 0.4.

3176 QBP121 CONDUCTOR - CYLINDRICAL

Unsigned

BD 146; H 485; CyL 131, D 50. Mid 19 C. G.

Turned mahogany base and sleeve for glass pillar to mahogany sleeve for brass cylinder with widened ends.

3177 QBP122 CONDUCTOR - POINTED

Unsigned

BD 102; H 424; PrD 12; WiD 5. Mid to late 19 C. G.

Mahogany base; brass sleeve for glass pillar; another brass sleeve on this for brass rod pointed at the top.

3156 QBP101 CONDUCTOR - SPHERICAL

Unsigned

B 197x150x31; H 420; SrD 135; HiD 32; PrD 24.

Mid to late 19 C. G.

Mahogany base and sleeve for glass insulating pillar; on top, hollow brass sphere with hole above.

In the hole is a small brass sphere (D24) on a replacement white insulating rod; there is a second hollow spherical conductor (D87) with a circular boxwood base (D151).

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Also present are two large hollow brass spheres (D235) somewhat elongated at their bottoms and with holes (D80) - which may be remnants of a large plate electrostatic generator, see 3189 QBP134.

3467 QBP193 CRYOPHORUS

Unsigned

L 460; SrsD 73; TuD 11. Mid to late 19 C. G.

Glass; a tube has its ends bent in right-angles leading to a sphere on each end; contains water.

While the apparatus resembles a pulse glass, it is larger, and there is no boiling of the liquid with hand heat; this suggests that it contains water, and is another form of cryophorus - see 3465 QBP191.

3465 QBP191 CRYOPHORUS - WOLLASTON

Unsigned

L 384; SrD 61; CyD 41, L 137. Mid to late 19 C. G.

Glass J-tube; near-spherical bulb on short arm; cylinder with a rounded end on long arm; contains water.

The water is led into the sphere; the cylinder is then placed in a freezing mixture which condenses the water vapour, leading to evaporation of water in the sphere; this results in cooling, which freezes the water in the sphere.

Details from Ganot 1890,342-3.

3457 QBP183 CUP OF TANTALUS

Unsigned

BD 86; H 157; MxD 89. Mid 19 C. G.

Glass; disc base, neck, and bell-shaped goblet; through a cork in the neck is a tube bent in an ellipse; the end of the tube, inside the goblet, is close to the bottom of the goblet.

3908 QBP269 DIP CIRCLE

"NIVOC" W. & J. GEORGE LTD. London & Birmingham

Sp 181; BD 162; Hs 164x154x71. Late 19 early 20 C. G.

Three brass screw feet; mahogany disc base and glazed housing for silvered circle and brass mounts for needle.

The base has a central divided ring 0-90-0-90-0°, and the housing rotates, its rotation being measured on the ring; the vertical silvered ring inside the housing is divided 10-90-10-10-90-10°; the needle sits on agate plates on brass diagonal horizontal supports, and there is a knob at the side of the housing to lower the supports so that the needle can swing; the needle is housed in a tin box, with tweezers; on top of the housing is a bubble level.

2328 QBP094 DIP CIRCLE

W. Wilton, ST. DAY, Cornwall

Sp 171; HoCrD 143; VeCrD 134; H 207. 1830-1851. R.

Brass; horizontal circle; spirit level; vertical circle in glazed cylinder housing; thermometer at back.

Needle on jewelled bearing; two clamping knobs at back of cylinder housing where there is also a brass divided circle 0-90-0-90-0° with two verniers; horizontal circle on three level screws is divided 0-80-0-80-0-80-0-80°; vertical circle has silvered scale 0-90-0-90-0° for double white-metal needle; thermometer has scale -10-150° F and 20-70° C.

Dates for William Wilton from Clifton 1995,301.

0272 QBP067 DISC SPINNER

Unsigned

B 228x145; H 298; DiD 164. Mid 19 C. G.

Mahogany base and pillars; ebonite disc, coloured spots; two conductors; to demonstrate short duration of spark.

Spots coloured white, purple, yellow and red - 12 in all; open mahogany base; conductors on glass pillars at sides; when the disc is rotated and a spark is generated, the spots stand out sharply, since the duration of the spark is very short.

This information based on a somewhat similar instrument in Teyler's Museum, illustrated in Turner 1983,191.

3157 QBP102 DISCHARGE FRAME

Unsigned

Fr 333x132x8; H 240; SrD 21. Late 19 C. G.

Turned boxwood handle holds mahogany frame for glass pane with zig-zag metal strip; brass sphere at one end.

The strip has six 180° turns, and is interrupted to give a varying spangled appearance; the brass sphere is attached to one end of the strip; there is a hook at the other side of the frame, but it does not appear to be connected to the other end of the strip.

3886 QBP247 DISCHARGE TUBE

Unsigned

L 180; D 13. Late 19 C. G.

Three cylinder tubes, with point electrodes at each end, containing phosphorescent (presumably) powders.

3510 QBP236 DISCHARGE TUBE

Unsigned - marked G 572 - weighing scales Trade Mark.

BD 118; H 380; SrD 132. Early 20 C. G.

Black wood base; two vertical metal cylinders with wires to sleeve for glass sphere with three different electrodes.

The central electrode, rising from the metal sleeve holding the sphere, through a central glass tube, ends in a U-shaped filament with a white-metal strip across the arms of the U; on one side is a long spike electrode from an angled side arm, and on the other side is a rectangular plate electrode, also from a shorter angled side arm.

3509 QBP235 DISCHARGE TUBE

Unsigned

RiOD 432, ID 396; H 290. Late 19 C. G.

Glass; horizontal ring has its ends rising off-vertical to form a V, with electrodes on top of arms.

The arms end in copper thimbles with screw contacts attached inside to disc electrodes; the bottom of the V is blackened, and each arm has a side tube bent in two right-angles so that most of it rises parallel to the arm of the V; the ring tube contains some mercury

3512 QBP238 DISCHARGE TUBE - CROOKES

RICH. MÜLLER-URI BRAUNSCHWEIG [on paper label]

BD 73, H 310; SrD 130. 1894-1910. F.

Black turned wood base; tube to glass sphere with three point electrodes and one concave disc electrode.

The point electrodes are held by side arms below the sphere, on top, and below the equator at one side; the disc electrode is close to the equator on the other side.

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Griffin 1910,958 notes that this tube gives the luminous discharge required in "so-called" Geissler Tubes, and it will pass from the disc cathode to whichever electrode is made the anode.
Brachner 1985,146 records that the firm was founded in 1894, and was active until at least 1910.

3887 QBP248 DISCHARGE TUBE - CROOKES

Unsigned 8 - Molecular Shadows on Screen

BD 77; H 318; TuD 30. Mid to late 19 C. G.

Black turned wood base; vertical glass tube; horizontal disc electrode below, glass cross, angled screen.

The white screen (126x28) extends along most of the tube above the horizontal cross; on top is a point electrode.

3514 QBP240 DISCHARGE TUBE - CROOKES

Unsigned

BD 81; H 215; TiL 160, D 35. Mid to late 19 C. G.

Black turned wood base; support for vertical glass tube with concave disc, point, and foil electrodes.

The upper electrode is the disc; about three-quarters of the way down the tube is a side arm for an electrode attached to a foil kite (now bent down); from the bottom rises the point electrode; all the electrodes are fused with red glass.

Griffin 1910,962 illustrated a somewhat similar spherical tube, showing that a piece of platinum foil at the focus of the concave electrode will be heated to glowing point.

3513 QBP239 DISCHARGE TUBE - CROOKES

Unsigned

BD 103; H 173; TuL 227, D 38. Mid to late 19 C. G.

Black turned wood base; glass support for horizontal glass tube containing a bent whitened metal sheet.

The sheet is nearly the full width of the tube, and it runs at a slight diagonal from one end of the tube to near the other where it is bent so that the curved end is perpendicular to the axis of the tube; the bent end has two slits; there is an electrode at one end, attached to the sheet, and two small disc electrodes at the other, opposite the slits; there is metal foil at the electrodes outside the tube.

Griffin 1910,962 has a similar tube to show the deflection of two cathode streams - when one electrode, at the end which has two, is made the cathode, the rays form a V-shape from the two slits; when both electrodes are made cathodes simultaneously, the rays are parallel; this phenomenon is attributed to electrostatic repulsion of the negatively-charged particles by the strong field surrounding the electrode.

3169 QBP114 DISCHARGE TUBE - CROOKES

Unsigned

BD 76; H 210; SrD 67. Mid to late 19 C. G.

Black turned wood base holds stem of sphere containing needle to pivot for four rotating metal diamond vanes.

An electrical contact below leads to the needle, and one on top to a wire above the vanes' pivot.

3511 QBP237 DISCHARGE TUBE - DE LA RIVE

Unsigned

BD 66; H 215; D 75. Mid to late 19 C. G.

Black wood base and vertical permanent magnet; elliptical glass vessel, with ring and point electrodes.

The glass vessel has a tube in its centre, which fits over the magnet; on top is a vertical descending point electrode, and from near the bottom is another electrode ending in a ring around the magnet tube.

Griffin 1910,947 gives this as one version of de la Rive's Apparatus, which demonstrates that, in a partially ex-hausted vessel, a discharge will revolve around a magnet.

3885 QBP246 DISCHARGE TUBE - GEISSLER

Unsigned

L 325-157. Late 19 C. G.

A collection of 13+ glass tubes of various shapes, from dumb-bell to those with ellipses, spirals, coils.

Two of them are more elaborate, containing respectively a green glass vase, amphora like, with a foliate top, and a green glass jug of similar shape, but with a flat, lipped top, and an S-shaped white glass handle; six of the tubes are joined together.

3483 QBP209 DISCHARGE TUBE - HITTORF SPIRAL

Unsigned

BD 147; H 599; SrsD 98&100. Mid to late 19 C. G.

Black wood base and pillar to brass bracket for glass tube consisting of two spheres and three glass spirals.

At the suspension point, at the top of the pillar, is a vertical spiral tube; from the end of the tube, and from the centre of the spiral are connected two tapering spirals leading downwards and connecting at their bottoms to two glass spheres; these, in turn, are joined by a horizontal tube, and two long wire electrodes stretch from the outsides of the spheres into the connecting tube, nearly meeting; the base is now cracked.

Griffin 1910,955 shows a similar, though less elaborate, tube, which it describes as: "Hittorf's Spiral Tube, to show that when the distance between the electrodes is less than the length of the dark space, the discharge will pass more readily through an alternative route although this may be very much longer."

3891 QBP252 DISCHARGE TUBE - HOLTZ VALVE

Unsigned

L 418; TusD 18; BusD 32&37. Late 19 C. G.

Glass; two pear-shaped bulbs lead to two parallel tubes, with segments joined by tubes in opposite directions.

Griffin 1910,954 illustrates a similar tube, but one which has small funnels connecting the segments, rather than the thin tubes in this example, and calls it a "Double Holtz Valve Tube"; a single tube is also illustrated; the description is: "with two arms in which the funnels point opposite ways. The discharge will only pass through that arm in which the cathode stream goes from apex to base of the funnels."

3178 QBP123 DISCHARGE TUBE - SPANGLED AURORA

Unsigned

L 395&323; D 13&16; SrsD 24. Mid to late 19 C. G.

Two; each has brass ends holding a glass cylinder with spiral spangles; the shorter ends in brass spheres; the longer has cylinder brass ends, one rounded and one flat.

3504 QBP230 DISCHARGE TUBE - SPIRAL

Unsigned

H 432; W 280. Mid to late 19 C. G.

Glass; central coil has right-angled tubes from its centre and end to two tapering spirals ending in electrodes.

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The tube is almost identical to the Hittorf spiral tube 3483 QBP209, except that the tapering spirals in this case do not lead to glass spheres connected by a horizontal tube; instead, the tubes end in thin cylinders, each of which has a four ring coil electrode at the bottom, and one of which has a glass side arm.

3158 QBP103 DISCHARGER - JOINTED

Unsigned

L 470; HaL 192; SrsD 24. Mid 19 C. G.

Turned glass handle to sleeve and pivot for two bent brass arms ending in spheres.

There is a second, smaller, jointed discharger missing one of its brass spheres.

3907 QBP268 EAR MODEL

BAILLERE, TINDALL & COX, 8, HENRIETTA Street, Covent Garden, London, W.C.

C 162x83x45. Late 19 early 20 C. G.

Cardboard case with six plaster models of parts of ear.

There are two larger models of the ear structure, plus four small models of "Bones of the ear"; the case has a paper label with the signature, and: "MODELS OF HUMAN EAR TO ACCOMPANY Sound and Rythm."; inside the lid is a label reading: "MODELS OF BONES OF HUMAN EAR. The models are of the left ear, and consist of: the two halves of the petrous bone, in which the ear is embedded, sawn across: the labyrinth bone, consisting of the cochlea and the three semi-circular canals: the three ossicles or small bones of the ear, namely, the malleus, or hammer; the incus, or anvil; and the stapes, or stirrup. The first three models are of natural size: the three ossicles have been enlarged five times linear."; a "nightingale whistle" mentioned is no longer present.

3883 QBP244 EARTH INDUCTOR - DELEZENNE CIRCLE

ELLIOTT BROTHERS LONDON

B 445x352x20; MxH 453; Fr 342x342; CrOD 272.

Late 19 early 20 C. G.

Mahogany base, trunnions to rotating square frame and coil circle; brass disc outside one trunnion 90-0-90°.

A turned wood and brass handle outside the frame allows the coil and housing to be rotated; on the other side of the frame is a commutator, having copper wire contacts to two brass screw electric contacts; an indicator on the brass disc gives the angle of the frame.

3160 QBP105 ELECTRIC EGG

BAIRD & TATLOCK LONDON & GLASGOW

BD 152; H 505; SrD 151. Late 19 C. R.

Mahogany base; brass stop-cock and sleeve for glass egg; two brass sphere conductors inside, the upper one adjustable.

The latter is attached to a rod through a brass sleeve to a ring (OD44) on top, so that the distance between the spheres inside the egg can be adjusted; between the base and the brass stop-cock is an oxidised brass horizontal air outlet tube; the base is weighted below with an iron ring.

Baird moved to London in 1890, Brian Gee, Bull SIS 27, 1990,33.

3172 QBP117 ELECTRIC SPRING

Unsigned

B 146x124x26; H 402; CyD 61, H 31. Mid to late 19 C. G.

Mahogany base holds brass sleeve for glass cylinder, and pillar and bracket to suspend spring into the cylinder.

The base has two brass screw contacts, one connected to the pillar, and hence to the top of the spring, the other to a wire in the centre of the cylinder, which presumably is to hold mercury; the bracket on the pillar can be adjusted, and it also holds a vertical bar magnet in the centre of the spring.

Presumably, when a current is passed, the spring rises and falls.

0224 QBP018 ELECTRO DYNAMOMETER

SIEMENS BROS. & CO. LIMITED. LONDON No 1167

B 206x179; H 325. Late 19 early 20 C. G.

Boxwood base and vertical support for coils; white circular scale 0-350° on top connected to moving coil.

Both coils are green-covered; the moving coil has four turns around the many-turned stationary; there are three brass screw contacts on the base.

3191 QBP136 ELECTROMETER

THOMSON'S ELECTROMETER NO 17. J. WHITE GLASGOW

HsD 88, H 102; CD 105, H 130. Pre 1892. R.

Brass cylinder housing, four rectangular windows; divided top disc 0-90 drives linear scale inside 0-30; case in the form of two leather cylinders, one fitting over the other.

The linear scale measures the position of the hidden element in an internal cylinder housing, protected on one side with an arc support for three ceramic panels; on the top is a slide to insert paper giving "DATES OF DRYING"; at the bottom of one of the windows on the sides of the housing is a sliding magnifier; glass rod for inside plate broken.

Kelvin was elevated to the peerage in 1892, Smith 1989,799.

3165 QBP110 ELECTROMETER

Unsigned

H 255; PrD 11; SvD 18; P 72x13. Mid 19 C. G.

A glass rod leads to a brass sleeve; on this is a brass plate with a hinged white-metal leaf.

The glass rod is on a modern wood base; at right-angles to the bottom of the vertical plate is a horizontal rod with two screws, which possibly originally held a scale.

3164 QBP109 ELECTROMETER

Unsigned

CyH 147, D 41-36; SrsD 14-15. Mid 19 C. G.

Glass cylinder; lower half has foil outside and metal inside; two brass conductors, one has two spheres, the other has one.

The cylinder is slightly tapered, getting a little wider on top, where there is a small pourer indent in the rim; a brass sleeve around the outside leads to a brass rod bent in a right-angle ending in a brass sphere; from the metal inside the cylinder rises another brass rod leading to a sphere and then to a second sphere at the end of a crook-shaped rod.

3161 QBP106 ELECTROMETER - GOLD LEAF

NEWMAN LONDON

BD 170; H 452; CyMxD 120, H 223. 1816-1860. F.

Turned mahogany base and table for glass cylinder; on top, mahogany cap with brass groove for two leaf holders.

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The base and table are separated by a short turned boxwood pillar; the leaf holders are at the bottom of metal rods, which go through brass sleeves sliding in the groove (but protected from them with glass rods and red resin), to brass rings on top (OD26); the missing leaves can thus be separated to any required degree up to c62mm.
Dates from Turner 1983,24.

3181 QBP126 ELECTROMETER - GOLD LEAF

YEATES & SON, DUBLIN.

B 154x149x15; H 280; JaD 129; DiD 135.

Mid to late 19 C. G.

Mahogany base with groove for glass jar; on top, brass disc with rod through ebonite to leaves in jar.

The jar which is present is damaged at the bottom; the base has a foil strip along it, and two such strips run up the sides of the jar to about half way.

There is another similar disc with a rod through an ebonite and brass sleeve, but without its jar;

0220 QBP016 ELECTROMETER - QUADRANT

Unsigned

H 380; Sp 350. Early 20 C. PC.

Kelvin standard; triangular base, three struts to table with contacts and mirror; below, glass quadrant housing.

The base has three level screws at the corners of the base triangle, and at the points where the three struts rise to the table above the suspended glass globe holding the quadrants and, below these, vertical strips and a horizontal ring of metal foil outside, with corresponding copper strips inside; the fittings above the table include a drum micrometer, and a lens to read a scale in a semi-circular housing on top.

Name from Griffin 1910,670; date on card with instrument.

0221 QBP017 ELECTROMETER - QUADRANT, DOLEZALEK

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE ENGLAND NO 3259

BD 150; H 355. Pre 1907. N.

Cylinder brass housing, square window; amber pillars.

Three level screws on base; housing in Room EB14 in oak case signed "Isenthal & Co 85, MORTIMER ST. LONDON, W.", which contains four shunts for another missing instrument.

Name from Griffin 1910,667; CSI serial No 4734 dated 1:3:1907, J. Bennett, PC.

0263 QBP058 ELECTROMETER - TORSION, COULOMB

ELLIOTT BROS LONDON

BD 333; H 600. Third ¼ 19 C. G.

Laminated mahogany base; three level screws; paper scale 0-35 on housing; silver drum vernier torsion micrometer.

Wide cylindrical glass housing on base; brass sleeve in centre of glass disc lid to cylinder holds a vertical glass tube to the micrometer fibre suspension; a hole in the disc lid has a brass sleeve for a dumb-bell conductor

Similar to that illustrated in Elliott 1895,58, but missing circular windows on side of housing.

3179 QBP124 ELECTROPHORUS

Unsigned

D 229, 241 & 229; SrD 22. Mid to late 19 C. G.

Brass disc with glass cylinder handle; ebonite disc; brass disc with turned glass handle and side sphere.

The disc with the cylinder handle has a raised edge on the handle side; that with a turned handle, which does not seem to match the other and looks older, is entirely flat, but has a right-angled rod to the sphere; seemingly two separate instruments, now sharing the remaining ebonite disc.

For description, see Ganot 1890,720.

3189 QBP134 ELECTROSTATIC GENERATOR

Unsigned

PsD 882 & 765. Mid to late 19 C. G.

Large glass plates only - probably from two different machines; the smaller has a wood axis;

These are notable particularly for their size; the larger being among the largest found in the country; it could be worth trying to find other parts for what were likely to have been two fine machines; possibly the large spherical conductors listed in 3156 QBP101 belong to one of them.

0264 QBP059 ELECTROSTATIC GENERATOR - WIMSHURST

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST LONDON

B 483x262; H 597; PsD 462. Late 19 C. F.

Open mahogany base and pulley wheels; brass conductors with ebonite and glass insulation; two leyden jars.

Two vertical mahogany supports rise to the axis of the counter-rotating ebonite plates, which have white-metal lozenges around them; the leyden jars are cylinders of glass in brass sleeves on the base; glass pillars in brass sleeves rise to spherical brass couplings for the combs and the conductors; brass bars with copper brushes extend from the plate axis.

This is a complete instrument in fine condition.

Firm founded in 1884, Downing 1988,57; Wimshurst Machine invented in 1883, Van Camp 1988,63.

3442 QBP168 EXPANSION APPARATUS - BAR BREAKER

GRIFFIN, LONDON

B 444x92x40; H 125. Late 19 early 20 C. G.

Cast iron base and supports for burner under expansion rod which has a hole in one end for the breaking bar.

The missing bar would be secured between two pairs of vertical supports at one end of the base; at the other end are two more pairs of bars to hold a knotted nut on a screw thread on the rod; with the bar in place, the rod would be tightened using the nut; heating the rod by means of the heating pipe underneath - which has a brass input pipe and stop-cock, with 21 holes - would break the bar.

Similar device illustrated in Griffin 1910,416.

2316 QBP082 EYE MODEL

YEATES & SON, 2 Grafton Street, DUBLIN.

C 252x109x45; StBD 56; H 227, PrD 8. 1840-1864. F.

Mahogany case; 12 model retinas; brass stand with weighted base, right-angled bracket, and mirror.

Latter is detached and has a central hole; instrument variously called an ophthalmometer or ophthalmoscope; printed label in case lists the characteristics of the retinas: 1° OEil physiologique. 2° Atrophie de la papille et de la rétine. 3° Atrophie

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choroïdienne. 4° Staphylome postérieur et ancien: foyer la régnon de la macula lutea. 5° Hémorragie rétinienne. 6° Altération rétinienne de l'aluminarie - etc.

3202 QBP147 EYE MODEL

Unsigned

B 335x235x15; H 205; BaMxD 145. Mid 19 C. G.

Black wood base for plaster base and eyeball with optic nerve; the ball comes apart to show lens and iris.

The mass of the eyeball is made of a cut-off sphere of glass with an indent for the biconvex lens, which can be removed when the two halves of the ball are separated; the upper half of the sphere has tracing paper with anatomical details; over the ball fits a cut-off hollow hemi-sphere with painted nerves, and the top half of the iris, the bottom half of which is attached to the fixed half of the model.

3201 QBP146 EYE MODEL

Unsigned

BD 89; H 240; RiD 110. Mid 19 C. G.

Brass base and turned pillar to brass ring housing for imitation eye - cornea in front and convex lens behind.

Inside the housing is a ring with a paper-covered front and a black back; in the centre of this is the silvered brass imitation eye held in place with an oxidised brass screw-on ring (OD44); the silvered hemi-spherical housing for the (cracked) cornea screws off to reveal a broken glass ring in front of the brown iris, with the bi-convex lens system behind.

3216 QBP161 EYE-SIGHT TESTER(?)

J., Duboscq à Paris

L 534; Br 500x25x12. 1849-1883. F.

Brass and oxidised brass; divided bar 0-45 has plate and clip at end for lens; sliding plate has hole pattern.

The latter is in the form of a circle of 16 small holes, with another in the centre, and four more inside the circle; the plate with holes has a sliding window vernier 0-10 running along the bar to determine its distance from the lens.

Dates from Brenni 1988,3-4.

0216 QBP012 FARADAY NEEDLE

YEATES & SON, DUBLIN.

H 313. c1877. CT.

Cast iron tripod base; vertical magnet; wood mercury reservoir on top; wire from brass crook into mercury.

Cylinder magnet rises vertically from green painted base; on top is a boxwood mercury reservoir with a brass contact; a brass crook with a contact at the bottom rises from the base to above the cup; a wire from this into the mercury will rotate when a current is passed; a card with the instrument notes that this is a model of the first electric motor as designed by Michael Faraday.

Illustrated in Yeates 1877,31.

3443 QBP169 FLYWHEEL

Unsigned C101

B 216x140x25; H 275; WhD 125. Mid to late 19 C. G.

Mahogany base; right-angled iron bracket holds axes for heavy brass wheel with concave/convex centre.

The lower axis is a short iron pin in the concave underside, and this fits into a short iron pillar on the base bracket; the upper axis is long and tapering, and its top fits into a hole in a brass arc which can be clamped in a groove at the end of the supporting bracket.

3492 QBP218 FRESNEL BIPRISM

Unsigned

40x30x3; STBD 127, MnH 190. Late 19 C. G.

Glass plate slightly roofed on one side; on a wood and brass stand with a plate for a plano-concave lens.

The prism is now sellotaped to a black brass arc with a hole for the reducing lens; this is held on a brass pillar with a wood base.

3501 QBP227 FRICTION HEATING APPARATUS - SEARLE

W.G. PYE & Co. CAMBRIDGE

B 199x138x32; H 257; W 440. Early 20 C. G.

Cast iron base; brass arch to pulley wheel, endless screw, and, on top, brass cylinder housing for cones.

The housing (H54,D67) has cork lining, and holds the rotating tapering brass vessel; the stationary vessel sits into this, and it has two spikes above for the missing large pulley wheel to which would have been attached tangentially a string for weights held beyond a small pulley wheel on a rod bent in two right-angles from the base; the endless screw above the base drives a brass disc rotation counter (D50) reading 0-100.

Pye 1914,110 notes that this apparatus to determine the mechanical equivalent of heat was designed by Dr G. F.C. Serle, F.R.S.: "The work is expended in heat caused by the friction between two well-fitting cones, the lower or outer one of which is driven by a motor or hand-wheel. The upper cone, in which water is placed to measure the heat generated, is prevented from rotating by means of a weight hanging over a pivoted pulley."

0237 QBP031 GALVANOMETER

UNIVERSAL-GALVANOMETER D.R.G.M. No 123356

BD 214. Late 19 early 20 C. G.

Glazed cylinder brass housing; white scales 0-100 and 100-2, arc parallax mirror; side knob to 1 10 50 or 0.

There are two brass screw contacts on the base outside the housing; the face has a trade mark consisting of a Greek Omega with an AS or SA entwined monograph inside it.

3219 QBP164 GALVANOMETER - ASTATIC, NOBILI

ELLIOTT BROS.. LONDON.

Sp 305; BD 280; H 410. Mid to late 19 C. G.

Laminated mahogany base; coil on wood frame; brass crook to suspend needle above coil and magnet in it.

Glass dome fits in groove around base, which has three brass level screws; the needle has a red arrow head and a black tail, and reads a white disc scale 80-0-80°; there are two brass screw contacts on an ebonite plate on the base; below the base is a brass handle which can turn the coil housing and scale disc.

2334 QBP100 GALVANOMETER - ASTATIC, NOBILI

Unsigned(?) - [in locked case]

BD 147; H 294. Mid to late 19 C. G.

Brass base; three level screws; slightly tapering glass cylinder housing, brass ring on top; scale 90-0-90.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Double needle, one part in coil housing, other above white scale with inscription: "La tete de l'Aiguille dévie en A ou en B selon que le courant entre par a ou par b.".

A card with the instrument notes that it was built and used by J.J. Thomson - but it looks too old and professionally built to have been made by him, and the French inscription would suggest otherwise - however, it could have been used by him.

3478 QBP204 GALVANOMETER - ASTATIC MIRROR

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD No 1377.

Sp 199; BD 165; H 206. Late 19 early 20 C. G.

Brass double ring base, three level screws, and arch over ebonite-covered coils; pillar and astatic magnet gone.

The coils and inner base ring can rotate within the outer base ring, and there are two clamping screws; the centres of the "Thick Wire" and "Thin Wire" coils have windows through which the (detached) rectangular mirror can be seen; there are four brass screw contacts on each side of the coil housing, with one side labelled "C" "D" "G" "H"; on top of the brass arch over the coils is a disc base for the astatic pillar.

J. Bennett PC gives 1907 date for No 4734.

0227 QBP021 GALVANOMETER - AYRTON MATHER

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE ENGLAND NO 3685

BD 170; H 242. Pre 1907. N.

Brass; three level screws; black cylinder magnet; mirror.

The base has two spirit levels and three screw electric contacts; the vertical coil housing fits between the poles of the ring magnet, and is secured by two screws; the mirror is in a glazed housing just above the brass disc cover to the magnet.

CSI serial No 4734 1:3:1907, J. Bennett, PC.

3170 QBP115 GALVANOMETER - AYRTON MATHER

AYRTON & MATHER. R.W. PAUL, HATTON GARDEN, LONDON. 4276.

Sp 137; BD 147; H 180; MD 102. Patent 1892. S.

"PATENT 1892."; brass; three level screws; base disc; ring magnet; brass disc on top; coil and mirror insert.

The latter fits between the poles of the black horizontal ring magnet; the mirror is housed in a glazed cut-off cylinder (D30H19) on the insert (mirror now detached); on top of the upper disc is a central circular bubble level containing pink liquid; there are two brass screw contacts on the base disc.

0228 QBP022 GALVANOMETER - BROCA

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE ENGLAND NO 4683

BD 170; H 258. c1907. N.

Brass base and frame; ebonite coil housing.

The base has three level screws, two spirit levels, and two screw electrical contacts.

Griffin 1910,732 describes the instrument: "This galvano-meter is of the 'moving vertical magnet' type. The magnets consist of two steel wires placed vertically and each so magnetised that its two ends are of like polarity with a consequent pole in the middle. This form makes it possible to use comparatively powerful magnets while the moment of inertia of the suspended systems is kept small; and at same time [sic] the arrangement is very astatic. The whole system is suspended by a fine quartz fibre. The controlling force is supplied in a small degree by this fibre but principally by the controlling magnet at the back of the instrument. The faces of the ebonite coil boxes are completely covered by a thin metallic shield, while, the frame being of metal, the suspended system is completely shielded from electrostatic forces. In order to prevent a large potential difference existing between the metal frame and the coils one terminal is connected to the frame and so brought to the same potential as the magnet system by means of the clamping device."

CSI serial No 4734 dated 1:3:1907, J. Bennett, PC.

0219 QBP015 GALVANOMETER - CURRENT

SIR WM. THOMSON'S PATENT J. WHITE GLASGOW NO 214

L 397; W 152. 25:2:1889. S.

Mahogany base; boxwood scale; coil; moving magneto-meter in arc housing, arms for semicircular magnet.

Magnetometer in right-angle arc oxidised brass housing with double pointer and mirror below; other end of magnet sits on a small adjustable pulley wheel with a bubble level beside it; date on magnet "FEBY. 25TH. 1889".

Details of the instrument are given on a photocopy from an unnamed text, which notes that the coil is made up of a few turns of thick copper wire, has a resistance of only about 1/1000 of an ohm, and that any current with an intensity of less than 100 amperes may be safely measured.

0276 QBP071 GALVANOMETER - D'ARSONVAL

HOLDEN DARSONVAL GALVANOMETER J. PITKIN LONDON

BD 125; H 202; CyHsD 91, H 142. Late 19 C. G.

Ebonite base; three level screws; ring magnet with 20 laminations; coil turns around cylinder; brass housing.

The latter has a circular window for the mirror; on top is a circular bubble level, now empty, which hides some of the signature; two brass screw contacts project from the side of the base.

Downing 1988,103 gives dates 1858-1949 for the firm of James Pitkin.

0218 QBP014 GALVANOMETER - POTENTIAL

SIR WM. THOMSON'S PATENT J. WHITE GLASGOW NO. 46

L 382; W 150; H 150. 28:2:1883. S.

Mahogany base; boxwood scale; heavy coil; moving magnetometer in arc housing; semicircular magnet.

Magnetometer in right-angle arc oxidised brass housing with double pointer and mirror below; arm to hold magnet whose other end sits on a small adjustable pulley wheel with a bubble level beside it; date on magnet "Feby. 28TH 83".

Details of the instrument are given in a photocopy from an unnamed text, which notes that the coil is of insulated copper or German silver wire, whose resistance is generally over 5000 ohms.

3171 QBP116 GALVANOMETER - TANGENT

W.G. PYE & CO. CAMBRIDGE, ENG: [on magnetometer]

Sp 172; H 212; CoHsOD 164; MaD 113. Early 20 C. G.

Two; mahogany base and coil housing; brass; three level screws and four contacts; glazed magnetometer 0-90-0-90-0.

There are three magnetometers - one only is signed and has no parallax mirror; the other two have circular parallax mirrors (one cracked); one of the instruments is signed: "W.G. PYE & CO MAKERS CAMBRIDGE" [stamped on the base]; the other is missing its signature disc, but is identical to the first.

0225 QBP019 GALVANOMETER - TANGENT

Ruhmkorff, à Paris

H 510; SD 235; CoD 340. 1840-1877. R.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Tribach base; on this, horizontal silver ring scale; vertical brass coil; magnetometer on central pillar.
The base has four brass screw contacts on an ebonite plate, and a spirit level, as well as the six-spoke scale ring 0-90-0-90-0°, which has vernier and clamping screws, and shows the direction of the coil ring housing; the magnetometer is in a glazed brass cylinder housing, with a silvered ring scale 0-90-0-90-0°.
A card with the instrument calls it a Sine and Tangent Galvanometer.
Dates from Turner 1983, 184-5.

3503 QBP229 GALVANOMETER - TANGENT, GAUGAIN

Unsigned - [signature disc missing]

Sp 248; BD 220; CoHsD 336. Late 19 early 20 C. G.

Mahogany base and two coil housings for single and multiple turns; central brass glazed magnetometer 0-90-0-90-0°.

Each coil housing, which has a mahogany diameter, has a covered multiple-turn coil and a single copper turn; there are four brass screw electrical contacts on an ebonite arc on the base, which also has three brass level screws; the magnetometer is placed on mahogany crossed arms from the diameters of the coil housings, on top of a turned mahogany pillar in the centre of the base.

Name from Griffin 1910, 742.

3448 QBP174 GEISSLER TUBE SPINNER

Unsigned

B 353x143x31; WhsD 209, 111, & 21. Mid to late 19 C. G.

Mahogany base holds two brass and oxidised brass A-shaped brackets, holding two brass and one wooden pulley wheels. In the centre of the cross bars of the A support is the axis of the larger brass pulley wheel (D111), turned by a brass and wood handle; a missing thong would have connected this to the brass pulley wheel (D21) on top of the frame; the latter is on the axis of the large wood pulley wheel (D209) which would have supported the geissler tube; it now has a modern cork handle attached; the base retains only two of four disc feet; it also has two brass screw electric contacts at one end connected to two sunken wires under the base leading to one side of the centre of the base; these ends appear to have been connected to two vertical rods, now broken off.

The Queen's catalogue list describes this as a "Geissler tube rotator".

3456 QBP182 GLASS GLOBE

Unsigned

H 158; D 139; DisD 69. Mid 19 C. G.

Two brass and oxidised brass curved triangular plates with glass disc centres hold a glass sphere.

The plates are held together by three brass rods with knurled screws to tighten them; the glass sphere has cut-off ground ends which are covered by the discs in the centres of the plates; the sphere also has a small hole (D9) half way between the cut-off ends.

The purpose of the apparatus is unclear.

3455 QBP181 GLASS GLOBE

Unsigned

H 380; MxD 134. Mid 19 C. G.

Tear-drop-shaped vessel with brass sleeve, stop-cock, and hanging hook on top; for weighing air.

The hook is on a sleeve, screwed onto a thread which would fit in the centre screw hole of an air pump plate; this is part of the stop-cock system, whose other end also unscrews from the sleeve protecting the narrow end of the glass tear drop.

3462 QBP188 GLASS TANK

Unsigned

172x163x163; H 210; Sp 237. Mid to late 19 C. G.

Oxidised brass base with side tap and three level screws for cubic tank with a brass rim on top and a glass lid.

The square lid has five circular holes (1xD31, 4xD21); white resin separates the glass bottom of the tank from the brass base; there is a hole in the centre of the bottom of the tank, leading to the tap; the apparatus now has black binding tape outside and a polystyrene square inside.

2315 QBP081 GONIOMETER - CRYSTAL, WOLLASTON

YEATES & SON Dublin

B 112x111x24; H 160; DiD 100. Mid to late 19 C. G.

Mahogany base; brass; trunnion to axis of disc, scale around side; knurled knobs turn disc and crystal holder.

Scale 10-90-0-180-10-90° with vernier 0-60; crystal holder on sliding support from base, with a universal ball joint and a black glass (28x16); in mahogany fitted case (178x 161x127).

3486 QBP212 GRATING - DIFFRACTION

MERTON N.P.L. PROCESS 15,000 LINES/"

Fr 51x38x7; C 64x53x19. Early 20 C. G.

Glass frame with black binding and white paper edging for transparent grating; in black-covered hinged case.

The case is lined with blue velvet and has a brass clip.

0135 QBP004 GRATING - DIFFRACTION

Ruled by Schneider on Prof. H.A. Rowland's engine. Polished by J.A. Brashear, Allegheny, USA.

BD 70; H 64. Late 19 C. R.

Brass and oxidised brass; speculum metal grating.

Brass base disc has three level screws; the grating is in a square oxidised-brass housing.

Bennett 1984a, 100-102 records Rowland gratings dated from 1888-1891; card with instrument suggests c1884.

3485 QBP211 GRATING - DIFFRACTION

Thorp's Transparent Diffraction Grating Replica of Rowland's 14438 lines to the inch.

62x54x5; B 93x24x5; H 60. Late 19 C early 20 C. G.

Oxidised brass base has two supports for a glass panel to which the transparent film grating is applied.

The bottom of the panel is now chipped, and it is held onto the base using plasticine.

There is also a similar smaller grating (51x38x5) with no stand or case, which has the inscription: "Transparent Replica from Rowland. Metal Diffraction Grating, approximately 14550 lines to the inch. The surface of the grating must not be touched."

3487 QBP213 GRATING - DIFFRACTION

Unsigned

Hs 153x127x32. Early to mid 20 C. G.

Rectangular black-painted housing and frame for speculum metal grating of 30,000 lines per inch.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

A label attached to the grating reads: "Reflection Diffraction Grating 30,000 lines per inch. Blazed one side to 2nd order. To show 4th order used [s/c] side opposite to Blazed side."; behind the housing is a brass bar (L69D15) at right-angles to it, with a knurled screw on the end.

3496 QBP222 GRATING - DIFFRACTION, MOUNTED ON PRISM

Unsigned - attributed to Thorp.

PmL 38, Sis 24,30,38. Late 19 C early 20 C. G.

Transparent film mounted on a right-angled prism with ends and smallest face frosted; in black shaped case.

The film is attached to the largest side of the prism; the hinged case has dark blue velvet lining.

The Queen's catalogue lists describes this as: "Thorp's grating mounted on prism for direct vision"; the sides of the case measure 49x44, 49x45, 49x34, 44x34, and 49x17.

3445 QBP171 GYROSCOPE

BRENNAN'S PATENT Sole Makers Newton & Co., 3. Fleet St., London.

Fr 454x108x12; WhD 75. Late 19 early 20 C. G.

Oxidised brass frame; brass gimbal mount and flywheel.

The frame has two long side arms with three cross pieces; two of these make an open square on top and in this sits the brass ring pivoted from two points on the frame; the ring has a white-metal axis across a diameter for the brass flywheel; attached to the ring is a brass ribbon, bent in two right-angles, which stretches below the cross piece support, and prevents the ring from revolving more than about 160°; above the cross piece near the bottom of the frame (H77), is a wood bracket which can slide up or down the frame, and which has a central metal bar.

2319 QBP085 GYROSCOPE

Newton & Co., Opticians & Globe Makers, to the Queen, 3, Fleet St. Temple Bar, London.

BD 100; MxH 275; DiD 86; Sus D157,132,106.

Late 19 C. G.

Brass and oxidised brass; heavy disc in gimbals; stand.

Weighted detachable brass base and turned pillar; into this fits white-metal pin, holding the oxidised brass semicircular ring support for the double ring gimbal disc supports; a knurled knob clamps the pin in the stand; gyroscope disc spins on white metal axis.

The instrument is in a fitted case (244x196x120) with green Trade Card: "Newton & Co. (Opticia)ns, Mathematical, Philosophical, & Astronomical INSTRUMENT MAKERS GLOBE MANUFACTURERS to her Majesty, 3, FLEET STREET. LONDON. NEAR TEMPLE BAR."

3444 QBP170 GYROSCOPE

Unsigned

BD 116; MxH 242; WhD 82. Mid to late 19 C. G.

Brass base and pillar holds iron rod for brass half-ring and whole ring gimbal mounts for the iron and brass flywheel.

The inner ring support is secured with a bar held by two small knurled knobs on one side of the half-ring outer support; the flywheel has a brass disc at the centre surrounded by a heavy iron ring; on the flywheel axis are four cog-wheels (D9-18), presumably to act as Savart discs.

There are various parts of other gyroscopes present also.

0137 QBP002 HELIOSTAT - SILBERMANN

J.C. Silbermann Invteor, Fait par J. Duboscq à Paris No 95

H 358. 1849-1883. F.

Brass and oxidised brass; cylinder clockwork housing; eight-sided mirror on double arc system.

The circular base has three level screws and a spirit level; two supports from the base rise to a pivot for the clockwork mechanism cylinder drum, and one of them has a window vernier and clamping screw to read an arc scale 0-110°; on top of the drum are two small silver scales, 15 30 45 60, read by watch hands, a brass pointer to "M" or "A", a clamping screw, and a slide from "A" through "O" to "R"; a turned pillar above the drum rises to a semi-circular arc and on top of this is a divided disc 1-12(x2); on this again is a divided arc 30-0-30, with a moving block having a large turning key; one end of this arc is attached to a bracket to the centre of the long side of the mirror housing, and a similar bracket attaches to one end of the semi-circular arc.

The instrument was rescued from a skip by technician Bill Boyd in about 1967.

Dates from Brenni 1988,3-4.

3500 QBP226 HORN

ATM CLARITONE BBC PATENT APPLIED FOR RESIST 2000 AUTOMATIC TELEPHONE MANUFACTURING CO, LTD. LIVERPOOL

BD 176; H 580; MxD 355. Pre 1923. S.

Wood base on metal disc; black curved metal horn.

There is a white-metal boss for the black painted horn; "MAY 1923" is stamped on the base; a metal lever on the base varies: "INCREASE Air Gap Adjustment DE-CREASE".

3481 QBP207 HYDRAULIC BELLOWS

Unsigned

L 973; TuD 16; FuMxD 53. Mid 19 C. G.

Part only; a glass tube has a brass funnel at one end and a brass sleeve with a screw thread at the other.

The purpose of the tube was obtained from the Queen's catalogue list.

Ganot 1890,187-8 describes a "water-bellows", which uses a stream of steam through a constriction to raise water from a lower to a higher level.

3482 QBP208 HYDRAULIC RAM

Unsigned

TuL 1072, D 14. Mid 19 C. G.

Part only; thick walled glass tube has a brass sleeve at L132-174 and another with a bent pipe at the end.

Both sleeves have screw threads; the pipe at the end is bent in a 90° curve.

The purpose of the tube was obtained from the Queen's catalogue list, which calls it a "water ram".

Ganot 1890,133-4 shows the complete apparatus which uses the energy of falling water to raise a portion of it to a greater height than the reservoir from which it is fed - it was invented by Montgolfier.

2312 QBP078 HYDROMETER

Riddel, Leo(?) Belfast No. 1 Temp. 60°.

L 225; RsD 20; BuD 30; SfD 6. Late 19 C. G.

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Glass; lead shot weight; tear-drop shaped bulb; paper scale 0-24 with hand-written signature.
"No." and Temp. 60th are printed - the scale, as well as the signature, appear to be written by hand.

2311 QBP077 HYDROMETER

Yeates & Son, Dublin.

L 236; RsD 19; BuD 32; SfD 18. Mid to late 19 C. G.

Glass; spherical mercury reservoir; pear-shaped bulb; hand-written paper scale 800-1000; "Temp 60".

3473 QBP199 HYDROMETER

Hydrometer after Specif: Gravity. Tp:60°. Fahrht.

L 250&295; BuD 14&15; CyD 13&17; CL 263, D 23.

Late 19 C. G.

Two; glass; pear-shaped mercury reservoir; cylinder bulb; hand-written paper scales 1000-1300 and 0700-1000.

The 0700-1000 instrument has a shorter bulb, and a long tapering tube between the reservoir and bulb; the 1000-1300 hydrometer has only a neck; they are both contained in brown mottled cylinder cardboard cases.

2313 QBP079 HYDROMETER - NICHOLSON

Unsigned

L 282; CyD 42; C 292x78x52. Mid 19 C. G.

Brass; conical weight; convex sliding "basket" above; conical cylinder float; rod to disc; mahogany case.

2310 QBP076 HYDROMETER - TWADDELL

WILLIAM TWADDELL SPIRIT PROOF MAKER, No 449, Well Close, head of the Gallowgate, GLASGOW.

L(Rm) 215&192; MxD 32&31; C 277x229x80.

1813-1823. A.

Glass; two (broken) from a set of six in boxwood case.

Tear-drop shaped bulbs; paper scales in stems 24-48 and 138-170; mercury reservoirs broken off; the signature on the instrument is: "Hydrometer, made by Will.. Twaddell, Glasgow. N. 2 ="; second signature obscured.

The signature recorded above is from a trade label on the case; it continues: "In the Hydrometer every degree rises .005 decimal parts of a thousand - No 0,m Hydrometer No 1, being unity, to which point the instrument will sink in distilled water at 56° of Fahrenheit's Thermometer. To find the specific gravity of any fluid, multiply the point it stands at by 5 - if it be immersed in a fluid in which it stands 170 in Hydrometer No 6, then multiply by 5, 850. The integer 1, being added as above shows the real specific gravity compared to water, being 1000 - the fluid which points to 170 is as 1850 to 1000, and so on." Dates from Bryden 1972,58.

4082 QBP270 HYGROMETER - EDNEY PAPER

"EDNEY" PAPER HYGROMETER PERCENT RELATIVE HUMIDITY ENGLISH MAKE No [blank]

HsD 77, W 14. Early 20 C. G.

Thin cylinder silver case; hair spring; scale 20-100.

There is a red needle from the hair-spring to the arc scale; the housing has a ring handle on top.

4083 QBP271 HYGROMETER - MASON

W.B. NICOLSON GLASGOW DRY No.26462 WET No.26463

H(-Ha) 310; W 152; TaH 46, MxD 43. Early 20 C. G.

Oak back; two struts hold two vertical glass-mercury thermometers 30-120°; gauze to copper tank for wet one.

The tank is tapered in shape, and has a lid; it is held on a bracket below the oak back.

0245 QBP040 KALEIDOSCOPE

J. Duboscq à Paris

H 390; L 240. 1849-1883. F.

Horizontal adjustable rectangular black glass mirrors pivot on expanding brass stand; colour chips at one end.

The angle between the mirrors (one cracked) can be adjusted, with scales 100-0(X2); the coloured chips are in a housing at one end; with a plate glass eyepiece in a housing at the other.

Dates from Brenni 1988,3-4.

3193 QBP138 LAMP - CARBON ARC, BROCKIE

JOHNSON & PHILLIPS MAKERS LONDON 4266

MnH(-Ro) 338; HsBo 145x68, To 88x68. Late 19 C. R.

Focus keeping; inclined carbon rods with internal four-coil mechanism to adjust both; oxidised brass housing rising at an angle to the vertical.

Described in Wright 1891,209.

0238 QBP032 LAMP - ELECTRIC

THE-EDISON-SWAN"

BuH 300, D135. c1886. PC.

Fifteen candle power "glowlamp" from Ewart's spinning factory - 1886; glass; with brass and ebonite switch.

Electric light bulb and switch mounted on (new) wooden backing; the inverted commas are only at the end of the signature

A card notes that it is "Original light bulb and switch from Ewart's flax spinning mill - 1886. The carbon filament is 15 candle power, and they were known as 'glowlamps'."

Date on card with instrument.

2327 QBP093 LAMP - LIME LIGHT

Unsigned

BD 110; H 172; W 305. Mid to late 19 C. G.

Decorated iron base; brass pillar; clamp for bracket for two brass inlet pipes with stop-cocks to curved jet.

Latter points towards (missing) lime light cylinder, which can be moved up or down by a knob on a long arm ending above the two stop-cocks.

0252 QBP048 LANTERN - UNIAL

J. LIZARS MANUFACTURING OPTICIAN BELFAST

H 870; Hs 653x390x238. 1894-1921. F.

Mahogany; brass bound corners; curved russian iron top with pointed cope; manual carbon arc lamp inside.

Dates from Burnett & Morrison-Low 1989,150.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3507 QBP233 LENS - BULL'S EYE

Unsigned
BD 124; MnH 265; LeHsD 69, W 15. Mid to late 19 C. G.
Black iron base; brass expanding pillar to pivot for block; in this slides a brass rod holding the lens.
The plano-convex lens is held in a brass ring housing on the end of the rod, which has a knurled knob at its far end.

3508 QBP234 LENS - CYLINDRICAL

Unsigned
BD107; MnH[stuck]422; LeHsD110; Le50x50.
1849-1883. F.
Brass base and expanding stand to oxidised brass semi-circle mount and housing for plano-convex cylinder lens.
The ring housing holds an oxidised brass disc with a central cut-out square for the lens, and with two brass knobs, one above, and one below, the lens.

3479 QBP205 LENS - FACETED

Unsigned
HsH 70, D 16-42. Mid to late 19 C. G.
Turned boxwood tube with no eyepiece but having a faceted convex objective with 32 segments.
Sixteen of the segments are square or nearly square, and there are sixteen more edging segments to give the lens a circular edge; the instrument produces an attractive image when an object is viewed, especially if it is rotated.
Tesseract 23,1988-9,64 describes this instrument as a "MULTIFACETED KALEIDOSCOPIC VIEWER...it pre-sents to the viewer an array of 16 identical images, which rotate about the centre as the instrument is turned."

3167 QBP112 LENS - PLANO CONCAVE

Unsigned
BD 111; MnH 380; LeHsD 112. Mid 19 C. G.
Weighted brass base and adjustable brass pillar to semi-circle mount for oxidised brass lens housing.

3163 QBP108 LEYDEN JAR

[Signature stamp indecipherable] PATENT
B 227x115; JaMxD 97; H 312. Mid to late 19 C. G.
Tin base; two sleeves for jars with foil inside and out; mahogany cap with brass conductor to six copper wires.
The base has a brass screw contact at one corner; on top of each cap is a turned brass pillar with a screw contact above, leading inside the jar to a junction for the six bent copper wires.
Also four more leyden jars of three different smaller sizes, one with the outer foil in the form of diamonds, and all with brass spheres on top and chains below the mahogany caps.

3188 QBP133 LEYDEN JAR BATTERY

Unsigned
Hs 480x480x200; JasD 142, H 280. Late 19 C. G.
Mahogany base with nine compartments, now containing six glass cylinder jars with foil on lower 75%.

3162 QBP107 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned
MxD 124; MnD 83; H 400; SrD 18. Mid to late 19 C. G.
Three tapering cylinders; outer brass, next tall glass, next closed copper with brass crook ending in sphere.
The central glass cylinder is covered in resin.

0274 QBP069 MAGNET - ROTATING

Unsigned - attributed to Yeates & Son
H 356; Sp 194. Mid to late 19 C. CT.
Green painted iron tripod foot; arched brass bracket for magnet with two contacts to boxwood mercury reservoirs.
Knurled brass knob on top of arch to secure rectangular magnet; brass contacts to connect to mercury in central ring reservoir and bottom cup.
Illustrated in Yeates 1877,31 "Apparatus to show Faraday's experiment of the revolution of a magnet round a voltaic current"; similar instrument 1575 MAY064.

0270 QBP065 MAGNET & ROTATING CONDUCTOR

Unsigned
H 203; S 120. Mid 19 C. G.
Brass tribach foot; red horse-shoe magnet with adjustable wooden cups; coil and cage rotate around poles.
Part of set demonstrating Faraday's and Ampere's laws; an adjustable brass pillar from the base, with a horizontal bar on top, holds the copper coil and cage so that they are free to contra-rotate around the magnetic poles, and have their bottoms in the cups, which are located about half way down the arms of the vertical magnet.
Another set illustrated in Turner 1983,opp177.

3168 QBP113 MAGNET & ROTATING WHEEL

HARVEY & PEAK. LONDON. W.
BD 92; H 255; WhOD 85. 1884-1909. F.
Brass base holds vertical U-magnet; tear-shaped poles on top retain axis of wheel as it runs around them.
If the iron axis of the four-spoke brass wheel is placed on the apex of the poles, the axis, and thus the wheel, will run down the pole, around the broad bottom, and up the other side.
Dates from Downing 1988,57.

0217 QBP013 MAGNETIC DIAGRAMS

Unsigned - reportedly by Michael Faraday
193x153; 147x131; 120x111. Presented c1870. G.
Three red leather-framed iron-filing magnetic patterns given to Thomas Andrews by Mrs Michael Faraday.
Probably framed by Faraday himself, who had been a book binder; the diagrams show lines of magnetic force around two poles (the largest diagram), three poles (the middle size), and one pole (the smallest).
Michael Faraday 1791-1867 - presumably presented after his death.

2309 QBP075 MANOMETRIC FLAME APPARATUS - ANALYSER

RK [monogram of Rudolph Koenig]

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H 908; Sp 486&331; RnsD 40-220. 1858-1901. F.

Bank of eight brass Helmholtz resonators on iron frame with manometric capsules and four rotating mirrors.

Latter have sizes 396x114 and are mounted on a square cross-section, turned by a handle through two toothed discs at right-angles; one of the mirrors is chipped and cracked.

Koenig's newly invented manometric flame analyser was displayed at the International Exposition in London in 1862, where it won him a gold medal.

Dates from Payen 1986,160; instrument illustrated in Turner 1983,144.

3454 QBP180 MANOMETRIC FLAME APPARATUS - BURNER

Unsigned - but attributed to R. Koenig.

BD 91; H 441; PrD 10; PisD 4. Late 19 C. G.

Turned white metal base; vertical iron pillar; three adjustable sleeves on this hold thin burner pipes.

The oxidised brass sleeves have brass clamping screws; they hold brass wires bent in two right-angles, which, in turn, hold the burners; two of the burners are straight pipes with one end open and the other closed, but with a small hole on top near the closed end; the other burner is T-shaped with two open pipes at one end and a right angled bend at the other, with a hole on the end of the right-angled bar.

An identical burner (except that it is missing the T-bar piece) is illustrated in Koenig 1889,84, where the open ends of the burners are connected to manometric capsules on organ pipes, and the burning flames are observed by a rotating cubic mirror.

There is also another large burner (BD97,H352,TuD25) with an iron base and copper vertical burning tube, having a sliding sleeve which can close parts of the five small holes (D6) at the bottom of the tube, or a slit (48x2) half way up.

2326 QBP092 MAXWELL TOP

HARVEY & PEAK BEAK ST. LONDON. W.

BD 109; PrH 106; ToD 114; C 192x160x145.

1884-1889. A.

Brass base and turned pillar; heavy brass cup, with six horizontal and three vertical knurled knobs, spins on this.

Cup on white-metal pin into fulcrum on top of pillar; knobs presumably adjust weight distribution; there is also an adjustable ring weight on the screw thread stem below the cup.

The fitted case has a white printed Trade Card: "HARVEY & PEAK, BY APPOINTMENT TO THE ROYAL INSTITUTION OF GREAT BRITAIN, Successors to WILLM. LADD & CO. Manufacturers of Microscopes, Mathematical & Philosophical Instruments, Beak Street, Regent Street, W. London. PRIZE MEDAL, LONDON, 1862. SILVER MEDAL, PARIS, 1867. APPARATUS FOR SPECTRUM ANALYSIS. Improved Induction Coils and Apparatus. Apparatus for Experiments in Electricity, Galvanism, Optics, Polarization, Pneumatics, &c, &c. Spectacles to suit all sights Opera and Race Glasses AGENT FOR GEISLER'S VACUUM TUBES."

Dates from Downing 1988,57.

3459 QBP185 MERCURY DIFFUSING CUP

Unsigned

H 164; CuMxD 72; FIH 109, D 80-63. Mid 19 C. G.

Ebony "egg cup" has a hole at the bottom for a wood stem; the cup fits into a conical glass skirt.

The wood stem is painted red.

3493 QBP219 METAL SCREEN ON STAND

Unsigned

BD 113; H 624; P 305x305. Mid 19 C. G.

Decorated iron base; brass pillar to tin plate painted black and white; with four oxidised brass optical frames.

The plate is painted black on one side and white on the other; it appears to be associated with a mahogany case (478x129x98) containing four disc (D65) and sleeve (D52,H25) frames with holes of different shapes for optical elements, since a label on the sliding lid reads: "Fittings for Metal Screen on Stand 2 Slits (adjustable) 1 Slit with single wire 1 slit [sic] with 2 wires 1 slotted holder 1 Plate with 3 holes"; four of these five elements were located - a slit with one wire, a slit with two broken wires, a slotted holder for missing sliding elements, and a frame with a square hole, now containing a white-metal sheet held in place by the frame and two brass screws.

0134 QBP001 MICROSCOPE - COMPOUND, BINOCULAR

BAKER 244, High Holborn, LONDON

H 495. Second ½ 19 C. R.

Brass; Y-shaped base; mechanical stage with below-stage condenser and mirror; rack and pinion focus.

Two vertical mounts rise from the base to pivots for the limb; coarse focus is by double knob rack and pinion on a substantial rectangular bar; fine focus is by two knobs on top of this; a right-angled bar from the limb holds the bottom of the binocular system, above the two-objective nose-piece; the mirror is on a semi-circular mount from a cylinder support from the limb pivot; between this and the mechanical stage is a mechanical condensing lens support; eyepiece focus is by double rack and pinion; the microscope has a variety of lenses and accessories in three drawers (the actual case is in the basement), and these accessories include four pairs of eyepieces and three objective lens cylinders.

Charles Baker worked from 1851-1909, Clifton 1995,14.

0259 QBP054 MICROSCOPE - TRAVELLING

W. WILSON 1 BELMONT ST. LONDON N.W.

H 250; W 340. 1900-1901. A.

Brass, oxidised brass and silver metal; three adjustable feet; scale and vernier; micrometer fine focus.

Bubble level on moving base; triangular vertical pillar for microscope; coarse focusing by rack and pinion.

Dates from Crawford 1988,18.

3480 QBP206 MIRROR - ANAMORPHIC

Unsigned

BD 79; H(-Ha) 101; CD 84, H 118. Mid 19 C. G.

Mahogany turned semi-circular base and (damaged) top; vertical semi-circular cylinder metal mirror; tin case.

There is a brass ring handle on top; the case is also a semi-circular cylinder, green painted, with a hinged lid.

3185 QBP130 MIRROR - CONVEX

Unsigned

BD 92; MnH 320; MiHsD 123. Mid to late 19 C. G.

Brass weighted base and expanding pillar to oxidised brass support sleeve and ring for brass housed mirror.

The mirror housing has a shallow cylinder behind, which fits onto the support ring on the stand.

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3217 QBP162 MIRROR - ROTATING CUBIC

Unsigned

Sp 384&342; H 554; MisHs 176x154x150.

Mid to late 19 C. G.

Cast iron tripod base and support to hold cubic mirror, revolved by brass and turned wood handle and two cog-wheels.

The latter are at right-angles to each other such that the rotation of the handle axis is translated in a perpendicular direction to revolve the four mirrors on the vertical sides of the cube housing.

0275 QBP070 NEWTON RINGS APPARATUS

NEWTON & CO. 3, Fleet Street, London

H 173; HsD 54. Late 19 C. G.

Expanding brass stand for cylinder brass housing with glass front; four pressure knobs at back to form rings.

3502 QBP228 OPTICAL BENCH

Unsigned

408x149, H 161; TIH 340; LeFrSD 50&30.

Early to mid 20 C. G.

Mahogany table; raised bar for metal scale 1-30; two vertical supports to two metal bars for sliding lenses.

One of the white-metal bars holds sliding sleeves attached to the nine ring metal frames, five large and four small; the other bar positions them in the light path; one of the frames holds a mirror, two have clips for inserts, and the others have lenses; joining the bottom of the supports is another metal bar holding a pivoted arm which rises to a bracket spanning the bars above, and whose position can be read on the scale.

3205 QBP150 OPTICAL ELEMENTS

SOLEIL RUE DE L'ODEON PARIS

From D 60-45. Mid 19 C. R.

Collection of 24 elements in cork housings, including "Verre Trompe", "Quartz Vert"; and "Amethyst".

The quartz also comes in "Bleu", "Orange", "Rouge", "Jaune", "Violet", and there is also "Quartz axe" and "Quartz obliques de Savart à axes croisés"; the "Verre Trompe" comes in five shapes - two hexagons, triangle, square, and diamond; there is also "Spath", "Spath hémitrope", "Courmatine perpendiculaire", "PLOMB CARBONATE", and "MICA D'ONDE AXES"; plus "Tourmaline Avillée perpendiculairement à l'axe"; plus some more.

Three generations of Soleil were active from 1819 until 1872, Payen 1886,176.

3497 QBP223 OPTICAL ELEMENTS

[On Case] Yeates & Son Dublin International Inventions Exhibition. LONDON 1885 SILVER MEDAL.

C 144x54x33. 1885. S.

Cardboard case with a quartz prism and three Nicol prisms.

The edges and one side of the quartz prism (23x19x19 x14) are frosted; one Nicol prism is in a cork and brass housing (D40,W14); a second Nicol prism is in a damaged cork housing (D18,L26); the third Nicol prism (24x23x11-12) has no housing; the signature is stamped in purple ink on the inside of the case; a label on the case reads: "Arens prism/2 Hartneck prisms/1 nicol in cork (long)/ditto (short)/ ditto brass."

2325 QBP091 OPTICAL STAND

Unsigned

BD 103; PvH 208; LeHsD 77. Mid to late 19 C. G.

Iron base; brass pillar to universal ball joint; arm to brass ring with screw thread for plain glass disc.

Instrument similar to "bulls-eye" microscope condenser, where the present plain glass would be replaced by a condensing lens to illuminate microscope samples or slides.

Turner 1989,305.

3186 QBP131 ORGAN - DEMONSTRATION

MAX KOHL A.-G. CHEMNITZ I/S 192

TsH 390&913; ToT 850x573; HIID 18.

Late 19 early 20 C. G.

Wood table on castors; lower level holds bellows, upper has oak wind chest with holes for eight pipes.

In front of the chest is a small (distressed) keyboard for eight ivory-covered notes and stops; on the table behind the chest is a smaller bellows; although there is a collection of varied organ pipes, none is signed Kohl, so it is not certain which pipes were supplied with this demonstration organ, although it would work with many; beside the eight holes for the pipes is a larger hole (ID25) - all are brass bound.

3901 QBP262 ORGAN PIPE - BLOCK

RUDOLPH KOENIG A PARIS UT3 SOL4 UT5

L 653,263,214; Se 64x53,35x31,32x29. 1858-1901. F.

Three; boxwood with mahogany plate below opening, and tapering input; open top.

Firm dates from Payen 1986,160.

3900 QBP261 ORGAN PIPE - BLOCK

YEATES & SON OPTICIANS DUBLIN C3

L 370; Hs 340x48x47. Mid to late 19 C. G.

Two; boxwood with mahogany plate below opening, and tapering input; open top.

There is a similar unsigned C3 pipe.

3898 QBP259 ORGAN PIPE - CYLINDER

Unsigned

L 627-330; D 51-38. Mid to late 19 C. G.

Four all brass cylinder pipes with horizontal rectangular opening and slightly tapering input pipes below.

The Queen's catalogue list calls these: "4 brass organ pipes C E G C".

3899 QBP260 ORGAN PIPE - CYLINDER

Unsigned

L 622-320; D 52-40. Mid to late 19 C. G.

Four; brass tapering input pipe below cylinder base with horizontal rectangular opening; paper tubes.

The bottoms of these pipes are similar to those for the all brass cylinder pipes 3898 QBP259, but the cylinders are cut off at the bottom, and the pipe stems are of rolled paper; there are four other paper tubes (L534-199;D54-39) not mounted on brass

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bases.

The Queen's catalogue list calls the mounted pipes: "4 paper organ pipes C E G C"

3905 QBP266 ORGAN PIPE - REED

RUDOLPH KOENIG A PARIS

L 307; Hs 267x63x63. 1859-1901. F.

Three; oak housing; tapering input pipe; glass panel on top front and part of sides over the reed.

Two of the reeds are in front of copper pipes, the third on a brass plate.

The Queen's catalogue list describes these as: "Reed pipe with glass sides"; "Beating reed with adjuster"; and "Free reed. Sol4".

Firm dates from Payen 1986,160.

3904 QBP265 ORGAN PIPE WITH MANOMETRIC CAPSULE

RUDOLPH KOENIG A PARIS UT3 UT3 M13 SOL3 UT4

L 670-355; Hs 618x74x65-308x52x48. 1858-1901. F.

Five; boxwood; mahogany plate below wind hole; tapering input; single manometric capsule on side.

Outside each housing (except one where it is broken off) is a wood bracket with two pipe attachments; the largest two pipes each has an adjustable mahogany slide on top, and one is missing its tapered input pipe.

Firm dates from Payen 1986,160.

3903 QBP264 ORGAN PIPE WITH MANOMETRIC CAPSULES

RUDOLPH KOENIG A PARIS

L 845; Hs 797x82x82. 1858-1901. F.

Boxwood with two glass sides (one cracked); three manometric capsules on one side; mahogany plate below hole.

Tapered input pipe; at the bottom of the housing is a brass pipe input leading to three turned brass outputs with stop-cocks; the capsules are labelled: "N2" (top), "N1V2" (middle), and "N2" (bottom).

Firm dates from Payen 1986,160.

3902 QBP263 ORGAN PIPE MOUTHPIECE

RUDOLPH KOENIG A PARIS

MnL 330; W 70; Li 227x60. 1858-1901. F.

Boxwood cut-away block-type organ pipe with sliding lip above mahogany plate; tapering input pipe.

The Queen's catalogue list describes this as: "Flute mouthpiece with adjustable lip"; but Koenig 1989,13 as: "Mouth-piece of organ pipe, with movable over lip."

Firm dates from Payen 1986,160.

3183 QBP128 PANTOGRAPH

Elliott Bros Strand London.

L 842; LmsW 19; C 864x83-159x102. 1864-1886. A.

Mahogany case; brass; two long and two short hinged limbs; ivory wheels; shaped lead base; weighted pencil.

The cloth-covered base has a brass disc and iron spike to hold the instrument; there are one fixed and two sliding sleeves for the pencil insert, which has a shallow cylinder on top for weights; three of the arms are marked "B", "C", and "D"; "B" and "D" are divided from 1-2 to 1-12.

Firm in the Strand from 1850-1886, Crawforth 1988,8, but the number is usually given up to 1863.

2320 QBP086 PEN - ELECTRICAL RECORDING

THE CAMBRIDGE SCIENTIFIC INST: CO LTD CAMBRIDGE NO 8631

L 154; C 204x79x76. 1909. N.

Mahogany case; brass base and pillar; removable arm for four-coil electromagnetic double pen system; six contacts.

Pencilled on case: "Double Time Marker"; pen on an adjustable brass arm which fits into a clamping arm to attach to the pillar in the case; two clamping screws, one to the pillar and one for extending arm to the pen; two markers of white-metal.

Date from J. Bennett, PC.

2307 QBP073 PENDULUM - CYCLOIDAL CHEEKS

WATKINS & HILL, 5 CHARING CROSS, LONDON.

Sp 475; W 1563; H 1158; BaD 48. 1819-1856. F.

Mahogany tripod foot; pillar holds large arc; swing of ivory ball constrained by two cycloidal cheeks.

Base has three wood level screws.

Dates from Clifton 1995,291.

3184 QBP129 PENDULUM - KATER REVERSIBLE

W.G. PYE & CO CAMBRIDGE.

L 1285; CysL 76&39, D 49&24; C 1310x90x84.

Early 20 C. G.

An iron rod has matching cylinders of brass and wood on it and can be suspended from below the larger of either.

The two large cylinders are near the ends; and have brass brackets for iron knife edges underneath; the smaller cylinders are nearer the centre; two brass sleeves with iron pointers can be placed on the ends of the bar; the pendulum is housed in a boxwood case, which has a broken hinge.

Pye 1914,22 describes this, with its stand: "Kater's Reversible Pendulum, having two sets of moveable steel knife-edges working on agate plates, one large and one small solid brass weight and two similar boxwood weights to compensate the air displacement of the brass ones, as re-designed by Prof. L.R. Wilberforce, M.A., Liverpool University."

0214 QBP010 PHONOGRAPH

Unsigned but attributed to Edison - No 19 (on wheel)

B 373x235; H 230; L 590. c1886. R.

"Edison's tinfoil"; heavy metal base; cylinder and fly wheel; handle; hinge to mouthpiece above needle.

The red-painted base has a gold line decoration; two mounts on the sides hold a horizontal iron bar with a screw thread at one side, the threaded cylinder in the middle, and the flywheel and handle at the other end; two short supports in front hold a pivot, with brass knobs on either side, for the iron frame (also with gold line decoration) to the damaged wooden mouthpiece above the diaphragm and needle, held by its weight against the cylinder.

Illustrated in Turner 1983,138.

3220 QBP165 PHOSPHOROSCOPE - BECQUEREL

Phosphoroscope de E. Becquerel par J..Duboscq à Paris.

CyHsD 113, W35; WhsD 107; TuD 45, L 50. 1849-1883. F.

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Brass and oxidised brass; cylinder housing; handle turns cog-wheel system to revolve V-shaped holes in two discs. The turned wood handle revolves a six-spoke cog-wheel, which drives another similar cog-wheel via a smaller cog-wheel; this, in turn, revolves two discs with V-shaped cut-outs on either side of a cell compartment, such that there is a hole in one disc where there is not in the other; there is a viewing tube on one side.
Dates from Brenni 1988,3-4.

3499 QBP225 PHOTOMETER

Unsigned 1943

Hs 475x88x68. 1943. S.

Mahogany housing; brass fittings; sighting tube at one end; sliding bracket rheostat adjusts reference light.

The sighting tube (D32), which has eyepiece and objective lenses, views the light from the object in a semicircle, and there is an angled white frosted half disc in the other half of the circle; this is illuminated from the housing, which contains a hidden electric lamp, with flex and plug, and the rheostat adjusting knob with a pointer reads a boxwood scale of 1-25 "FOOT-CANDLE"; stamped with date(?) 1943.

3892 QBP243 PHOTOMETER - LUMMER-BRODHUN

Unsigned

H 385; Hs 154x104x56; DiD 37; TuL 44, D 22.

Early 20 C. G.

Blackened metal and brass; adjustable pillar to housing for sight tube to white glass disc; holes at each side.

The pillar rises from a base (135x107) with three rollers, presumably for a missing bench; the height of the housing is adjusted by a rack and pinion knob; light on either side shines through the holes onto the glass disc (which is on a slide frame and can be removed), and the light distances are adjusted until an inner disc and outer ring seen through the tube have the same intensity.

Name from Kohn 1911,469.

3215 QBP160 PHOTOMETER - WHEATSTONE

J.. Duboscq à Paris

CyD 60, H 22; WhD 19; RiD 49. 1849-1883. F.

Brass cylinder housing; handle one side; cogged ring on black other side; in this, cog-wheel with six spikes.

As the brass handle is turned, the black cog-wheel revolves, guided by the cogged ring.

Tesseract 42,21,1993 describes the action: "When the crank is turned slowly, an arm on the other side rotates rapidly, driving a small polished steel sphere in an epicyclic path. The sphere is bright against the blackened background. With persistence of vision, the observer can intercompare the brightness of two light sources reflected in the moving sphere, and adjust their positions for equal intensity."

The same catalogue (Lot 33) gives biographical information: "Sir Charles Wheatstone (1802-1875) was a prolific inventor, research scientist, and manufacturer...By 1834 [he] had been appointed Professor of Experimental Philosophy at King's College, London, and concentrated more and more on laboratory research than on his family's Conduit Street musical business". Dates from Brenni 1988,3-4.

3180 QBP125 PITH FIGURINES

Unsigned

H 44-54. Mid to late 19 C. G.

Lady in dress; sailor; foreign gentleman in skirted outfit with tall hat; also pith balls and feathers.

3449 QBP175 POISSON'S COEFFICIENT BAR

Unsigned

902x50x1½; SvsL 51. Late 19 C. G.

White-metal bar has two brass sleeves at the centre of each side with holes through them and tightening screws; the sleeves are at right-angles to the bar.

Ganot 1890,79 notes that: "Longitudinal stretching is accompanied by lateral contraction, and the ratio of the contraction to the proportional stretching is known as Poisson's coefficient"; the bar has "Poissons Ratio" written in red marker on it.

The phenomenon is now, apparently, demonstrated with a bra - in which side stretching produces uplift!

0248 QBP044 POLARIMETER

J. Duboscq Bte à Paris

H 440; L 397. 1849-1883. F.

Brass; pivoted above pillar and tripod foot; scale in front of eyepiece, on brass ring with four spokes; vernier and clamp for scale reading.

Dates from Brenni 1988,3-4.

0231 QBP025 POLARIMETER

PHILIP HARRIS & CO. BIRMINGHAM

No measurements available - [cabinet wouldn't open] Early 20 C. G.

Brass and oxidised brass; circular base and pillar; magnifier for scale 120-0-120; knobs for nicol prisms.

The latter are on racked arms on either end of the instrument; the scale is also racked, with a knob pinion; eyepiece focus is by rack and pinion.

0249 QBP045 POLARIMETER

C. Reichert Wien VIII Bennogasse 26 PATENT

H 362; L 555. Late 19 early 20 C. A.

Brass and oxidised brass; tripod foot and tapering pillar; horizontal iron bracket for tubes; silvered scale 20-0-90(X2); brass sample tubes.

Anderson 1990,71-2 lists catalogues at this address from 1883-1912.

0277 QBP072 POLARISATION ANALYSER - GUÉRARD

JD monogram [attributed to Jules Duboscq]

Sp 217; PvH 305; DiD 301. 1849-1883. F.

Iron tripod foot; brass expanding stand; white disc with black glass pyramid and conical prism on sides.

This apparatus is described as "Appareil de Guérard composé d'une pyramide et d'un cône en verre noir, taillé sous l'angle de polarisation (par Soleil)", in the Conservatoire des Arts et des Metiers in Paris.

Name from Kohl 1911,552; dates from Brenni 1988,3-4.

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3200 QBP145 POLARISCOPE

Ruhmkorff à Paris

SDiD 152; W 125; TuD35. 1840-1877. R.

Brass; divided disc 90-0-90-0-90° has central tube eye-piece housing, with vernier arm, for nicol prism.

The housing slides out from the centre of the disc; on the other side of the disc is a short tube leading to a smaller disc D67, with three loose screws to an identical disc and a longer tube containing another nicol prism, ending in another eyepiece.

Dates from Turner 1983,184-5.

0244 QBP039 POLARISCOPE

Unsigned

BD 206; H 520; Ps 256x144 & 214x124. Mid 19 C. G.

Mahogany instrument with upper and lower revolving elliptical black glass plates.

Turned mahogany base with two side supports holds a circular mahogany table; below and above this are revolving elliptical black glass plates, the lower pivoted to the side supports, the upper held by metal supports above the table; the upper plate can revolve in a horizontal plane, the turn being measured by a scale on the inside of the table.

0246 QBP041 POLARISCOPE - DUBOSCQ

J. Duboscq à Paris

H 440; L 375. 1849-1883. F.

Brass; weighted base holds pillar to a pivoted table, on which objective, sample clamp, and analyser, run.

The positions of the objective, clamp, and analyser can be adjusted separately.

Dates from Brenni 1988,3-4.

0253 QBP049 POLARISCOPE - ELBOW

NEWTON & CO. 3 Fleet Street, London

L 400; H 198. Late 19 C. G.

Black-painted metal elbow; brass shield (D99) at lantern end; brass lens system at other end.

The case has a blue trade card: "NEWTON & CO. Opticians, Mathematical, Philosophical, & Astronomical INSTRUMENT MAKERS, to Her Majesty, LONDON. 3, FLEET STREET. NEAR TEMPLE BAR."

Tesseract 12,1986,52 calls an identical instrument "THE WOODWARD POLARISCOPE, English c.1870"; it records that this large table-top polariscope can also be mounted on a large projection lantern; incident light from a candle or lamp is polarised on reflection from a large pile-of-plates in the base of the instrument, and passes through a slide holder and then a focusing lens system; the device is illustrated and described in Hogg's book "ELEMENTS OF NATURAL PHILOSOPHY" (1861).

Queen Victoria died in 1901.

0247 QBP042 POLARISCOPE - NORREMBERG

J. Duboscq à Paris

B 197x198; H 540. 1849-1883. F.

Mahogany drawer base, mirror; revolving glass on horizontal axis; revolving sighting tube on vertical axis.

On the base is a plane disc mirror in a brass frame; at the sides of this rise two vertical pillars; on one is a sliding sleeve to hold a condensing lens; above this are sleeves on both pillars, one with a screw clamp, for the revolving plate glass in a rectangular oxidised brass frame; on the side opposite the clamp is a brass disc with an arrow to record the angle of the glass plate; on top of the pillars is a brass disc, divided 90-0-90-0-90°, with a vernier to record the rotation of the sighting tube, which has a rack and pinion focus.

Dates from Brenni 1988,3-4.

3207 QBP152 POLARISCOPE - TOURMALINE PINCETTES

Unsigned

L 131; HsD 25; C 193x135x58. Late 19 C. G.

Wire U ending in rings for two oxidised brass housings containing brown tourmaline; in mahogany case.

The latter is much too large for the pincettes, but has a label: "Tourmaline tongs 3 unmounted tourmaline, 3 parts of Eye-pieces 1 Quartz in brass setting".

0239 QBP033 POTENTIOMETER

CAMBRIDGE SCIENTIFIC INSTRUMENT CO, LTD. CAMBRIDGE. NO 12. PAT. APP. FOR MARCH 2. 1897.

B 608X207. c1897. S.

Potentiometer wire; seven ceramic housed contacts for keys.

Mahogany base; on this sit the ceramic spools into which fit the brass keys; there are holes for unused keys on the base between the spools; the spools are labelled, on a mahogany strip above the base, "B10 C20 D40 E80 F160 G320 H640"; on the front of the base, is a boxwood scale 21-0-21, and a slider contact on the potentiometer wires reads this; there are nine brass screw electric contacts on the base, two of them on the right-hand edge.

3495 QBP221 PRISM

Unsigned

L 215; Sis 54. Mid 19 C. G.

Long green glass equilateral prism.

Plus an assortment of smaller colourless glass prisms.

3489 QBP215 PRISM - CYANIN

Sold by NEWTON & Co., 3, Fleet Street, London.

Hs 71x57x8. Late 19 C. G.

Black edged, and red card-covered, wood housing for glass prism seen between two slots in the card.

A label on the card reads: "Cyanin A Prism Angle about 15' R.W. Wood - Madison Wis."

Also a boxwood box (97x97x28) containing two glass plates and a single and double wedge for cyanin prisms.

The Queen's catalogue list gives: "Box containing 2 Wood cyanin prisms, 2 wedge prisms mounted to show silver nitrate crystals."

3488 QBP214 PRISM - HOLLOW

CARBON BISULPHIDE Water Prism (Rubber Cement)

H 112; Ps 99x65. Mid to late 19 C. G.

Glass bottle with one curved side and two plates, angled at 60°, which stick onto frames on the other two sides.

The stopper is gone, and there is chipped black paint on the curved side; the inscription is hand-written on a label on the curved side.

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3498 QBP224 PRISM - MULLER

Yeates & Son Dublin Mullers Prism EO/-

MxH 27; MxW 37. Late 19 C. G.

A flat glass diamond has, through its middle, a glass block with a diamond section, with the ends bias cut.

The inner diamond section (22x15) is parallel to the outer flat diamond (37x27); the ends of the block, cut at a sharp angle, are parallel to each other; the sides of the "prism" are of frosted glass.

This has been placed in the case with the Yeates & Son optical elements 3497 QBP223.

3491 QBP217 PRISM - RIGHT-ANGLED

J. DUBOSCQ à PARIS

DiD 139; PmMxH 43, W 27; PrL 183, D 11.

1849-1883. F.

Hollow oxidised brass pillar holds brass pivot and frame for glass cube with angled top; oxidised brass shield.

The latter is a thin disc with a rectangular hole (24x 20) in the centre which allows light to the prism, which is shaped like half a house.

The Queen's catalogue list records: "Rt:l prism in flange" and gives a diagram showing light being reflected by the long side of the prism through the cube; the apex angle of the prism/cube is 55°.

Dates from Brenni 1988,3-4.

3506 QBP232 PRISM ON STAND

J. DUBOSCQ à PARIS

BD 93; MnH 278; PmSis 30,25,25, L 30. 1849-1883. F.

Brass base and expanding pillar to pivoted right-angled bracket for pivoted support for stressed prism.

The support holds a frame with two screws which push a metal plate on the shaved apex of the prism; the base of the prism thus pushes on two glass plates when the screws are tightened.

The Queen's catalogue list describes the apparatus: "Prism on double plate crown glass & flint to show rings from oil drops".

Dates from Brenni 1988,3-4.

3505 QBP231 PRISM ON STAND

J. DUBOSCQ à PARIS

BD 103; MnH 315; PmSis 43, L 52. 1849-1883. F.

Brass base and expanding pillar to pivoted right-angled bracket for pivoted sleeve to four equilateral prisms.

The base of the stand is screwed off-centre to a non-original wood disc (D116) which is ignored in the measurements above; the prisms, of different types of glass (one of which has a green-yellow tint), are fused to each other - the outermost one being slightly chipped.

Dates from Brenni 1988,3-4.

3450 QBP176 PULLEY WHEELS

Unsigned

D 25-71; C 278x171x121. Mid to late 19 C. G.

A collection of brass pulley wheels of various kinds, most in frames - from single to eight-wheel systems.

Some have S-shaped screw clamps; they are now contained in a boxwood box.

3203 QBP148 REFLECTORS - PARABOLIC

Unsigned

D 428. Mid to late 19 C. G.

Two; concave copper disc with lip and silver-plate front; behind are four tin strengtheners and brass clamp.

The latter has a sleeve with a clamp screw for a stand.

0234 QBP028 RESISTANCE - STANDARD

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD ENGLAND NO 2234 [Certificate dated 25:9:1907]

HsD 67; H 158. c1907. D.

Glass cylinder, ebonite top; two copper leads bent 180°.

The leads are copper bars from the resistance coil inside the cylinder bent at 90° above the cylinder, and again at 90° beyond the cylinder, ending at the level of the bottom of the cylinder, and supported near the bottom point by an ebonite plate.

0233 QBP027 RESISTANCE - STANDARD

SCIENTIFIC INSTRUMENT CO LTD CAMBRIDGE NO 1168 [Certificate dated 25:9:1907]

HsD79; H 172. c1907. D.

Glass cylinder; ebonite top; four brass leads bent 180°.

"NP 419" also inscribed on instrument; the thick brass bar leads, from the resistance coil inside the cylinder, are in two parallel bars projecting in opposite directions, and have ebonite plates at mid point to give support.

3446 QBP172 RESONANCE TOP - FRAHM

Unsigned

H 206; MxD 77; WhD 56; C 229x90x80. Early 20 C. R.

Brass; turned handle holds ring; an iron axis pivoted in this holds a fly-wheel; on top, five resonance rods.

There are spaces for six resonance rods on small brackets on top, but one is missing; the rods are of flat white-metal with a right-angled turn on top; attached to the ring is another wire ring at right- angles to the ring and concentric with the fly-wheel; the apparatus is contained in a black fibre-covered case, with blue velvet lining, which also contains a spare ribbon which could be the precursor of another resonator.

Kohl 1911,299 notes: "The rotating disc at the top is loaded on one side, so that the top when held in the hand makes a considerable amount of vibration. A so-called Frahm comb with six spring tongues is fixed to the top, these tongues having different numbers of vibrations. With decrease in the number of vibrations one spring after another vibrates. The principle is used in speed measurements on prime movers, and when the tongues are electrically excited by means of an A.C. magnet, it can also be applied to frequency measurements." - reference given to Glaser's Ann., Vol. 59,1906,pp697 et seq.

0266 QBP061 RESONATOR - HELMHOLTZ

RK [Rudolph Koenig monogram]

B 439x292; D 33-220. 1858-1901. F.

Set of ten hollow spherical resonators of different diameters, on rectangular wooden base.

Dates from Payen 1986,160.

3195 QBP140 RHEOSTAT

ELLIOTT BROS. LONDON.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

B 413x190x21; CyL 254,D104; C 445x226x164.

Late 19 C. G.

Mahogany base for horizontal cylinder with wound wire; handle turns cylinder; sliding contact, scale 0-100.

Brass fittings; one end of cylinder has a silvered edge divided 0-90; the parts of the instrument are held by brass mounts on ebonite plates on the base; it slides horizontally into a mahogany case.

0120 QBP007 RHEOSTAT

YEATES & SON DUBLIN A7 PB650

B 402x205; H 144. Mid to late 19 C. G.

Mahogany base; two coil cylinders in arched glass housing; handle at one side; white scale 25-300.

The handle, which projects outside the arched mahogany ends of the glazing, turns a cog-wheel inside which, in turn, drives two adjacent cog-wheels revolving the horizontal cylinder coil housings; the resistance wire moves from one cylinder to the other as the handle is turned, and the wire crosses over the scale, parallel to the housings; there are two brass screw electric contacts on the base, on the side opposite the handle.

3453 QBP179 ROCKING BAR - TREVELYAN

W. LADD & Co LONDON

L 470; Bk 133x52x5; SrD 24. 1873-1883. F.

Iron; rod has a brass sphere on one end and a block with a central groove on the other; second rod has smaller block.

Inset into the block is a copper piece (40x46), which is stamped with the signature; the groove runs, in line with the rod, through the block and inset; the back of the block is flat, while the top, with the groove, is arched; the other rod is missing its brass sphere, and this smaller block, while it has a groove and arched top, has a concave back.

Poynting 1900,134 notes: "Certain phenomena now to be described are linked together by the fact that the musical vibrations are maintained by the communication of heat. The simplest case is that of Trevelyan's Rocking Bar... When heated to some point below the melting point of lead, and placed face downwards, with the edges of the V groove on the edge of a lead plate, the bar begins to 'sing', emitting a very rough note. The note may be made to rise in pitch by slightly pressing the bar... When one edge of the V groove comes in contact with the lead, it makes a little depression which tends to rise up again and throw the edge up; in other words, the edge rebounds. But the edge has given heat to the lead which makes it expand, and all the more since, for a metal, lead is not a very good conductor. The heating is therefore comparatively local. It takes place, also, chiefly during the rebound, since there is some lag owing to the time taken for heat to be conducted from the brass [in this case the bar seems to be of iron not brass]. Hence there will be an expansion of the lead upwards, aiding the rebound more than it neutralises the fall of the bar. More work is done upon the edge during the rebound than was done by it during the depression, and energy is given to the bar. The other edge then falls down and goes through the same process, and there is a rapid rocking, the vibrations increasing until the supply of mechanical energy from the heat is equal to that radiated out as sound."

Dates from Crawforth 1988,11.

3159 QBP104 ROD - CHARGING

A.C. COSSOR FARRINGDON RD LONDON C.E.S. PHILLIPS 1907.

L 213; MxD 18; C 217x40x32. 1907. S.

Brass tube with ebonite ends; brass syringe plunger into one end; ivory and white-metal rod from other; case; black leather-covered case with blue velvet lining.

3447 QBP173 ROLLER FOR INCLINED PLANE

Unsigned 12 oz Troy

CyL 89, D 46. Mid 19 C. G.

A brass cylinder with a paper cover is held in a three-sided frame with a small ivory wheel on the long side.

The cylinder has disc ends which are slightly wider than the cylinder; axis points are connected to the two short sides of the frame; on a curved widening at the centre of the long side is a short support for the ivory wheel (D8); on the other side of the wheel support is inscribed: "12 oz Troy".

The Queen's catalogue list describes this as "Brass roller for inclined plane".

3204 QBP149 ROLLERS

Watkins & Hill Charing Crofs LONDON.

B 202x150x24; CysL 157, D 37. 1819-1856. F.

Mahogany base; two vertical brass panels for axes of two horizontal cylinders, one of wood and one of brass.

On the brass panel, at one end of the brass-bound wood cylinder, is a scale 0-9, and presumably there was once a hand to read it, now gone; on the other end of this cylinder is a square end to the axis, presumably to allow a handle or key to turn it, and the brass cylinder axis has a similar end beside the scale; between the two rollers on the top of the frame are two screw holes for a missing part.

The purpose is unclear, but presumably something sat on the rollers and perhaps translated the rotation of one to the other - the brass cylinder is smooth, while the wood has a fine spiral corrugation, and the apparatus could demonstrate friction; there are no electrical contacts, so this does not appear to be a rheostat, missing its wire around the wood cylinder (which could possibly be made of ebonite rather than wood).

Dates from Clifton 1995,291.

3471 QBP197 RUPERT DROPS

Unsigned

L 61-105; MxD 12-14; C 182x68x35. Late 19 C. G.

Nine green glass droplets with drawn out and curved end; stressed; will splinter when end broken.

They are contained in cork chips in a blue cardboard case, with the notice: "Be Careful to guard the eyes"; the other side of the case has the address: "Mr F R Seivell 44 Brazenose St Manchester".

Griffin 1910,421 notes that Rupert Drops [also called Prince Rupert Drops in another catalogue] or Dutch Tears are: "made of glass which has been allowed to cool suddenly. The outer shell becomes rigid before the inner portion has had time to cool down, so that a considerable stress is set up between the inside and the outside. The stress is, however, distributed all over the surface so that there is equilibrium. But as soon as the tail of the drop is broken off the equilibrium is no longer maintained, and the drop is shattered. To perform this experiment the drop should be wrapped round with paper, and the tail broken off in such a way that nobody is exposed to the flying fragments."

The drops have been subjected to a recent study by S. Chandrasekar and M.M. Chaudhri, Philosophical Magazine B70,1195-218,1994, reported in Nature Vol.373,198,1995 and New Scientist, 11 Feb.1995, 23-25, which answered the question asked by King Charles II in 1661 about why the drops exploded.

0267 QBP062 SAVART DISC

R.J.T. MACROBY. FECIT.

B 240x107x22; H 248; WhD 100; DiD 78. Early 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Mahogany base and vertical support for a metal fly-wheel whose axis is connected to a six-spoke cogwheel; along part of the axis is a wood spool which can be used to help the rotation.

3182 QBP127 SEEBECK RECTANGLE

YEATES & SON DUBLIN.

BD 64; H 192; W 153; NL 87. Mid to late 19 C. G.

Brass base and pillar to horizontal metal bar with magnetic needle on central pivot; bismuth(?) bar broken.

The bars were matching; a change in temperature would deflect the red and white needle.

0235 QBP029 SELF INDUCTOMETER

Unsigned

B 177x112; H 205. Early 20 C. G.

Mahogany frame has two fixed coils and two more moving coils around a drum, read by rotating knob on ebonite scale.

Second similar instrument (B177x107x37,H207); scale 0-360°; both have four brass screw contacts on the ebonite plate above the mahogany frame.

The Ayrton & Perry self inductometer was introduced in 1895, Glazebrook 1922, Vol.2.420.

3196 QBP141 SHUNT

ELLIOTT BROS. LONDON. 196[on base]

BD 107; H 138; HsD 88. Late 19 C. G.

Brass cylinder housing; ebonite base and top; six brass segments - two contacts, 1/9, 1/99, 1/199, star; two keys.

Latter of ebonite and brass; they fit into four holes between the segments - one between the two with contact screws, one between the central star and the 1/9 segment, one between star and 1/99, and the last between star and 1/999.

Similar to that illustrated in Elliott 1895,23, which notes that it has coils reducing the sensibility of a galvanometer to 1/10th, 1/100th or 1/1000th of its unshunted value.

0222 QBP003 SHUNT - UNIVERSAL

ROBT. W. PAUL LONDON, N. UNIVERSAL SHUNT 10,000 OHMS

D 178. 1891-1919. F.

Cylindrical brass housing with ebonite top; rotating spring with 23 brass contacts.

Silvered ring scale under glazing, 1-10,000, with "OFF" position; there are four brass screw contacts on the ebonite top, labelled: "T1 T2 G1 G2".

Dates from Cattermole 1987,98-104.

0268 QBP063 SINGING FLAMES APPARATUS

Yeates & Son Dublin

H 623; FrH 445. 1865-1878. SI.

Black painted tripod foot; brass stop-cocks to slim conical brass burners contained in tall glass cylinders.

Asbestos caps on glass cylinders; gas input below tripod foot; bracket on foot supports cylinders.

Similar instrument dated 1865-1878 1476 UGP056.

3218 QBP163 SIREN - CAGNIARD

K [monogram of Rudolph Koenig]

H 200; W 91. 1858-1901. F.

Brass; pipe into cylinder; on this, rotating disc with 15 angled holes; above, silvered scales 0-90 and 10-50.

As the siren disc rotates under the pressure of the air input, it turns a central rod leading to a worm-screw mechanism behind the scale plate to move two (missing) watch-hands around the scales

Dates from Payen 1986,160.

0265 QBP060 SIREN - HELMHOLTZ DOUBLE

RUDOLPH KOENIG A PARIS

B 450x250; H 435. 1858-1901. F.

Mahogany base and supports; brass; double revolution counter; Y-piece to connect upper and lower inputs.

The base has a single brass level screw on one corner; two vertical supports at one side of the base hold the lower cylinder, and both this and the upper cylinder have revolving discs with circles of angled holes, connected to the counter; above the upper cylinder and below the lower are right-angled pipes, which are connected to the Y-piece on top of a turned mahogany pillar on the base.

Dates from Payen 1986,160; instrument illustrated in Turner 1983,137.

3206 QBP151 SLIDES

NEWTON 3 FLEET ST LONDON

101x57 [6] or 101x26 [4]. Late 19 C. G.

Collection of ten mahogany-bound slides, including "SELENITE WEDGE", "AMETHYST", "CALCITE", & "TOPAZ".

Also "NITRE", "SELENITE EVEN", "SELENITE UN-EVEN", "SELENITE DESIGNS (1)" [a pansy], and "SELENITE NEWTON'S RINGS"; the tenth is a hole with a slide cover.

There are also other somewhat similar slides, unsigned.

3461 QBP187 SOAP BUBBLE DRUM - BOYS

C.V. BOYS'S PATENT 16732/11 MADE BY GRIFFIN, LONDON

Sp 198; H 263; DrD 128. Patent 1911.

Iron tripod foot; steel pillar; over this, a brass sleeve holds the brass drum, with a conical bottom.

The foot has two brass level screws; the knurled sleeve, over the steel pillar, can revolve, turning the drum; inside the drum is a black velvet mat; and on top of the drum is a perspex pointed lid with a central brass screw knob.

3906 QBP267 SONOMETER

Unsigned

Hs 1154x129x73. Mid to late 19 C. G.

Boxwood sounding box on two mahogany cross feet; peg and brass pulley at one end; wing-nut and pulley at other.

Each side of the box has two circular holes (D37) containing mahogany five-pointed stars.

3897 QBP258 SOUND CONE

RUDOLPH KOENIG A PARIS

L 583,436,158; Se 115x116,90x90,89x90. 1858-1901. F.

Three; oak cones with open square-section at top and short brass cylinder (L15,D14) below; for reed pipes.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

The Queen's catalogue list refers to four "cones for reed pipes" - only three remain.
Firm dates from Payen 1986,160.

3894 QBP255 SOUND PIPE

RUDOLPH KOENIG A PARIS

MnL 801; Hs 670x37x36. 1858-1901. F.

Boxwood pipe in form of thin organ box pipe, but with piston insert and five side holes with hinged covers.

There is a tapered input pipe, and a mahogany plate under the whistle hole; the pipe is marked, on the left: "V/4 V/3 V/0[?] V/3 V/4 V", and on the right: "N/4 N/3 N/2 N/4 N/1/3 N/4 N/2".

There is also a brass tin whistle, various wind instrument mouthpieces (including clarinet and trumpet), and other related sound tubes.

Firm dates from Payen 1986,160 - the pipe is similar to one illustrated in Koenig 1889,44.

3895 QBP256 SOUND TUBE - HOPKIN'S FORK

Unsigned

PiSe 35x35; L 451; W 97; AsSe 17x17.

Mid to late 19 C. G.

Mahogany square-section pipe tapers and then splits in a Y-shape; remains of paper membrane on end of pipe.

John Reid (PC 1990) reports that this instrument is used with Chladni plates; when the fork ends are placed above in-phase nodes on the plate, sand on the membrane will hop, whilst if the nodes are out-of-phase, the sand will stay still.

The Queen's catalogue list calls this a "forked tube for interference".

2321 QBP087 SPECTROSCOPE - DIRECT VISION

J.G. Hofmann Paris

L 235; MxD 27. Third ¼ 19 C. R.

Brass; eyepiece end pivoted to brown leather-covered prisms housing by two screws; oxidised brass slit end.

Slit adjusted by screw with (missing) knurled knob.

Bennett 1984a,8 - instrument type added at late stage to 1862 London Exhibition.

2324 QBP090 SPECTROSCOPE - DIRECT VISION, McCLEAN

McClean's Star Spectroscope PATENT.

MnL 72; MxD 32. Fourth ¼ 19 C. G.

Brass; hole in end of eyepiece sleeve; lens and prism housing push-focuses into this; knob to adjust slit.

Latter on block (15x15x8) on end of housing.

Not in Bryden 1972, Pearsall 1974, nor Turner 1983.

0124 QBP038 SPECTROSCOPE - PHOTOGRAPHIC

ADAM HILGER LTD LONDON ENGLAND NO

E31303/27263

L 570; H 417 Early 20 C. G.

Cast iron tripod foot and pillar; brass collimator; black prism housing; mahogany photo plate housing.

The collimator has a dark red resin.

Firm incorporated under the name Adam Hilger Ltd in 1904, Cattermole 1987,142.

0122 QBP052 SPECTROSCOPE - PHOTOGRAPHIC

Unsigned B + M

L 1140; H 302; CIL 310, D 61. Fourth ¼ 19 C. G.

Angled cast iron base and support table for mahogany housing over prism optics; brass collimator.

A brass plate reads: "1302.76 + 186684912 B + M 3000 + 5200 1091.63 + 232908205 B + M 3200 - 2300"; the slit, on the end of the collimator, is adjusted by a brass knurled knob with a spring, and a sliding plate has three square holes, the lower one on the right, the next above its top right-hand corner, and the upper above the top right-hand corner of this one; the photographic plate (B380x120) is on a small bellows, and is parallel to the end of the housing, which is at an angle of about 25° to its long edge.

3884 QBP245 SPECTROSCOPE - PHOTOGRAPHIC

Unsigned B + M

L 1105; H 376; CIL 445, D 58. Fourth ¼ 19 C. G.

Angled cast iron base and support table for mahogany housing over prism optics; brass collimator.

A brass plate reads: "2581.67 + 151181741/B + M; the slit is similar to that on 0122 QBP052; in this case the collimator is longer, and the mahogany housing is smaller, missing out the angled addition for the photographic part; here a long bellows extends from the truncated housing, and the photographic plate arrangement (B165x165) is adjustable slightly from its position parallel to the end of the housing.

0123 QBP043 SPECTROSCOPE - TABLE

John Browning: London

L 812; TH 197. 1878. D.

Brass and oxidised brass; iron tripod foot; tapering pillar; small prism table on legs above scale circle.

Fixed collimator and moving telescope with clamping screw; slit adjusted with a small knurled knob.

A card with the instrument notes that it is a "STUDENT'S" spectroscope, and gives a date 1878.

0125 QBP037 SPECTROSCOPE - TABLE

J. Duboscq à Paris

TH 300; TD 310; Te&CIL 355, D 39-40. 1863-1883. R.

Iron tripod foot; tapering brass pillar to circular table, which holds a train of four prisms; prism cover.

Both telescope and collimator can be adjusted in position, which can be read by the silvered 360° scale ring on the table; the position of each prism can also be noted on the scale, and the prism train adjusted by a knob; there is a black disc shield near the double-plate slit on the collimator; the prisms can be covered by a semi-circular cover.

Bennett 1984a,9 illustrated this from a book published in 1863; Brenni 1988,3-4 gives Duboscq dates 1849-83.

3198 QBP143 SPECTROSCOPE - TABLE

A. HILGER. LONDON.

Sp 317; TsH 285&310, D 200&126; C 487x386x368.

Early 20 C. G.

Iron tribach and pillar to lower divided table 0-350, brass and enamelled brass telescope and collimator.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

The lower brass table has a silvered ring scale with two verniers; above this is a brass table in three segments for the prism; the collimator, which has a (cracked) glazed brass cover over the V-shaped slit mechanism, is fixed; the telescope has a tangent and clamping screw; both it and the upper table have verniers to the scale; both telescope and collimator have double-knob rack and pinion focus; boxwood case.

2318 QBP084 SPHEROMETER

BAIRD & TATLOCK LTD LONDON.

Sp 51; H 71; SdID 48. Late 19 early 20 C. G.

Brass and oxidised brass; knurled knob turns disc scale 10-100; side linear scale 10-0-10; centre screw of thick brass with white-metal point.

2317 QBP083 SPHEROMETER

YEATES & SON Dublin

Sp 45; H 54; SDID 36. Mid to late 19 C. G.

Brass and oxidised brass; knurled knob turns disc scale 0-90; side linear height scale 10-0-10; central steel screw.

2314 QBP080 SPINNER

Unsigned

Sp 503,161&303; WhD 364; H 302or620.

Mid to late 19 C. G.

Cast iron frame can sit horizontally or vertically; wheel and handle to drive brass spindle for accessories.

Instrument is painted black with gold lines; there are grooves around the wheel and the spindle for a spiral metal thong; the position of the wheel can be adjusted and clamped to tension thong; brass (mostly) accessories - Watt's governor; glass bowl for rolling ball; ball and spring "1-5 Kilo"; wood block, four clamps "for Cylindrical Jar"; bar with curved Y ends for centrifuge tubes(?); more recent centrifuge marked "1937".

3208 QBP153 STEAM ENGINE - HERO'S AEOLIPILE

Unsigned (but base reminiscent of Yeates & Son)

Sp 195; H 322; SrD 101. Mid 19 C. G.

Iron tripod foot and support for copper sphere between brass fittings; curved steam pipes to rotate sphere.

A brass side arm below and a brass bracket above allow the sphere to pivot; water can be added through a small corked sleeve on the upper side of the sphere; above it is a brass sleeve with the curved steam pipes under a wood pulley wheel; when the water in the sphere is heated, the sphere will be rotated by the issuing steam, and this can be used through the pulley wheel to do rotational work.

Apparatus referred to in Ewing 1906,2.

3222 QBP167 STEREO VIEWER

ACHROMATIC STEREOSCOPE. SMITH BECK & BECK 6 COLEMAN ST LONDON 1034

B 202x181; Ld 204x184x123. 1857-1863. A.

Mahogany frame and lid; brass plate and lens housings.

There is a hinged flap with a mirror on top of the frame, revealing two blackened compartments inside; at the side away from the eyepieces are spring and hinged clips for the cards; those with this viewer are mostly of sculptured figures.

Dates from Turner 1989,171 and Nuttall, Bull SIS 4,1984, 16.

3221 QBP166 STEREO VIEWER - BREWSTER

DS [Monogram of Duboscq-Soleil] Bréveté S.G.du G. ROBINSON OPTICIAN 65 Grafton St DUBLIN

Hs from 185x100 to 105x40; H 170. Mid 19 C. G.

Mahogany housing; two eyepieces; black and white cards.

The shaped rectangular housing has two brass sleeves for the eyepiece lenses, focused by push; there is a hinged flap with an ivory knob handle at the larger end of the housing away from the eyepieces; the (cracked) viewing screen has a carved frame; there is a collection of white geometrical patterns on black paper cards to be observed through the viewer

DS monogram interpreted in Morrison-Low 1984,98 - instrument invented by David Brewster 1781-1868.

3458 QBP184 STETHOSCOPE - MONAURAL

Unsigned

BD 71; H 168; SfMxD 34. Mid to late 19 C. G.

Boxwood; disc base; central tube has expanding conical end; below base are three brass pins; paper disc missing.

The Queen's catalogue list calls this "Stethoscope with paper disc" - the latter presumably being held with the three pins on the base against the patient's skin.

Bennion 1980,166-7 notes that the stethoscope was invented by the Breton doctor René Laennec of Quimper (1781-1826), who found that a percussor alone was inadequate to diagnose the chest condition of the stout, and being, it is said, embarrassed at putting his ear to the bosom of his female patients, he rolled up a paper secured with string, and found that this amplified the sound; Bennion does not mention the paper disc, as noted for this instrument; the monaural stethoscope was modified into the binaural type around 1850 by G.P Caniman of New York, who patented it in 1855; monaural stethoscopes are still commonly used in maternity hospitals to-day.

0273 QBP068 STURGEON DISC

Unsigned

B 254x149; H333; DiD 160. Mid 19 C.

Mahogany base on four turned feet holds curved support for magnet with rotating copper disc between poles.

The curved support has a mercury cup contact at the bottom, and the wheel dips into a mercury trough.

0226 QBP020 SWITCH

KEY TESTING NO 1. CATALOGUE NO WY. 2367 H.W.S. LTD SERIAL NO 6853 [H.W.S. assumed to be H.W. Sullivan]

B 175x118; H 108. Early to mid 20 C. G.

Double key; red ebonite base; brass contacts.

Two brass spring tappers, with ebonite knobs, extend from the back of the instrument, and have brass adjusting screws at two-thirds of the way; there are pairs of electric contacts at the suspension points of the springs, at the adjustment screws, and attached to the points which the tappers contact.

3192 QBP137 TELEGRAPH - MORSE

THE ELECTRIC TELEGRAPH COMPANY, 1862. H. IZANT, MAKER

Hs 130x173x96. 1862. S.

Mahogany glazed housing; silvered scale 90-0-90° with oscillating needle; slide door behind to reveal coil.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Latter is purple-covered in ivory and brass elongated spool; brass fittings include three brass screw contacts running to outside the housing.

0251 QBP047 TELESCOPE - REFLECTING

Unsigned

D 70; H 338; L 473. First $\frac{1}{2}$ 19 C. G.

Brass; folding tripod legs; turned pillar to pivot; focus by knurled knob on rod from eyepiece end.

0242 QBP036 TELESCOPE - REFRACTING

TROUGHTON & SIMMS LONDON

D 100; L 953; FL 327; D 29. Second $\frac{1}{2}$ 19 C. G.

Brass; rack and pinion eyepiece focus; finder with push focus; objective lens flap; on Dallmeyer mount 0241 QBP035.

0260 QBP055 TELESCOPE - REFRACTING

Unsigned

L 668; D 110. Late 18 early 19 C. G.

Mahogany tube with brass fittings - wide on front, narrowing at eyepiece; tube cracked.

0241 QBP035 TELESCOPE MOUNT

J.H. DALLMEYER, London

CrsD 305; H 2128. Late 19 C. G.

Cast iron support, painted black and white; brass; equatorial; with clockwork drive and two-ball governor.

The support is rectangular tapered in shape; a side limb holds a silver hours scale I-XXIV, with verniers and a mount for a reading magnifier, on a six-spoked brass wheel with racked edge; from the centre of this rises a conical brass pillar to the top of the support mount, which has another six-spoked racked wheel parallel to the hours circle; at right-angles to the support is a turned iron limb with the telescope mount at one side and the six-spoke declination circle at the other side 0-90-0-90-0°, with mounts for two magnifiers; in the centre of the upper part of the support is a clockwork drive in a glazed rectangular housing, and the two-ball governor in a glazed conical circular housing above.

The mount now holds the Troughton and Simms refracting telescope 0242 QBP036, but this is clearly not original.

0215 QBP011 THERMODYNAMIC SURFACE - MODEL

Unsigned but attributed to Clerk Maxwell

BD 255; H 320. c1875. PC.

"Clark[sic]-Maxwell's own model...of a thermodynamic surface" showing energy-entropy-volume for CO₂.

A card with the model notes: "This model and the accompanying diagram were sent to Dr. Andrews by Clark[sic]-Maxwell in 1875 after Andrews had given his first Paper at the Bakerian Lecture in 1869 and prior to giving his second paper in 1876. Dr. Thomas Andrews was Vice-President of Queen's College Belfast and is famous for his work on Carbon-Dioxide and the continuity of the gaseous and liquid states of matter.

Date on card with instrument; James Clerk Maxwell lived from 1831-1879 (Encyclopaedia Britannica 1968).

3472 QBP198 THERMOMETER - BECKMANN

B.T (assumed to be Baird & Tatlock) Jenear Normalglas. Centigrade.

L 567; TuD 13; CL 580, D 25. Early to mid 20 C. G.

White scale 0-5.8; brass sleeve cap on top; case.

The top of the mercury capillary, below the cap, is turned 180° twice, with a small cylinder mercury reservoir between the turns, parallel to the original capillary; the cylinder case is made of cardboard, coloured black and red.

0119 QBP008 THERMOMETER - GLASS MERCURY

Dr H. Geissler nchfl. Bonn Fein gekuhit Stickstoff

L 161; D 6; C 180x88. Mid to late 19 C. G.

Six standard glass-mercury thermometers in case for seven; red leather-covered case with blue lining.

Firm founded in 1854, Brachner 1985,140.

3468 QBP194 THERMOMETER - GLASS MERCURY

TROUGHTON & SIMMS, LONDON.

L 385; S 323x28; TuD 4; C 477x53x33. Mid 19 C. G.

Cylinder bulb; ivory scale 20-90°; in hinged boxwood case which contains another glass mercury thermometer.

The latter has no ivory scale, but has well-executed divisions on the glass with crudely inscribed numbers 0-50; it is marked: "N 4. Coef. 2.1754. 0°C=3,83 + (may 2.0/.5" [sic]; it has a cork on top for suspension; (L420, TuD 6).

3477 QBP203 THERMOMETER - GLASS MERCURY

Unsigned

L 217; TuD 21; BuD 34. Mid to late 19 C. G.

Mercury reservoir surrounded by a cylinder bulb with a side arm; stem protected by glass tube with brass cap.

Inside the protective tube around the stem is a glass scale -2-0-50° filling the width of the tube, but the numbers are upside down when the mercury reservoir is at the bottom; through the brass cap on top runs another capillary tube parallel to the mercury capillary, but it turns to go out the side of the tapering extension of the tube around the mercury reservoir within the wider cylinder bulb.

Precise purpose unknown.

3469 QBP195 THERMOMETER - GLASS SPIRIT

Fastré aîné à Paris 1856

L 309,219,213; TuD 6½,5,5. 1856. S.

Three; cylinder bulbs; yellow spirit; scales 30-0-40° (large); -8-0-4 and -4-0-13 (smaller).

The large thermometer has a maximum marker (not now on top, but falling in the spirit), and an air bulb on top of the capillary; it does not have a white background to its scale, as have the two smaller instruments; two of the thermometers are now in cardboard cylinder cases, and one is in a wooden cylinder case.

3476 QBP202 THERMOMETER - MINING

L Casella London 23446 24140

L 224; TuD 15; CL 261, D 29. Late 19 C. G.

Two; glass mercury; scales 0-100° and -2-0-120°; protected by outer glass cylinder; copper cylinder case.

In thermometer No 23446, the mercury reservoir is broken, and there is some yellow oil between the thermometer and its protective cylinder; in No 24140, the oil is contained in the part of the cylinder near the mercury reservoir, and is retained

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there by a ring plug between the thermometer and cylinder; another similar plug holds the thermometer near the top of the cylinder; cases have hinged flaps and handles on top.
Identified by reference to 3474 QBP200 & 3475 QBP201.

3474 QBP200 THERMOMETER - MINING

38339 Negretti & Zambra. London

L 225; TuD 22; CL 256, D 29. Late 19 C. G.

Glass mercury; column broken; scale 10-120°; protected by outer glass cylinder; wax around bulb; copper case.

The wax is contained in an open cylinder compartment joined by a neck to the protective cylinder, and the wax is held in by a cork; the instrument is housed in a copper cylinder case with a hinged top, which is signed: "PATENT MINING THERMOMETER Negretti & Zambra. London."

There are three more cases, but only one thermometer remains; two other cases are signed as for first, except that one has: "Patent Mining Thermometer" instead of the upper case letters, and the last is missing this part of the inscription altogether.

3475 QBP201 THERMOMETER - MINING

72187 Negretti & Zambra. London. 65295

L 249; TuD 24; CL 264, D 30. Early 20 C. G.

Glass mercury; white scale 0-130°; protected by outer glass cylinder; in hinged copper cylinder case.

The mercury reservoir is spherical, and there is a bend in the capillary just above it; the design is substantially different from 3474 QBP200 since, in this case, the glass cylinder protection encloses the whole thermometer, and there is no neck nor wax cylinder around the reservoir; the thermometer fits tightly in its copper case, which is signed: "PATENT MINING THERMOMETER NEGRETTI & ZAMBRA LONDON".

0121 QBP006 THERMOMETER - SPIRAL METALLIC

Celsius Metall=Thermometer nach Bréguet

BD 200; H 240. c1865. SI.

Mahogany base, white scale on top 20-0-40°; vertical support for spiral metal strip and pointer; glass globe.

There is a brass screw contact at the side of the base, and another beside the base of the arc support.

Breguet's metallic thermometer supplied to St Andrews in session 1865-6, Wray 1984a,7.

2323 QBP089 THERMOPILE

Griffin & Sons 22 Garrick St. London.

BD 97; PvMnH 182. 1868-1895. A.

Brass base and expanding pillar to pivot for circular wood and brass housing for 90 element pile; large cone.

Latter blackened (D47-84) with a leather-covered hood, as has the brass cylinder sleeve on the other side of the pile; base has two brass contacts.

Also a smaller brass thermopile (BD59,H165) with two contacts at sides of pile housing.

Dates from Anderson 1990,33-4 and Crawforth 1988,8.

2330 QBP096 THERMOPILE

HARVEY & PEAK. BEAK STT. LONDON. W.

BD 93; MnH 238; Hs 51x38x25. 1884-1889. A.

Brass; base with two contacts; expanding pillar to ebonite housing for 20 element pile; no cones.

Dates from Downing 1988,57.

3211 QBP156 TUNING FORK - ELECTROMAGNETIC

Made by Yeates & Son Dublin

B 770x173x30; FkL 750, W 108. Mid to late 19 C. G.

Mahogany base; on this, support for horizontal fork with a coil between its arms; mercury contact below.

A pin clamped by a brass knurled screw on the end of the bottom arm can connect or not with the small pool of mercury below it, and the apparatus can thus be used as a switch; a hand-written label reads: "MELDE'S EXPT STANDING WAVES ON STRINGS APPLY 8V DC. FOR OSCILLATION".

3463 QBP189 TUNING FORK - LISSAJOUS

Unsigned

Sp 197; H 458. Late 19 C. G.

Three; iron tripod foot; turned brass tapering pillar and sphere clamp; metal fork; mirror and counterweight.

The vertical forks are labelled "C" "G" and "G"; the weight (D31) of brass is at the top of one prong, and the plane mirror (D32) is on the top of the other; the grey-metal forks are secured in the brass spheres by means of simple screws in two cases, and a screw with a knurled top in the other; one fork has a double diamond trade mark.

3464 QBP190 TUNING FORK - LISSAJOUS

Unsigned

Sp 199, H 470; W 220. Late 19 C. G.

Iron tripod foot and pillar; boss on top with a brass clamp screw for the horizontal fork; mirror and weight.

The grey-metal fork is labelled "C", has a brass disc counterweight on the end of one prong, and a plane mirror on the end of the other; it has a double diamond trade mark.

3212 QBP157 TUNING FORK & SLIDING FRAME

Made by Yeates & Son Dublin

B 226x146x30; H 334. Mid to late 19 C. G.

Mahogany base and bridge to suspend two inverted tuning forks; slide at back for board to record vibrations.

The board is missing and now there are two broken glass sheets in its place; the spikes on the ends of the forks are also now gone; originally the vibrations of the fork could be made to write on the falling board, which could first be constrained by a spring clip and then released.

3210 QBP155 TUNING FORK ON RESONANCE BOX

RUDOLPH KOENIG A PARIS

Bx 589x281x149; FkH 330, W 54. Late 19 C. G.

Boxwood and mahogany veneer box with one end open; on top, turned boss for bright white-metal fork UT2 256VS.

The fork looks so bright and new that it might be assumed it was a recent addition, but it has the Koenig "K" monogram.

There is a smaller Koenig fork on a resonance box 308x116x64 - UT3 512VS - matching this, and also some unsigned more-modern forks on boxes.

Firm dates 1858-1901, Payen 1986,160.

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3517 QBP243 VAPOUR PRESSURE APPARATUS

Unsigned

B 279x203x29; H 965; TuD 10. Late 19 C. G.

Mahogany base and vertical support for three (of four) vertical glass barometer tubes in glass mercury reservoir.

The three tubes contain water, alcohol, and nothing, above the mercury; there are supports for the fourth (missing) tube.

The Queen's catalogue list notes that this apparatus is: "for showing vap[our] tensions of various liquids".

3516 QBP242 VIBRATING ROD APPARATUS

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST LONDON.

L 1038; W 430; H 453; TuD 15; BaD 31. Late 19 C. F.

Mahogany base and vertical frame; base holds adjustable horizontal brass rod; frame for strings to ivory ball.

The centre of the base has a mahogany block with a brass clamping screw to adjust the position of the rod.

Koenig 1889,52-3 shows a similar instrument: "to show the lengthening and shortening of a rod whilst vibrating longitudinally...Il se compose d'une verge de laiton moutés sur un support, et devant laquelle une boule d'ivoire est suspendue, de manière qu'elle arrive tout juste à la toucher. Aussitôt que la verge est mise en vibration, la bille est repoussée avec force."

Firm founded in 1885, Downing 1988,57.

0230 QBP024 VOLTMETER

AYRTON & PERRY'S DIRECT READING SPRING VOLTMETER PATENTED 1883

B 130x136; H 128. Patented 1883.

Mahogany base; cylinder brass housing; white scale.

The latter, 0-60, has an arc parallax mirror; the base has two brass screw electrical contacts, and a small inset magnetic compass.

3466 QBP192 WATER HAMMER - SINGING

Unsigned

L 236; BuD 34; CyD 16. Mid to late 19 C. G.

Glass; long cylinder leads to a capillary neck and then to a pointed elliptical bulb; contains water.

Name given in Kohl 1911,606.

0258 QBP053 WAVE DEMONSTRATION APPARATUS

I. NEWMAN 122 REGENT ST LONDON C Wheatstone Invr

B 631x202; H 145; C 655x224x239. 1827-1856. A.

Mahogany base and 16 wave forms; white glass-topped rods; oxidised brass housing; in boxwood case.

Two of the wave forms are held vertically, and are attached to supports on a sliding oxidised brass bound mahogany bar, which has holes in the brass numbered 56781234567812345; another slide has supports for two wave forms held horizontally; it has two sets of holes, one on each side, numbered 78123456781234567 and 123456781; on the base also are three pivoted horizontal bars with open elliptical ends (one of which is damaged), labelled "V", "D" (in the middle) and "H"; in the centre of the base is a rectangular oxidised brass frame with slits for rods ending in white glass spheres (D3) on the top and sides, and these show different wave patterns as different wave forms are slid through; at the sides of the frame are two mahogany bars which fit on clips, and which have permanent vertical wave forms.

Dates from Clifton 1995,199.

3896 QBP257 WHISTLE

RUDOLPH KOENIG A PARIS

L 667&353; MxD 22; TuD 15. 1858-1901. F.

Two; turned boxwood blow pipe with whistle lip, attached to long glass tube.

The Queen's catalogue list describes these as "Glass tube whistles" - noting that they were scrapped in 1963 - is this a miracle?!

Firm dates from Payen 1986,160.

3893 QBP254 WHISTLE - LOCOMOTIVE

RK [Monogram of Rudolph Koenig, Paris]

L 113; MxD 31. Late 19 C. CT

Brass; tapering input to cylinder with ring air vent blowing onto the conical base of a hollow cylinder.

The whistle is in four parts - the input pipe, the lower cylinder (L34,D31) with vent, a small connecting rod (D9), and the upper hollow cylinder (L31,D31), the bottom of which reduces to a smaller diameter corresponding to that of the air vent below.

The whistle is listed in Koenig 1889,72 as one of a pair of locomotive whistles, this one and one of variable pitch, with the note: "On obtient aussi avec ces sifflets des sons de battements continus et très forts, mais il est très difficile de se rendre compte des rapports entre ces sons et les sons primaires qui les provoquent, à cause du peu de fixité de ces derniers."

The firm of Rudolph Koenig was active from 1858-1901, Payen 1986,160.

3214 QBP159 WIND CHEST

RUDOLPH KOENIG A PARIS

Sp 278&177; H 142; Bx 205x97x61. 1858-1901. F.

Iron frame support for mahogany vernier base and wind box for two pipes; two stops; at back, four brass pipes.

Two of the latter, at the upper corners of the box, have stop-cocks.

Dates from Payen 1986,160.

3889 QBP250 X-RAY TUBE

Original Müller Röntgenrühr No 53764 Made in Germany

L 350; SrD 130. Early 20 C. G.

Glass sphere; short arm for angled electrode; long for concave electrode; side arm with point electrode.

The angled electrode is in the form of a disc at the centre of the sphere; the concave electrode is aligned with the circumference of the sphere; a wire spiral joins the shorter arm to the small side arm of the point electrode.

3888 QBP249 X-RAY TUBE

Schall & Son, London, W.

L 570; MxD 196; AsD 44&27. 1910-1919. S.

Glass; central sphere with cylinder arms for concave and angled electrodes; point electrode at side.

The signature label also reads: "Eq. Spark 7-inches Date 28.4.191?" (the last number being obscured); the tube is marked:

"Moment G" with a scales trade mark, "D.R.G.M. No 517109 D.R.P No 10944 D.R.G.M. No 346585"; a wire spiral connects the long thin arm housing the angled electrode to the point electrode further around the sphere; at right-angles to the main

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arms is a spark regulator.

Similar tube illustrated, Griffith 1910,940; smaller tube with same signature, 2808 UCP261, is dated 1913.

3515 QBP241 X-RAY TUBE

Unsigned

BD 79; H 260; SrD 72. Late 19 early 20 C. G.

Black turned wood foot; support to vertical glass tube, sphere and upper tube; concave disc and angled electrodes.

The wood foot does not seem to fit the tube, and is thus probably not original; the lower thinner tube holds the wire to the angled metal electrode in the sphere; the wider and longer upper tube holds the wire to the concave disc electrode just outside what would be the circumference of the sphere, if this were not interrupted by the upper tube; seems to be an early X-ray tube, with little sophistication.

3890 QBP251 X-RAY TUBE - COOLIDGE

COOLIDGE X-RAY TUBE BTH REGD TRADE MARK MADE IN ENGLAND

L 540; SrD 175; AsD 37&31. Patent 1913.

Glass sphere, two side arms; wider for angled electrode; shorter to disc and cylinder near angled electrode.

There is a screw-thread terminal on the end of the shorter arm; the two electrodes nearly meet in the centre of the sphere; there are no other arms; the tube is held in a wood frame with clamping screws.

A legend on the tube reads: "THIS TUBE IS MANUFACTURED BY THE B.T.H. Co. AND IS SOLD ON THE CONDITION THAT IT SHALL NOT BE RE-EXHAUSTED OR REPAIRED EXCEPT BY THE B. T.H. Co. OR ITS AUTHORISED LICENCEES AND ANY BREACH OF THIS CONDITION SHALL BE DEEMED TO BE AN INFRINGEMENT OF THE ABOVE PATENTS. VICTOR X-RAY CORPORATION LTD. 15-19, CAVENDISH PLACE, LONDON W."; the Patents noted are: "PATENT Nos. 14892 OF 1913 & 25849 OF 1913 PATENTS PENDING".

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ROYAL COLLEGE OF SURGEONS IN IRELAND - RCS

St Stephen's Green

Dublin 2

Telephone (01) 478-0200

Note: The College has a large collection of medical instruments, the listing of which is outside the parameters of this Inventory. However, instruments in this collection, which would normally be included in listings of other scientific instrument collections, have been detailed, these being chiefly microscopes, medical coils, and some thermometers.

4430 RCS053 CLOCK/BAROMETER/THERMOMETER

[On barometer] P. Mackey Dublin [On clock face] SHARP [with DUBLIN painted out]

H c1830. Early to mid 19 C. R.

Mahogany long case with white dial; circular brass barometer scale 28-31", and alcohol thermometer 10-120°, on front.

Located in the room outside the Abraham Collis room.

Fennell 1963,34 lists a regulator by Christopher Sharp, Dublin, 1824.

Banfield 1991,137 lists P.D. Mackey as a carver and gilder at 3 Skinner Row, Dublin w 1820, est 1820-50.

4293 RCS043 COIL - INDUCTION, MEDICAL

FANNIN & CO DUBLIN. 181C [Hand written 20/0 £4.6.0] [On instructions] D.T. ROBINSON & SON ENGLAND(?)

CH(-HA) 237x163x98. Late 19 C. G.

Mahogany case with two hinged sides holds blue-covered coil, bichromate battery, sphere and brush electrodes.

The coil with its signed blue cover (replaced by Fannin on original cover?) is held between two boxwood discs; at one end a brass cylinder, divided 1-5, and with a turned ivory end, can be pushed into or out of the coil; at the other end is an interruptor mechanism; there are three brass screw terminals marked with stamps "P" "N" "N" with ivory discs between them marked "P" and "S", and two plugs marked "P" and "N"; leads from the plugs go to two handles, one of turned wood and one of ebonite (presumably one is a replacement), into which can be screwed a small sphere electrode and a metal brush electrode; the case also contains a detached brass cylinder electrode.

A bulbous glass flask is for the battery solution; this has, on top, a brass sleeve, and an ebonite disc for the two carbon (both broken) and single zinc electrodes; the latter can be raised by means of a knob on the disc; the disc also has two brass screw terminals "P" "N".

In the lid is an illustration of the apparatus in which the original signature can be seen (unclear but perhaps "D.T. ROBINSON & SON ENGLAND"), and instructions are given for the "IMPROVED INDUCTION COIL AND BATTERY FOR MEDICAL PURPOSES"; these include the battery solution: "Dissolve 1 part bichromate of potash in 8 parts boiling water, when cold add 1 part sulphuric acid, all by weight."

4294 RCS044 COIL - INDUCTION, MEDICAL

McIntosh Battery and Optical Co., Chicago. Ill [On case] KNIGHT & LOWENBURG BOSTON, MASS

C 233x155x193. Early 20 C. G.

Hinged oak case; ceramic top to lower section with coil, interruptor, switch, mains lead, and adjustable gap.

The coil has fine green windings; there is an on/off switch and an adjustable interruptor mechanism attached to a curved bar, with an insulated handle, leading to a small sphere whose distance from a larger sphere on a mount can be varied; two insulated electric wires lead out for a (missing) plug for a lamp socket for 110 volts AC or DC.

Instructions direct that a (missing) "vacuum electrode" or other electrode is connected to the larger sphere while the smaller sphere is touching it; the electrode is then applied to the patient, and the small sphere is separated from the larger one until the desired strength of current is obtained.

A paper label gives the McIntosh signature and a plaque on the lid reads "KNIGHT & LOWENBURG X-RAY & HIGH FREQUENCY OUTFITS ELECTRO MEDICAL APPARATUS BOSTON, MASS".

4301 RCS051 CONDENSER WITH WHEEL OF APERTURES

Made by A. Rofs, London Registered July 20, 1849

H 84; W 62. 1849. S.

Brass; lens with flared cylindrical wheel of 22 apertures; also eyepiece and objective with wheels.

The wheel is angled between the support and the lens; the flared cylinder is divided from 1-19 with a clip to help locate the apertures; in all there are 22 apertures, two of them with solid discs in their centres.

Gerard Turner (Bull SIS No.40,1994,25-26) describes this "Achromatic condenser with wheel of apertures, designed by W.S. Gillett and first produced by Andrew Ross in 1849" in a brief article leading to the invention of the iris diaphragm (by J.H. Brown in 1867). He writes: "For a long time microscopists used a series of apertures from which they would select the appropriate one for the purpose in hand. An elaborate and popular version was in the Gillett achromatic condenser.... This incorporates a bevelled wheel with twenty apertures and two centre stops".

An unsigned objective (H71,W56) incorporates two wheels with two knobs to rotate them; the lower has apertures labelled 0 20 30 42 56 72 90 109; the upper has two free apertures, two containing central solid discs, one with one segment cut out, and two with two segments cut out.

A brass and oxidised brass eyepiece (H53,W85) incorporates a wheel with a free aperture, two with inner solid discs, and one with a crescent.

4291 RCS041 ELECTRICAL MACHINE - CLARKE

PAWSON & BRAILSFORD, LITH. SHEFFIELD. IMPROVED PATENT MAGNETO-ELECTRIC MACHINE FOR NERVOUS DISEASES

C 220x117x115. Late 19 C. G.

Boxwood case; horizontal U-shaped magnet; brass frame with mechanism to revolve two coils at poles of magnet.

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A wood and brass handle fits into a slot on the front of the case, and this drives a gilt decorated wheel connected by a (detached) leather thong to the axis of the revolving blue velvet-covered coils; the magnet, which is partially painted blue, has a minder which can moved by a knob outside the case; there are two cylinder brass electrodes; instructions show the use of the machine for "Toothache, Tic-doloreux and Neuralgia".
Prize medals illustrated "FIRST PRIZE MEDAL LONDON 1862", "SILVER MEDAL PARIS 1878", i.e. post 1878.

4292 RCS042 ELECTRICAL MACHINE - CLARKE

PAWSON & BRAILSFORD, LITH. SHEFFIELD. [Small labels] MASON, Essex Bridge, DUBLIN. Estd 1780.
C 257x118x123. 1878-1883. R.

Mahogany case; horizontal U-shaped magnet; brass frame with mechanism to revolve two coils at poles of magnet.
"IMPROVED PATENT MAGNETO-ELECTRIC MACHINE FOR NERVOUS DISEASES"; similar to 4291 RCS041, except that it has a mahogany case, the magnet is partially painted grey, the coil bobbins are covered in purple velvet, and the handle drives a large cog-wheel which connects to a small one at the axis of the main driving wheel, connected to the axis of the coils by a leather thong; there are replacement brass bar electrodes and the knob for the minder movement is gone. A card with the instrument records that it was donated by Mr Stanley McCallum in March 1983. Prize medals illustrated London 1862 and Paris 1878; Essex Street became Parliament Street in 1884.

4268 RCS018 EYEPIECE - MICROMETER

A. Rofs, London

L 117; W 40; H 66. Mid 19 C. R.

Brass; rectangular housing; at one side, drum micrometer 10-100; in centre, two lens system; inner toothed bar.

The drum micrometer moves the toothed bar seen in the field of view; this has divisions between each set of five teeth, with a deeper division at the centre; the eyepiece does not seem to fit the Ross microscopes in the collection, so it is listed separately.

Andrew Ross (1798-1859) was active from 1832 until his death, Turner 1989,154.

4289 RCS039 HYDROMETER - SIKES

[Case] SIKE'S HYDROMETER M. JORDI & Co DUBLIN. (No 4245) [Thermometer] MASON & SON. OPTICIANS. DUBLIN.
L 155; BuD 35; ThS 177x20; C 201x93x54.

Thermometer 1865-1875. R.

Gilt brass; scale 10-0; nine disc weights 10-90 plus cap weight; ivory scale for thermometer; fitted case.

The above signature is on an ivory plaque on the case, which is missing its lid lining, but has dark red velvet lining for the instrument; the hydrometer is signed "M. JORDI & Co 4245 SIKES P 51"; the weights are stamped 4245; the thermometer has an ivory scale 20-100°.

Morrison-Low 1989,131 lists Mason & Son from 1865-1875.

4297 RCS047 INCUBATOR

Ernst Leitz, Berlin Mikroskop & Laboratoriumsbedarf N.W. 6, Luisen-Str. 45

H 1440; Ch 626x538x395. Supplied 1895. D.

Copper and other metals; double metal and glass-framed doors; two cylinder electric heaters; thermoregulator.

Floor standing frame to chamber; the electrical heaters can be pushed into horizontal cylinders at the base of the chamber; thermoregulator on top; holes on top and sides for thermometers, one cap for these remains; drain tap at bottom; two gauze shelves inside.

Detailed specification received from Franz Bergman dated 31:5:90.

4254 RCS004 LENS - BULL'S EYE

Unsigned

BD 90; H 298; LeHsD 63. Mid to late 19 C. G.

Brass; disc base; pillar with slider for right-angled arm with inner rod to housing for plano-convex lens.

4296 RCS046 MEASURING TABLE

Unsigned [Case hinge stamped BLECKMANN SOLINGEN GERMANY]

Hs 255x204x61; C 318x258x92. Mid to late 19 C. G.

Boxwood frame with two red glass windows; brass rulers and hinged alidade; two spirit levels; boxwood case.

This instrument is something of an enigma!; there are red glass plates (both now cracked) above and below; the upper one has a brass rule along the bottom, divided 0-20, and another about one third of the way up the plate; on the left hand side is a long rule, divided and numbered from the upper of the previous rules from 0-47, and this can be bent in two right-angles so that it surrounds the other three sides of the plate; a slide on the bottom rule holds an undivided alidade with a single hinge allowing it to be extended to about the same distance as the long divided rule, but this one has a diagonal cut at its end leaving a point; all this might suggest a table for measuring photographic plates, especially if there was a light between the plates; but there is no sign of one, as the inside is filled with cotton wool, and, surprisingly, contains a small plumb-bob; at two sides of the frame are oak and brass spirit levels, and these might suggest a surveying use, supported by the presence of the plumb bob; a panel at the side is held on by two screws, and this seems to be designed to allow plates to be inserted under the glass plates; that at the back has cross wires and a small hook; with the instrument is a wood plate (252x240) with central metal diamond with cross wires and another small hook; the apparatus is contained in a boxwood case whose hinge has a German signature.

The true purpose of this instrument is very obscure!

4299 RCS049 MICROSCOPE

Unsigned

H 88; D 73. Late 19 C. G.

Brass; cylinder with a sprung stage; external rack and pinion focus for a double lens magnifier.

The bottom of the cylinder has a screw thread for a missing part of the instrument; inside the cylinder is a spring for the adjustable stage, which is held against the ring top of the cylinder; to the side of the cylinder is a bracket for a rack and pinion which raises or lowers the lens system, screwed into the centre of a disc attached to the rack; the magnifier consists of two plano convex lenses, with the convex sides facing inwards towards each other; although the instrument involves two lenses, it is more like what might be called a magnifier than a compound microscope; it has similarities with a dissecting microscope, except that the stage does not have easy access for manipulating specimens.

4284 RCS034 MICROSCOPE - COMPOUND

ARMSTRONG & BRO 88 DEAN'S GATE MANCHESTER

H 305; FoL 135, W 114. Late 19 C. R.

Brass and oxidised brass; Y-foot; trunnions to pivot for short limb for mirror, stage and arm to body tube.

The cylindrical bottom of the limb holds a sleeve for the rotating concave mirror, and the open end of the wide foot has a bar catch across it to stop the instrument from pivoting too far; the rectangular stage has a sliding bar and an aperture with a

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wheel of three apertures on top; a double knob rack and pinion raises an inner bar (now stuck) to adjust the arm holding the objective end of the body tube; the eyepiece lens is present, but there is no objective lens, and the fine focus screw near the objective end is also missing.

Banfield 1991,9 lists Thomas Armstrong & Brother, with dates estimated 1875-1900+.

4278 RCS028 MICROSCOPE - COMPOUND

BAKER, 244 High Holborn, LONDON [Lens] GUNDLACH BERLIN 1/2 In C. BAKER AGENT London
B 225x229; MnH 495; FoSp 205&175. Mid to late 19 C. R.

Mahogany base; brass with some copper; Y-foot; heavy rectangular limb; triangular section rack for focus.

The foot supports trunnions to a pivot for the limb; at the bottom of this is a cylinder for a sliding sleeve for the rotating plane and concave mirrors; the rectangular stage has two slide clips, and knobs for moving forwards and sideways; below the stage is a condensing system and a wheel of four apertures; the double knob rack and pinion coarse focus raises a triangular section rack and, via an arm, the body tube; there are two fine focus knobs on the arm from the limb to the tube; there are three lenses, three lens cans, and two eyepieces; the lens cans are signed: "1/4 in Baker London", "GUNDLACH BERLIN 1/2 in C. BAKER AGENT London" with "SEIBERT No II" on lens, and "GUNDLACH BERLIN 1/16 b Immersion C. BAKER AGENT London".

Clifton 1995,14 lists Charles Baker from 1851-1909.

4267 RCS017 MICROSCOPE - COMPOUND

E. LEITZ WETZLAR No.. 5491

MnH 249; FoL 80, W 90. c1879. N.

Brass; U-foot; pillar holds rectangular stage with, on top, fine focus knob and arm to sleeve for body tube.

Below the stage is an oxidised bracket for revolving plane and concave mirrors; under the stage is a sleeve for a push-in aperture; coarse focus is by pushing the body tube in the sleeve.

J. Bennett (PC) gives serial number 3431 in 1879 and 6547 in 1880.

4282 RCS032 MICROSCOPE - COMPOUND

E. LEITZ WETZLAR No 4712 [Card in case] Mikroskop Nr. 4145 Vergrößerungen bei 160 M. Tubuslänge 22/11/1881

MnH 248; FoL 87, W 75; C 290x120x97. c1879. N.

Brass, oxidised brass, enamelled metal; U-foot; pillar holds mirror, stage, and bracket for body tube; case.

A vertical cylindrical pillar rises from the foot, with no pinion; a pin through the bottom holds the rotating concave mirror; bolted to the pillar is the rectangular stage, with a wheel of five apertures below; two arms from the top of the pillar, which has a fine focus knob on top, hold a sleeve for the body tube, which has push coarse focus; mahogany fitted case with eyepiece and two objectives.

The number on the microscope and the card in the case are different, but will be of a similar date; the card gives details of the "Systeme" and "Oculaire".

J. Bennett (PC) gives serial numbers 3431 1879, 6547 1880.

4283 RCS033 MICROSCOPE - COMPOUND

Unsigned - but similar to 4282 RCS032 signed E. Leitz.

No measurements available. Late 19 C. G.

Brass, oxidised brass, enamelled metal; V-foot; pillar holds mirror, stage, and bracket for body tube.

A vertical cylindrical pillar rises from the foot, with no pinion; a pin through the bottom holds the rotating concave mirror; bolted to the pillar is the rectangular stage, with a wheel of five apertures below; two arms from the top of the pillar, which has a fine focus knob on top, hold a sleeve for the body tube, which has push coarse focus.

4266 RCS016 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No..18079.

H 308; FoL 120, W 89. c1890. N.

Brass; U-Y-foot; short pillar to pivot; rectangular stage; pillar above with arm to body tube; distressed.

There is a condensing lens below the stage; hinged to the pivot is a bracket for an oxidised brass revolving plane and concave mirror; the pillar above the pivot is missing its fine focus knob on top; coarse focus is by push; there is a double nose piece but no objective lenses; the eyepiece also is missing.

J. Bennett (PC) gives date 1891 for serial numbers 18553 and 19873.

4270 RCS020 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 46796

MnH 280; FoL 140, W 100. c1897. N.

Brass and enamelled metal; U-Y-foot; short pillar to pivot; circular stage; pillar and arm to body tube.

A short rectangular pillar rises from the back of the foot to the pivot; a small limb holds a rotating mirror and a mechanical iris diaphragm below the large circular stage, which has two slide clips and adjusting knobs; above the stage is a pillar with a fine focus knob on top, and an arm bracket holding the body tube, which has coarse focus by double knob rack and pinion; there is no objective lens present.

A card with the instrument records that it was manufactured in 1899, donated to the College by Richard Dancer Purefoy (1847-1919), Master of the Rotunda Hospital from 1896-1903, who was President of the College from 1912-1914. Purefoy's nephew, Dr W.C. Neville, who formerly owned the microscope, was one of the lecturers to give evening classes at the Carmichael School, just preceding the amalgamation.

J. Bennett (PC) gives serial numbers 44439, 1897, and 47792, 1898.

4271 RCS021 MICROSCOPE - COMPOUND

[Lenses only signed] E. Leitz Wetzlar 3 & 6

H 270; FoSp 123&100. Early 20 C. G.

Brass and enamelled metal; V-foot; trunnions to pivot for swan-necked limb; three lens nose piece.

A rectangular stage, with two slide clips, is attached to the bottom of the swan neck, and it has an iris diaphragm below; under this is a rotating bar for a rotating plane and concave mirror (the bar is numbered 5/01995/); the top of the swan neck holds the body tube which has double knob rack and pinion focus; the nosepiece is in the form of a concave/convex disc with threads for three objectives (only two remain).

4258 RCS008 MICROSCOPE - COMPOUND

ANDREW PRITCHARD 263 Strand, LONDON.

MnH 477; FoSP 226&251. c1834. D.

Brass; three limb foot; expanding pillar to pivot; limb with racked triangular bar to raise body tube.

The expanding pillar is clamped using a knurled ring; the pivot is attached to a clamped ring into which fits a cylinder which would have held a sleeve attached to the (missing) mirror arrangement; at the top of the cylinder is a fixed rectangular stage, with a double knob (the inner larger part not now functioning) to allow the stage to move forwards or sideways; on top of the

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triangular bar inside the limb is an arm to the objective end of the body tube; at the bottom of the base pillar is a side arm which, according to a card with the instrument, was for a candle holder and chimney.

The card also notes that the mechanical stage is that of Turrell (1833) in which the milled heads for movement in both directions are placed close together on the same axis; the card gives the c1834 date.

There is also a lens can with an objective signed "C1/8 Andrew Pritchard 263, Strand London"; and an eyepiece with a nicol prism signed "Andrew Pritchard 263 Strand London".

Christie 29:9:94, Lot 293, records that Andrew Pritchard (1804-1882) was operating at 263 Strand by 1836, followed in 1838 by his final move to 163 Fleet Street. Anderson 1990,65 lists Pritchard at this address in 1837, and at other addresses in 1829 and 1842. Clifton 1995,224 lists him at this address from 1835-1838.

4252 RCS002 MICROSCOPE - COMPOUND

A. ROSS, LONDON No. 522 [One lens can is signed: Andw Rofs & Co Opticians 33 Regent St, Picadilly]

MnH 505; FoSp 240&220.

Lenses dated 1852&1854; Purchased Feb.1863.

Brass; Y-foot; trunnions to pivot for heavy limb; double knob rack and pinion focus; arm to body tube.

The coarse focus raises a triangular section bar in the rectangular section limb and this raises the arm holding the body tube; at the bottom of the limb is a cylindrical bar with a sliding sleeve for the rotating plane and concave mirrors; there is a mechanical condenser system without optics below the stage, which has three rack adjustments, forwards, sideways and rotating; on the arm are two fine focus knobs, one divided 7-28; there are four objective cans signed "A. Rofs, London", 1/8, 1/6, 1/2 and 2 "In", and six lenses, three signed "A. Rofs", one dated 1854, and two 1852; a further empty lens can is signed "Ross London 1/8 In".

A card with the instrument records that it was purchased by the College in February 1863 for £140. It had been the property of a Mr T.F. Bergin. He was quite likely Mr Thomas F. Bergin, who held office as Clerk (ie Secretary) to the Dublin and Kingstown Railway Company - the first in Ireland, opened in 1834.

Andrew Ross (1798-1859) was at 33 Regent Street from 1839-1843, Turner 1989,154.

4276 RCS026 MICROSCOPE - COMPOUND

SMITH & BECK LONDON 1816

MnH 295; L 400; C 298x130x142. 1847-1857. R.

Mahogany case and base; brass and oxidised brass; trunnions to pivot for limb for mirror, stage, and arm to body tube.

The trunnions are attached to one side of the base, which also holds frames for six lens cans (five remain and one set of three holes is detached); the base slides into the case when the instrument is lowered; below the stage is a sliding cylinder for the rotating concave mirror; the rectangular stage has a housed nicol prism below; there is a fine focus knob on top of the limb, below which is an arm leading to a sleeve into which slides the body tube, to give push coarse focus; the mirror is not securely fixed in its pivots; there are three unsigned lens cans and three objective lenses with the microscope; elsewhere is an empty lens can signed "4/10 Smith & Beck 6 Coleman St, London.", and a fifth unsigned lens can containing a cylinder tube with a side knob, signed "SMITH BECK & BECK PATENT LONDON" on an elliptical metal plate on its side.

Turner 1989,178 records that this type of microscope was described by Richard Beck in "A Treatise...on Achromatic Microscopes" in 1865, the first "third class" microscope made by the firm, which was by then being superseded by the "Popular Microscope" with a binocular body. James Smith and Richard Beck became partners in 1847; Joseph Beck became partner by 1857, Turner 1989,171.

4273 RCS023 MICROSCOPE - COMPOUND

J. SWIFT & SON LONDON [Lens] 1/12 IN OIL IMM N.A.I.30 J. SWIFT & SON LONDON.

MnH 295; FoSp 155&133. Early 20 C. G.

Brass and enamelled metal; foot has curved back and two limbs; pivot for pillar limb with bar to body tube.

The foot makes up trunnions to the limb pivot; the limb has a slide tube under it for the (missing) mirrors; the large rectangular stage has a pivoting condensing lens system below; on top of the limb pillar is a fine focus knob; an arm from the limb leads to a double knob rack and pinion coarse focus for the body tube; a concave/convex nose piece holds three objective lenses, one by Swift & Son and the others by E. LEITZ WETZLAR; these latter are marked "6" "R.C.S.I. No28", and "3" "R.C.S.I. No40".

4272 RCS022 MICROSCOPE - COMPOUND

ROBT. NAUDE & KEYS DUBLIN "KIMA" BIOL. DEPT R.C.S.I. 10

W. Watson & Sons, Ltd London 68303

No measurements available. Early 20 C. G.

Brass and enamelled metal; Y-foot; trunnion mount to swan neck limb for stage and body tube; double nose piece.

The rectangular stage has an iris diaphragm below, and a rod to a rotating plane and concave mirror; at the top of the limb are double fine and coarse focus knobs; a concave/convex disc holds two objective lenses; a lens can housing an objective is signed "1/2 INCH WATSON & SONS 313 HIGH HOLBORN LONDON".

The firm took the name Watson & Sons in 1882, and became a Limited Company in 1908, Clarke 1989,87.

4275 RCS025 MICROSCOPE - COMPOUND

Unsigned

B 180x148; MnH 353; FoSp 156&126.

Mid to late 19 C. G.

Mahogany base; brass; Y-foot; trunnions to pivot for limb holding mirrors, stage, and arm to body tube.

The limb is in the form of a cylinder, with a sliding sleeve below for the rotating concave mirror, and a rectangular stage just above the pivot; the stage has a sliding bar across its width; just above the stage is a double knob pinion for adjusting the position of a triangular section rack inside the limb cylinder; an arm on top leads to a ring into which screws the body tube; the fine focus knob is near the objective.

4264 RCS014 MICROSCOPE - COMPOUND

Unsigned

L 125; MxD 21. Early 20 C. G.

Black enamelled tube; angled cylinder objective end with mirror; body slider to change magnification; case.

The straight tube has an eyepiece at one end and, at the other, a short cylinder cut at an angle, with a small plane mirror at the taller side; at the base of the cylinder is the objective lens, and a ring around the outside focuses the system; a slide running along part of the tube allows changes to be made in the magnification "60X 50X 40X"; the microscope is stored in a brown leather purse with a silver metal clasp, part of which is now broken off and missing.

Presumably this is for specialist medical use, though it is not immediately obvious which part of the anatomy it would be used to view.

4253 RCS003 MICROSCOPE - COMPOUND

Unsigned

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B 234x196x19; H 467; FoSp 227&213.

Early to mid 19 C. G.

Brass; three limb foot on mahogany base; trunnions to pivot for double parallel bar limb; tube on arm on top.

The pivoted limb is unusual in consisting of two parallel, square-section bars, the back bar is attached to the pivot; a sliding bracket at the bottom of the front bar holds a bar at right angles, on which slides a sleeve for the plane and concave rotating mirrors, on a sliding dove-tail which also revolves; also on the front bar is a rack and pinion adjusted rectangular stage, with two slide clips, and a small condensing lens on a pin at the edge; the bar is marked 1-5, presumably to give the rough position for different lens powers; on top of the bar pair is a right-angled arm holding the objective end of the body tube; fine focus is by a small wheel outside the objective end which runs on a screw thread to vary the position of the sprung objective; accessories include tweezers, brass slider with four windows in a brass frame, and a brass specimen tweezers on a pin for the stage; there are also a lens, aperture, and lieberkuhn which do not appear to belong to this instrument. This interesting microscope, which seems to be derived from the "Jones Most Improved Type" (see Turner 1989, 66-67) differs from anything contained in Billings 1987 and Turner 1989.

4277 RCS027 MICROSCOPE - COMPOUND, BINOCULAR

HENRY CROUCH LONDON 3167 [Lens cases] H. Crouch London 1/4 1/2 1 & 2 in

MnH 430; FoSp 167&155. Late 19 C. G.

Brass and oxidised brass; foot with curved back and two arms; swan neck limb; mechanical stage and sub stage.

The foot rises to trunnions for the swan neck limb; below is a rotating arm for the plane and concave mirrors; then there is a condensing aperture with no optics, having a rack and pinion adjustment and centring knobs; above this is a wheel of four apertures; the circular stage has brackets above with knobs for mechanical forward and sideways movement; the limb leads to a double knob rack and pinion coarse focus for the body tube (one of the knobs is detached); the binocular tube also has rack and pinion eyepiece focus; there is a fine focus knob at the objective end which has also a double nose piece; there are four lens cans, with three objectives, an eyepiece, and some eyepiece sleeves.

The firm of Henry Crouch dates from 1868 and lasted into this Century, Downing 1988,30.

4256 RCS006 MICROSCOPE - COMPOUND, BINOCULAR

ROSS, London. 3450. [On tube] WENHAM'S BINOCULAR by Ross, London

MnH 527; FoSp 248&211. c1875. R.

Brass; Y-foot; trunnions to pivot for heavy limb; double knob rack and pinion focus; arm to body tubes.

The coarse focus raises a rectangular section bar in the rectangular section limb and this raises the arm holding the body tubes; at the bottom of the limb is a cylindrical bar with a sliding sleeve for the rotating plane and concave mirrors; above this is the mechanical sub stage with centring knobs but no optics, adjusted by rack and pinion on a dove-tail plate; the mechanical stage has knobs to adjust forwards and sideways, above a large mechanical ring divided 10-360°; fine focus is by divided knob 5-30 on the arm to the body tubes; these have a rack and pinion eyepiece focus; a revolving bracket allows one or other of two objective lenses to be used; when seen, the microscope had a "Ross London 2In 20431" lens and an "E. Leitz" lens attached; on the stage is a pin holding a sample tweezers.

Turner 1989,160-161 gives dates c1875 for No. 3229, and c1880 for No. 5015.

4257 RCS007 MICROSCOPE - COMPOUND, CUFF

Made by Geo. ADAMS in Fleet Street London

B 162x162; H 377. Mid to late 18 C. R.

Mahogany tapering case with drawer; mahogany base with drawer; brass instrument; divided pillar focus.

On the centre of the base is a disc for a rotating concave mirror; from one corner of the base rises a square section support for the pillar, the support having a curved strengthening arm at the back; the pillar holds a cruciform stage and an arm for the body tube, which fits into a tapered ring; coarse focus is by pushing one half of the pillar, moving the body tube, relative to the other; fine focus is by screw, after clamping, the clamping screw being missing; one half of the pillar is marked 1-6 for the different powers of the lenses; the objective end of the body tube is divided also, and Turner 1989,49 records that these marks are to "set the lieberkuhn carrier numbered for each objective"; there are six marked objective lenses.

A card records that this microscope belonged to John Shekleton, first curator (1820) of the College Museum, whose untimely death in 1824 was caused by a dissecting room infection.

John Cuffe introduced this type of microscope in 1743, George Adams died in 1772, and his son George in 1795.

1433 RCS001 MICROSCOPE - COMPOUND, CULPEPER

EDWD. CLARKE OPTICIAN No.18 Lower Sackville St. Dublin.

BD 82, H 260; CB 133x128, H(-Ha) 330. 1810-1812. A.

Brass; signature on trade label on door of pyramid case; disc base; double scroll legs; circular stage.

Below the stage is a spring for sliders, and on the stage is a specimen tweezers on a pin; on top of the upper legs is a disc with a screw thread for the body tube; this has a narrow tapered objective end for the lenses; there are five lenses, one in the microscope and four in the drawer of the case, which also contains a large and a smaller fish plate with ribbons; and an ebony disc.

Trade label illustrated in Morrison-Low 1989,49; dates from Morrison-Low 1989,122.

4274 RCS024 MICROSCOPE - COMPOUND, CULPEPER

Unsigned - base stamped "IM"

BD 120; H 317. Early to mid 19 C. R.

Turned wood base and three sloping rods to convex disc with stage above; cardboard and wood body tube on top.

In the centre of the base is a central wood mound with a pivot for a plane mirror; the stage has a spring to hold sliders; the body tube fits into a cylinder above the stage, which is cardboard inside and has orange snake-skin(?) outside, and has a wood ring on top; the cardboard body tube also has a wood ring strengthener, and the eyepiece lens screws into a wood screw thread on top.

Turner 1989,205 illustrates a somewhat similar "IM" microscope, which he to the dates first half of the nineteenth century.

A card with the instrument calls this a "Nuremberg" microscope, and gives a date c1750, recording that Nuremberg, Bavaria, was quite famous for these cheap microscopes constructed of wood and cardboard. This has a magnification of 45 diameters.

4260 RCS010 MICROSCOPE - COMPOUND, DRUM

J. Crichton 112, Leadenhall Str, LONDON

BD 64; H 242. 1834-1865. A.

Brass; ring base; cut-out cylinder for revolving mirror and stage, and a sleeve into which the body tube slides.

The base ring holds two vertical side pieces, part of a cylinder, which becomes complete on top to hold the push-focus body tube; the revolving concave mirror is held by two small screws in the cylinder sides, below the stage, which consists of a double ring with a glass disc below.

Dates from Clifton 1995,71.

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4261 RCS011 MICROSCOPE - COMPOUND, DRUM

E. Hartnack sucr de G. Oberhauser Place Dauphine 21, Paris
BD 79; MnH 227. 1860-1870. R.

Brass; disc base; cut-out cylinder with mirror to stage; side pillar with arm to push-focus body tube.

The short base cylinder is cut out in front, with a concave mirror turned by a knurled knob outside; on top of this is the rectangular stage, with two slide clips; the short pillar at the back of the stage has a fine focus knurled screw underneath, and an arm at right-angles to a ring holding a sleeve into which the body tube slides for coarse focus.

A card with the instrument records that this form of microscope was first produced, c1742, by Benjamin Martin, who called it a "Pocket Reflecting Microscope"; in 1816 the pattern was adopted by Fraunhofer, and in 1830 the manufacture was continued by Oberhauser; in 1837 it was patented by Lerebours, and c1840 manufacture was continued by Harnack; this particular model was popular as a student microscope in laboratories for many years.

Edmund Hartnack succeeded George Oberhauser in 1860, and moved to Potsdam in 1870 - Turner 1989,210.

4259 RCS009 MICROSCOPE - COMPOUND, GOULD

Dollond, LONDON

B 219x152x54; H 282. c1830. D.

Mahogany case; brass microscope rises from one corner; stage rack and pinion focus; wheel of objectives.

The case has a brown velvet lining; a base pivot is fixed in one corner of the case; above this is a limb with a hole at the bottom for attaching a revolving concave mirror; the racked limb has a knurled knob pinion to move the circular stage, which has a spring for sliders and a specimen tweezers; an arm on top of the limb holds the objective end of the body tube, which is tapered below and cylindrical above; under the arm is the wheel of four objective lenses; the signature is similar to three illustrated in Turner 1989,76 (signed Bate or Cary), who suggests that "one manufactory supplied the entire English trade in these pocket microscopes".

A card with the microscope reads: "William Cary commenced the manufacture of his very popular thirteen 'Cary'-type microscopes in 1827 until 1850....This model dates from 1830 but its stage also has a swing movement. The stage is also fitted with springs to hold the ivory sliders (precursor of the glass micro-slides) in place with a constant tension. The introduction of achromatic lens systems (and thus longer body tubes) and the use of glass slides requiring a larger stage ended its popularity."

4265 RCS015 MICROSCOPE - COMPOUND, GOULD

Unsigned

H 252; FoSp 157&146; C 181x145x40.

Early to mid 19 C. G.

Brass; folding foot; pillar holds racked stage and arm to body tube; mahogany fitted case with accessories.

The folding three limb foot holds the racked pillar; a knob pinion raises or lowers a bracket with a hole for a pin holding the circular stage, containing a disc with a glass centre; the stage has an extension at the side into which fit a revolving condensing lens and a specimen tweezers; at the bottom of the pillar is a hole into which fits a revolving concave mirror; on top of the pillar is an arm to hold the objective end of the body tube, which is conical at the lower end and cylindrical at the eyepiece end; the objective lens screws into the bottom of the body tube before it, in turn, screws into the thread on the supporting ring; the instrument fits into a fitted mahogany case, lined with green velvet, containing accessories, including four ivory six-window sliders, an ivory disc blackened on one side, a plane glass disc, and a convex/concave glass disc.

4281 RCS031 MICROSCOPE - COMPOUND, JONES

Dollond, London. [Case plate engraved] DFF 1844

MnH 450; FoSp 182,184,187; C 333x231x85.

Pre 1844. S.

Brass; folding foot; pillar to pivot for square section limb for mirrors, stage and body tube arm; fitted case.

The folding tripod foot supports a tapering pillar to a pivot to a racked limb; on the bottom of this is a sliding sleeve for rotating plane and concave mirrors; a pinion knob moves a square stage, which has a hinged condensing lens below; on top of the limb is a clamped bracket for an adjustable arm to the objective end of the body tube, which is tapered, the upper part of the tube being cylindrical, with a narrower part for the eyepiece; below the objective end support is a wheel of six lenses of different powers; the case contains accessories, including eight four-window ivory sliders, a small ivory cylindrical case for mica plates and brass rings, a brass four-window slider, a fish plate, a pivoted specimen tweezers, a mount for a missing rotating mirror, a live box, two lieberkuhns, and a black and white ivory disc; a brass plaque on top of the case is engraved "DFF 1844", which gives a latest date for the instrument.

A card with the microscope records that it came from Dr F.S. Bourke's house, and possibly from Dr T.P.C. Kirkpatrick.

A variation of the Jones Most Improved Microscope, dating to the first quarter of the 19th century, Turner 1989,66-72.

4279 RCS029 MICROSCOPE - SIMPLE

REPLICA OF MICROSCOPE BY ANTONY VAN LEEUWENHOEK ABOUT A.D.1665 MADE IN 1933 BY BAUSCH & LOMB OPTICAL CO. ROCHESTER, N.Y. U.S.A

L 87; W 26. 1933 (1665). D.

Silver metal plate holds lens and a bracket for adjusting the position of the specimen; in grey box.

One side of the plate narrows with curved corners, and on this end is a bracket with a clamping screw to hold a screw thread adjusting the position of a bar with a point for the specimen; another screw through the bar allows the specimen to be rotated slightly; the point also has a screw thread with a knob to help positioning; the instrument lies on a grey velvet lining in a grey cardboard box, with the logo of a draped face on top, and the legend "TO GREATER VISION THROUGH OPTICAL SCIENCE BAUSCH & LOMB".

Inside the lid of the box is written: "This instrument is a replica of one of the microscopes made and used by that pioneer in Biology, Antony van Leeuwenhoek (October 24, 1632, to August 26, 1723). Born in Delft, Holland, of middle class parents, he received his early education at a village school and at sixteen was apprenticed to a draper at Amsterdam. After spending some years in the drapery business, he returned to Delft, married, and some time later was given an obscure political position, neither arduous nor exacting, but enabling him to spend much time with his lenses. With self-acquired knowledge of grinding, polishing and mounting the lenses, he surpassed all others with his microscopes and was the first to discover protozoa (1674) and bacteria (1676). He was visited by royalty, elected a Fellow of the Royal Society of England and a member of the French Academy of Sciences."

4280 RCS030 MICROSCOPE - SIMPLE, COMPASS

Unsigned

L 108. Mid 18 C. R.

Brass and silver; frame with knurled knob to adjust position of specimen tweezers for lieberkuhn lenses.

The expected turned ivory handle is missing; the two limbs of the frame are held apart with a spring, and their distance apart controlled by a knurled knob on a screw; a curved extension of the longer limb ends in a ring with a screw thread into which one of the four lieberkuhn lenses fits; the shorter limb holds a pivot for an adjustable bar with tweezers at one end and a

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frame for a small ivory disc at the other end, the latter with two blued steel hinged pointers to keep it in place. Turner 1989,257 lists two similar compass microscopes which he dates to the second quarter 18th century.

4302 RCS052 MICROSCOPE ACCESSORIES

Leitz, Spencer, Zeiss, Unsigned

Various sizes. Mid to late 19 C. G.

Collection including lens cans, objectives, eyepieces, Wenham oblique illuminator; specimen tweezers, etc.

Lens cans not otherwise listed with the relevant microscope include "3 E. Leitz", "1/12 177D. SPENCER", "C. ZEISS JENA D"; with some unsigned; one signed objective "7 E. Leitz Wetzlar", with several unsigned; large collection of unsigned eyepiece tubes and lenses; a Wenham oblique illuminator (Turner 1989,300); an eyepiece with a camera lucida prism and hinged flap; a silver side reflector (Turner 1989,304); several specimen tweezers on pivoted rods; eyepieces with nicol prisms; parts of stages, etc.

4263 RCS013 MICROSCOPE LENSES

Unsigned - one marked M-E

C 85x54x33. Mid 19 C. G.

Black leather-covered case with red silk and velvet lining containing three objectives, one eyepiece, one aperture.

The case has six circular compartments; the three objective lens systems are marked 0, 1 and 5; the eyepiece is labelled "M-E"; the aperture is cylindrical with the other end open.

4285 RCS035 MICROSCOPE SLIDES

[Case] CARPENTER & WESTLEY OPTICIANS 24 REGENT ST JERMYN ST LONDON [Most slides labelled] J.B.

77x25; C 80x35x35. Post 1837. R.

Rectangular red leather-covered case with lid for twelve glass slides of zoological specimens.

The slides have colourful labels, green, blue and brown, and contain such specimens as flea, sting of wasp, and tongue of bee.

Philip Carpenter died 1833; his sister took over; firm called Carpenter & Westley in 1837, Turner 1989,73; Clifton 1995,49 gives this address from 1835-1914+.

4255 RCS005 MICROSCOPE SLIDES

Unsigned

L 69,97,177; W 14,14,22. Early to mid 19 C. G.

Six long and seven short ivory sliders, and two boxwood slides, with six, four, and six windows respectively.

The slides are of zoological specimens.

There is also a small ivory cylinder with two screw-off ends, which contains mica discs and brass rings.

There are other similar ivory slides with some of the microscopes in the collection.

A card with the slides notes: "What we now know as 'slides' were called sliders...The holes in the slider were made so that a narrow shelf was formed. The object was enclosed between two thin pieces of mica, held in place by an expanding brass ring.

4300 RCS050 MICROSCOPE WHEELS OF APERTURES

Unsigned

Various. Mid to late 19 C. G.

Four; two oxidised brass cylinders with wheels on top; one on oxidised brass plate; one of card on metal base.

The cylinders (D51) have respectively three and twelve apertures, with a spring clip to help locate them on the cylinder aperture; the third has no cylinder, but a screw thread on a plate below, with three apertures and clip above; the fourth is a cardboard plate (112x98) with a blackened brass mount and rod below, and a card wheel of five apertures.

4298 RCS048 POLARISCOPE

Unsigned

L 152; W 78. Mid to late 19 C. G.

Hinged oxidised brass frame holds pile of polarising glass plates; plano convex lens with double slide clips.

This instrument is reminiscent of a solar microscope with its hinged "mirror" - but the "mirror" is a pile of glass plates, used for obtaining polarised light; the back plate is blackened; the polarised light is passed through a plano-convex lens in a rectangular frame, and a specimen to be observed in the polarised light is held by a double slide clip at the plano side away from the plates; below the apparatus is a double brass sleeve, with a figure-of-eight cross-section, for a stand or other missing part of the instrument.

4262 RCS012 SPECTROSCOPE - DIRECT VISION

THORP'S D.V. DIFFRACTION SPECTROSCOPE R. & J. BECK. LTD

L 46; D 12; C 58x22x20. Late 19 early 20 C. R.

Brass cylinder with oxidised brass ends; push focus; black leather-covered case, blue silk and velvet lining.

Richard & Joseph Beck formed a Limited Company in 1895, Crawforth 1988,4 - successors to Smith, Beck & Beck.

4269 RCS019 SPECTROSCOPE - MICRO

John Browning, London.

L 154; D 24&40. Late 19 C. G.

Brass; central cylinder with external stage; on one side, sleeve for microscope, on other eyepiece system.

The stage, at the side of the central cylinder has one (of two) slide clips, and a short pillar for a (missing) lens; a small knob at the side varies the slit width inside, and there is a small prism inside opposite to an aperture on the stage; the eyepiece tube, which slots into the central section, has a lens system and a direct vision prism system secured by cork.

A leaflet, dated 1877, describes a similar, though not identical, version of the apparatus, recording that Browning worked in conjunction with H.C. Sorby, F.R.S. who first proposed the apparatus. "This arrangement is applied to the eye-piece of the microscope by means of direct-vision prisms. It is applicable to opaque objects, without preparation, and by its means two spectra may be compared at the same time with one lamp. It possesses the immense advantage over all other contrivances of the kind, from the fact that the spectrum of the smallest object, or a particular portion of any object, may be obtained with the greatest certainty and facility."

Browning started work in 1866, and the firm lasted into this century, Crawforth 1988,4, Downing 1988,15.

4295 RCS045 SPIROMETER

LOWNE'S PATENT SPIROMETER L. CASELLA MAKER TO THE ADMIRALTY & ORDNANCE LONDON No 120.

H 90; MxD 70; C 150x105x104. Late 19 C. R.

Brass and enamelled metal; cylinder housing with glass-covered scale 10-90 cubic inches; fitted case.

A disc base holds a narrow cylinder with an input pipe; above this is a wider cylinder presumably containing a vane anemometer; the scale is covered in glass and read by a needle; a smaller scale at 12 o'clock reads 0-7 HDS; a separate

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cylinder, with input and output pipes and a lid, is presumably to dry the breath before it goes into the main apparatus; there are rubber connecting tubes, one with a glass mouthpiece, and the apparatus fits into a case lined with green velvet.

A hand-written note on the inside of the case reads "5ft.7in = 230 c.in. 1" ht = 8 c.in."

Anderson 1990, 16-17 lists L.P. or L. Casella catalogues from 1860-1900, when the firm became Casella & Co.

4290 RCS040 THERMOMETER

Unsigned 9554 PATENT

D 28; CD 32. Late 19 early 20 C. G.

Silver metal pocket watch type housing in similar hinged case; glass front; scale 7-110° and 25-40°.

A knob on top, looking like the winder of a watch, prevents the needle from moving when pulled out.

The thermometer is in an envelope with the message: "Thermometer presented to the College by Dr. J.O.C. Fitzsimons in 1974. This instrument is over 100 years old." (It looks somewhat more recent?)

4286 RCS036 THERMOMETER - GLASS MERCURY

J.H. Bowden Ph. Chemist 136 Lower Baggot St Dublin

L 103; D 4; RsD 2; CL 110, D 7. Early to mid 20 C. G.

Clinical thermometer in metal cylindrical case; scale 95-109°; slim mercury reservoir; engraved signature.

The latter is hand engraved along the body of the thermometer, filled in black.

4287 RCS037 THERMOMETER - GLASS MERCURY

[On case] FANNIN & CO. 41. GRAFTON STREET. DUBLIN. [On Instrument] Fannin & Co. Dublin. Patent 943/4

L 110; D 9; CuD 21; C 124x32x30. 1904. P.

Clinical thermometer with the mercury reservoir in the form of a spiral in an ebony and silver cup; case.

The cylindrical body has the maker and patent number hand engraved on it, filled in black; scale 70-110°; a brass sleeve at the bottom holds a turned ebony cup whose inside is covered in silver metal; this cup contains the flat spiral of the reservoir, which presumably is placed on the skin to take the patient's temperature; the black leather-covered case has blue silk and velvet lining.

The patent number might be 94374 - which would give a date 1915, but seems to be 943/7, giving 1904.

4288 RCS038 THERMOMETER - GLASS MERCURY

[Label] SPENCER AND SON, Opticians, 19 GRAFTON St. DUBLIN MANUFACTORY, 13 AUNGIER STREET

L 278 & 303(complete); D 6; C 334x76x19. 1866-1868. R.

Pair of "CLINICAL THERMOMETERS, specially graduated for Medical Men"; one straight, one bent; in case.

Both thermometers have scales 80-115°; the bent one is broken above the mercury reservoir, and the reservoir is missing; they are contained in a fitted case with instructions pasted in the lid; these direct that the curved thermometer is warmed to about 90° and then fitted into the patient's axilla for at least three minutes, being read in situ; the straight thermometer is constructed to register the maximum temperature, with a minute portion of air cutting off about half an inch of the mercury column at the end away from the reservoir; it is set by a rapid swing of the arm and then used in the axilla or other part of the body for as long as is needed to observe the maximum temperature during that period; the instructions refer to Dr Aitken's "Science and Practice of Medicine" published by C. Griffin & Co., Stationers' Hall Court; the mahogany case is stamped "SPENCER & SON [sic] DUBLIN".

Morrison-Low 1989, 136 gives both addresses from 1866-1888 only.

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ROYAL DUBLIN SOCIETY - RDS

Ballsbridge

Dublin 4

Telephone (01) 668-0866

0476 RDS096 AIR PUMP

Unsigned

B 271x168; WhD 306; PiD 56. Mid to late 19 C. G.

Iron base and support to wheel axle - turns off-centre cog wheel traversing cogged ring to drive piston; a smaller plunger opens and shuts exhaust outlet.

0475 RDS003 AIR PUMP - DOUBLE BARREL

J. Lynch and Son Dublin

PH 1030; BH 655; PD 274; BaD 62&52. 1808-1825. F.

Three leg mahogany base to shaped platform; two brass barrels and three pillars on this; circular vacuum plate.

The three pillars support the plate via brackets; leather-coated pistons (leathers now removed) cranked by mahogany and brass handle via toothed wheel and sprockets; mercury manometer of glass and iron with scale 0-80mm rises from cup at back of base.

Dates from Morrison-Low 1989,129.

0474 RDS097 AIR PUMP - FLEUSS

FLEUSS PATENT NO 1971

B 432x311x48; PvH 610; CyD 62&52.

Late 19 early 20 C. G.

Cast iron base with supports to pivot; on this, handle at one side, piston plunger at other; brass piston.

Brass vacuum outlet having elliptical copper drum at bottom.

Turner 1983,103 dates Fleuss pumps c1900.

0477 RDS077 AIR PUMP PLATE

Unsigned

D 255; PH 184. Mid to late 19 C. G.

Two; iron tripod legs; brass pillar, stop-cock and side tube; glass plate on iron disc, strengthened with five struts; centre knob unscrews.

0471 RDS007 ANEMOMETER - BIRAM

YEATES & SON DUBLIN NO 1594

D 127; H 44; C 154x149x57. Late 19 C. G.

Circular oxidised brass frame; white scale 0-90 feet (inner 0-9); ten tapered white-metal vanes.

Frame in form of open cylinder with three spokes top and bottom; circular scale in middle; mahogany case.

Illustrated in Stanley 1901,544.

0491 RDS008 BALANCE - EQUAL ARM

JAMES ROBINSON OPTICIAN, AND PHILOSOPHICAL ARTIST, 65, Grafton Street, Dublin

BmL145; PasD 51; C 162x78x27. 1845-1884. F.

White-metal beam; brass pans; tassel hold; shears and pointer; mahogany case with signature label pasted in lid; one square brass weight labelled DRAM ½.

Dates from Morrison-Low 1989,133.

2653 RDS150 BALANCE - PRECISION

H.L. BECKER FILS & CO. BRUXELLES EN FRANCE HENRY-LOUIS BECKER E.L. DE REEDE SUCCR JOSEPH M. MAIBEN & CO DUBLIN MADE IN BELGIUM

Hs 520x275x390; H 333; BmL 240. 1912-1922. F.

Mahogany glazed case; brass; open beam; plumb-bob.

Mahogany base has three feet, two levelling; a brass pillar rises to a bracket, and a handle on the front of the base raises the beam to free the balance; the pans hang from double hooks and rectangular frames on agate knife edges; a pointer from above the beam reads an unnumbered signed ivory scale with 26 divisions at the pillar base; a (detached) plumb bob hung from an arm through a ring.

Maiben & Co. dates from Morrison-Low 1989,130.

0492 RDS046 BALANCE - PRECISION

Ladd & Oertling London SOLD BY J. Spencer & Son, 19 Grafton St. Dublin.

BmL 360; PrH 256; PasD 66; C 570x555x288.

1866-1868. F.

Brass open-work beam; platinised copper pans; ivory scale; mahogany and glass case with two drawers.

Upper member of beam graduated for riders 9-0-9; agate centre and end plates on white-metal knife edges; white-metal index moves over scale; knurled knob on front of base raises beam on brass pillar; drawers contain weighing glasses and some weights, including two brass weights with screw-off lids containing lead shot.

Spencer dates at this address 1866-1883 from Morrison-Low 1989,136.

Ladd & Oertling dates 1860-68, Chaldecott 1989,161 and Downing 1988,72.

0493 RDS078 BALANCE - PRECISION

OERTLING LONDON

BmL 410; H 410; PasD 152; C 710x568x292.

Late 19 early 20 C. G.

Metal open-work beam; top member divided for riders; ivory scale; brass pans; mahogany and glass case.

Upper member divided 9-1-9; agate centre, end plates (detachable) and knife edges; steel index arm moves over ivory scale (20 divisions); brass knurled knob on base raises beam on brass pillar; four level screws on case; two panels on front slide up, one locked; mahogany bridge over pan for specific gravity work (not fixed); three boxes of weights also present.

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0417 RDS045 BALANCE - SPECIFIC GRAVITY

F. SARTORIUS GÖTTINGEN

PvH 180; BmL 225; C 248x216x82. Late 19 C. G.

Brass; cylinder base; beam, weight, and scale pointer at one side and nine weight supports at other; two flasks.

The base has three feet and holds an expanding pillar to a platform with a raised ivory scale (seven divisions each side of zero); three glass pear-shaped weights; one flask conical, other double cylinder; in black paper-covered fitted case.

0473 RDS009 BAROGRAPH

Self Registering Barometer Yeates. & Son. Dublin.

H 1073; CIL 930; CD 280. Mid to late 19 C. G.

J-shaped column; clock; brass scale and clockwork drum for paper; thermometer with RDS crest; D-shaped case.

A (broken) device translates the mercury level in the column to the scale 28-31ins and 71-79cm, with silver vernier; attached to pen through ink pad to the drum (D106); silver-metal clockface (D42); mercury thermometer has spiral reservoir and crest on ivory backing, reading 0-120°F and -10-50°C; mahogany case with brass spirit level on bottom of opening curved glazed door.

This is a fine example of the craftsmanship of the Yeates & Son firm.

1867 RDS130 BAROGRAPH - ANEROID

YEATES & SON, DUBLIN.

Sp 346&203; H 179; DrD 96. Late 19 C. G.

Black stained mahogany and glass housing; brass drum and fittings; eight evacuated capsules; white metal pen; mirror at back; glass ink vial.

0472 RDS031 BAROMETER - FORTIN

YEATES & SON DUBLIN

H 990; D 22. Mid to late 19 C. G.

Brass cylinder support; glass mercury reservoir with ivory pointer; black metal body; window in brass top.

Scales 27-32" and 68-83cm; vernier missing; thermometer (broken) on body of instrument reading 0-30°.

1998 RDS135 BASIN

Unsigned

MxD 465; H 156. Mid to late 19 C. G.

Greenish glass; lip around top with indent for pouring; convex base.

Assumed to be for scientific use.

0406 RDS105 BLOWPIPE

Unsigned

L 454; TuD 7. Mid to late 19 C. G.

Long narrow brass (or copper?) tube with brass stop-cock and right-angled bend.

0409 RDS106 BURNER - ACETYLENE

INCANTO PATENT

L 233; TuD 8; StH 131. Mid to late 19 C. G.

Curved input with stop-cock leads to brass tube and three vertical outlets; on cast iron tripod.

0408 RDS089 BURNER - BUNSEN

T. FLETCHER & CO WARRINGTON

BD 77; H 155; D 13. Late 19 C. G.

Brass; raised leaf pattern boss for side arm with stop-cock; revolving sleeve at bottom of burner.

0407 RDS034 BURNER - OXY HYDROGEN

E.M. CLARKE 428 STRAND London

L 245; D 10; C 203x108x58. 1840-1851. A.

L-shaped rectangular brass block has inlets for oxygen and hydrogen with stop-cocks, and burner outlet; case.

Burner attachments screw onto outlet; in partitioned mahogany case.

Dates from Downing 1988,23.

0410 RDS001 BURNING GLASS

Unsigned - attributed to William or Samuel Parker

PvH 1110; HsDs 450 & 250.

1784-1803 (bought 1812). F.

Kirwan's; double; mahogany tripod foot, turned pillar and lens housings; latter on semi-circular iron bracket.

The large and small lens housings are joined by eight mahogany bars, and the combination pivots from the sides of the top housing in the supporting bracket; there are two knurled knobs, one at each side of the pivot, which presumably clamped the lenses in position, but do not do so now.

A plaque on instrument reads "The Burning Glass of RICHARD KIRWAN 1735-1812 Purchased from his Executors by the Dublin Society Dec 1812."

The Report of the Committee of Science of the RDS for 1910-11 records as follows: "KIRWAN'S BURNING LENS Some time ago the Committee learned that the Burning Lens, which once belonged to Richard Kirwan, and which the Dublin Society purchased shortly after his death, was in the Physical Laboratory of the Royal College of Science. Knowing that this interesting relic of one of the foremost scientific men of his time was of little use for teaching purposes, while it possessed great interest to the Society, the Committee recommended the Council to take steps to have it restored to the Society. Application was accordingly made to the Department of Agriculture and Technical Instruction for Ireland, and on February 2nd, 1910, a letter was received from the Department stating that arrangements had been made to hand over the Lens to the Society on permanent loan. It may be of interest to note that the first mention of the Lens in the Society's records is an entry in a manuscript book, entitled 'Laboratory Want Book'; between the dates November 11th and December 7th, 1812, there is an entry, 'Burning Lens (Mr. Kirwan's),' and opposite this is written in pencil, 'To be sold for 30 guineas.' The purchase of the Lens at this price was sanctioned at a meeting of the Society on December 10th, 1812 (Proceedings of the Dublin Society, vol. xlix., page 51). It is to be hoped that the Society will treasure this memento of the founder of the Natural History Museum." Smeaton 1987 has details of other Parker lenses; the Science Museum (postcard No.606) has a similar glass.

0377 RDS019 CALCULATOR

The BRITISH CALCULATOR (MODEL B) FOR COMPOUND ADDITION PATENT

D 134; H 9; C 159x159x20. Early 20 C. G.

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Metal; three arc grooves; four windows to £450, £49, 19s, 11½d; ivory pointers to move slides in grooves; wood case. Latter is covered in black paper with blue lining and is broken.

0423 RDS063 CAMERA - BELLOWS

Unsigned

B(Mn) 640x330; H 410; BI 295x265. Late 19 C. G.

"Universal" square bellows studio camera; mahogany base; double extension; focus screen; lens missing.

Double rack and pinion fine focusing; lens housing broken and repaired with wooden ring; focusing screen has two reduction frames; each of two plate holders has three reduction frames.

0422 RDS064 CAMERA - PHOTOMICROGRAPHIC

E. LEITZ Opt. Mech. Werkstätte Wetzlar No 58

H 359; BP 312x251. Late 19 early 20 C. G.

Iron base plate; vertical support; tapering bellows; lens incomplete; aerial and ground-glass screens; clamp for sliding extension; plate holder with one adapter.

0483 RDS030 CAMERA LUCIDA

Unsigned

L 297; D 8; C 242x63x24. Late 19 C. G.

Brass; G-shaped clamp; hinge to shaft; hinged prism attachment.

Two lenses, one enlarging, one reducing, can be moved into the light path, as can a pear-shaped attachment with a curved triangular hole; in red paper-covered case, lined with purple velvet.

Donated by Dr John Jackson in 1984; was property of George Farran, biologist.

2650 RDS147 CARBON ARC RODS

SHIP CARBON LUXO POS.; SIEMENS & CO.; W.D C; ..AKKO REG TRADE MARK; "TELL" ELECTROCARBON; SOLUX L 88-203; D 12-16. Mid 19 to early 20 C. G.

About 50; mostly signed "LUXO POS. MADE IN ENGLAND".

Full signatures: "SHIP CARBON LUXO POS. MADE IN ENGLAND" (43); "GEBR. SIEMENS & CO. LICHTENBERG 27 SPEZIAL MARKE - S.A." (2); "-A-DOCHTKOH A-GEHR. SIEMENS & CO. CHANLO..." (1); "...W.D***C***W.D**.." (1); "AKKO REG TRADE MARK MADE IN ENGLAND KINA.." (1); "ELECTROCARBON-o-*o-TELL" (2); "SOLUX SHIP SOLID ENCLOSED NO 70 MADE IN ENGLAND".

"SHIP" is the Trade Mark of Chas Champion, 60-66 Wardour Street, London.

Champion details from 2752 TDP296.

0136 RDS079 CENTRIFUGE - GERBER

H.A. LISTER AND CO LTD DURSLEY DRA [with hand symbol]

D 440; H 280. Early 20 C. G.

Milk-testing; circular tin chamber, screw-on lid; eight brass sample-tube holders; iron G-clamp for table.

Pulley sleeve under chamber for rotating it via a thong from a spinner; for use with Gerber tubes 0361 RDS098; a red gear wheel painted on top of the chamber surrounds a white left hand with "DRA" at its cuff.

For details of instrument, see Baird & Tatlock 1914, 888.

2660 RDS158 CINEMATOGRAPH MECHANISM

WRAY COUSSELL

H 182; W 265. Early to mid 20 C. G.

Iron frame; electric bulb housing with slit; film clamp leads to drum, slit, cogged spool and second drum.

On the other side of the frame from the cogged spool is a white metal cylinder which turns with it; the apparatus is clearly not a projector, since the slit on the housing is small (13x2.5) and is at the side of the film; a damaged electric cable, reinforced with plated wires, leads from the bulb housing to a two-pin plug.

The purpose and operation of the apparatus are not clear.

0484 RDS054 CINEMATOGRAPH MECHANISM

Unsigned

H 330; W 180. Pre 1897. PC.

Iron frame; white-metal flywheel; gear mechanism; cylinder/chain/cylinder movement; earliest in Ireland.

A card with the instrument reads: "35mm Maltese cross movement. The earliest cinematograph to be used in Ireland. The apparatus, which fits on the front of an ordinary projection lantern, was acquired by the RDS and shown at the Conversazione given to celebrate the opening of its new lecture theatre (now the meeting place of Dail Eireann) on March 10th, 1897".

It is not clear how it attaches to the lantern.

0485 RDS053 CINEMATOGRAPH PROJECTOR

PATENT APPLIED FOR MADE IN FRANCE. SOLE AGENTS, W. WATSON & SONS, 313 HIGH HOLBORN, LONDON

Hs 157x143x116; H 245. Late 19 C. F.

Mahogany case; brass lens frame; hand cranked; 35mm.

Back removable; lens system focused with rack and pinion; brass fitting on top to hold small reel; plays through slit to clamp inside with toothed cylinder to wind on film; this and U-shaped shutter mechanism (brass and ivory) cranked by outside handle.

Firm assumed this name in 1882, Clarke 1989,87.

2659 RDS157 CINEMATOGRAPH SPOOL WINDER

Unsigned

L 607; DisD 200 & 62. Early 20 C. G.

Iron bracket with G-clamp; handle and two cog wheels turn brass disc spool spindle; iron spindle at other end.

The black iron bracket is reinforced and of overall long curved shape incorporating the clamp for fixing to a table; at one end is the double cog mechanism, the larger cog wheel being revolved by the turned wood handle, and the smaller at the axis of the large brass disc, which has an iron screw-on disc to secure one spool; the other spool fits on a disc and sprocket on the other end.

2832 RDS161 CLOCK - REGULATOR

Jas.. Ritchie & Son Edinburgh

H 1998; MxW 498; DisD 318&124. 1873-1874. R.

Mahogany long case; glass front; silver metal minutes dial; small seconds/hour dials; cylinder pendulum.

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Brass top to dark metal pendulum; this has engraved arrows and divisions, pointer to these from pendulum rod to show shortening or lengthening; scale below pendulum 10-0-10; cylinder weight at side; keyhole on side of housing leading to brass plate and incomplete switch, presumably remaining from electrical contacts.

This was the Master clock of the RDS Time control system, which lasted from 1874-1921 - see Wayman 1987a,134-137. Jas Ritchie FL 1809-1842 - his son Frederick 1825-1906 perfected the electric driven clock system, Britten 1977,488.

2835 RDS162 CLOCK - TIME SYSTEM

Unsigned (attributed to Ritchie, Edinburgh)

H 1955; W 474,378,450; De 270,225,257. 1873-1874. R.

Mahogany case with front window (707x185); brass mounted coil pendulum around bar; white-metal face.

Bar silk-covered; roman hours; smaller seconds dial; electrics disconnected; one of the slave clocks from the Master 2832 RDS161.

Wayman 1987b,25-6 notes: "In Jones' adaptation of the Bain pendulum to synchronised clocks, driven by clockwork but synchronised by electro-magnetic impulses, a near-ideal configuration of the magnetic field at the central position existed. With radial symmetry, the enclosing swinging coil would experience a force in the direction of the swing all round its circumference and the impulse would be nearly independent of pendulum position for a small range of positions around the central point of the swing. These pendulums were used in the Edinburgh system and in the system of controlled clocks installed by the Royal Dublin Society using clocks made by Messrs. Ritchie of Edinburgh, of which a perfectly preserved example may be seen in the main lobby of the RDS premises at Ballsbridge in Dublin."

Wayman 1987b,25-6 gives details of the Dublin clock control system from 1874.

0393 RDS076 COIL - INDUCTION, RUHMKORFF

AC [monogram with C outside A] No 37092

B 322x152x50; CoD 83; Sis 95x94x10. Late 19 C. G.

Mahogany base; brass pillars, brass terminals; square ebonite sides for black-covered coil, no commutator; one spark terminal broken.

0394 RDS005 COIL - INDUCTION, RUHMKORFF

APPS 433 STRAND. LONDON PATD. 1881 NO. 1133

B 600x290x110; CoL356; C 648x362x328.

Patented 1881.

Mahogany base; ebonite coil cover; terminals of brass, ebonite and ivory on ebonite pillars; ivory and brass commutator; eight brass terminals.

Box-wood case with instructions pasted on underside of lid, with "APPS' PATENT INDUCTION COILS. ALFRED APPS, ELECTRICIAN, OPTICIAN, &C., 443, STRAND, LONDON." "THIS INSTRUMENT should be kept quite dry, and as far as possible free from dust. If used in a Laboratory where there are acid fumes, or near the sea, on the appearance of any deposit of moisture upon it, all the ebonite parts are to be carefully rubbed with a piece of wool slightly moistened with a strong solution of soda, and afterwards with a piece of dry wool. In extreme cases, the ebonite may be brushed over with paraffin wax dissolved in benzole, which gives a slightly dull appearance, but on board ship where the damp cannot be excluded, this plan has perfectly preserved the black polish of the ebonite. The 1 in. spark coil requires only one cell of Grove's Battery, platem. 5 in. by 2 1/4 in., and the contact breaker should be adjusted for moderately quick vibrations. The 2 in. coil requires three Grove cells of the same size. The 3 in. coil, four cells. The coil now chiefly used both for research and for instruction, giving 5 in. to 6 in. sparks, may be worked in the best manner by five Grove's cells, platem. 6 1/4 in. by 3 in. (The cells not being quite full can be easily moved, which for the above purposes is often required). The 10 in. coil will do its work with the same battery, the cells being filled and little resistance interposed by line wires. To obtain the shortest sparks, screw up the black-headed screw of the Contact Breaker until the spring stands free; but to produce the greatest effects, the spring must have only 1/16th in. play, and the black-headed screw is to be turned to the left until great tension is obtained in the spring, when the vibrations will become slower and slower. Such long sparks should not be taken between points, but the positive pole should be the point, and the other rod should be placed sideways, or a disc of an inch or two in diameter may be used. On reversing the commutator, the relation of the secondary poles should also be reversed. Special directions will be given for the management of all larger size coils. The line wires for the three smaller sized coils should not exceed 3 yards in length of No. 14 best copper wire (common copper wire should never be used), and for the two larger sizes named, at least No. 12 should be employed (when necessary to lengthen the lines they must be of a larger size). To obtain the best effects the battery plates should be amalgamated every time they are required, and the porous cells are to be kept in water, taking out and inverting them for one hour prior to use. The battery connections are to be carefully cleaned before screwing together, and kept in solution of soda when not fixed on the battery."

0386 RDS086 COMMUTATOR

Unsigned

B 118x58x8; H 52. Mid to late 19 C. G.

Mahogany base, four brass terminals; two cylinder brass contacts to springs between two parallel ebonite discs.

0385 RDS115 COMMUTATOR

Unsigned

B 112x56x17. Mid 19 C. G.

Mahogany base; revolving ebonite cylinder on brass pillars with two brass lugs to contact two brass springs.

Rectangular ebonite handle to turn cylinder; four brass contacts on base.

4182 RDS163 CROSS STAFF HEAD - FRENCH FORM

Unsigned

H 151; MxW 72. Late 19 early 20 C. G.

Brass; conical pillar leads to octagonal cylindrical body with four line and window and four line sights.

The pillar screws into the cylinder; two of the window sights are at the top of the cylinder, and two below.

Stanley 1901,523 records that "Cylindrical heads super-seeded the open cross-head. The modern instrument used is the French form, which is made of octagon brass tube. This is cut with alternate sight slit and opposite window, with vertical hair, on each of four rectangular sides of the octagon. On the other four sides there are plain slits subtending 45° to those first mentioned. The octagon tube is mounted upon a socket-piece which fits upon a conical pointed staff. The defect of this cross-head is the closeness of the slits, due to the small diameter of the tube, which renders the direction given for sighting uncertain.

The instrument was presented to the Society by Dr Leo Curran.

0356 RDS056 CRUCIBLE

F. W. & J. REINNICKEL

H 37-85; D 40-105 (H 74; D 66). Late 19 C. G.

Five nickel crucibles of varied size, four with lids, two extra lids; one unsigned heavy silver crucible.

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0424 RDS044 CRYSTAL - ICELAND SPAR

Unsigned
L 110; Sis 94x52x44 [Cube 56x57x57]. Mid/late 19 C. G.
Parallelepiped showing double refraction; cracked in places, but still complete.
Also a glass cube.

2663 RDS153 DEEP SEA WATER BOTTLE HOUSING(?)

Unsigned
L 499; CysL 234&238, D 64&51. Late 19 C. G.
Two concentric brass cylinders; slit and spring in one; iron arm on pivot; string to bottom reverses bottle.
If the iron arm is held, and the string is pulled, then the whole apparatus will turn upside down; this would allow a bottle inside (though none is present now) to fill up and be taken to the surface; a spike in the side of the larger cylinder will prevent the apparatus from turning more than 180°; the slit (222x 8) on the thinner cylinder runs along its length, revealing an internal spring; holes top and bottom.

0430 RDS088 DIAPHRAGM - IRIS

Unsigned Rapid Aplanat No. 2
W 30; D 35. Late 19 C. G.
Cylinder brass mount; circular brass plate; slit in side with aperture lever; 8, 11, 16, 22, 32, 45, 64, 90.

0387 RDS058 DISCHARGER - POINTED

Unsigned
L 374; D 30. Mid 19 C. G.
Elongated pear-shaped glass handle fits into brass sleeve, to which is attached a brass pointer.

0378 RDS021 DIVIDERS - PROPORTIONAL

Unsigned
L 168; W 13. Late 19 early 20 C. G.
White-metal limbs, hinged with movable slide; scales for lines, polygons, surfaces and solids; steel pointers.
All scales 1-10 except polygons 6-20; steel pointers top and bottom.

0379 RDS020 DRAWING INSTRUMENTS - SET

W.H. HARLING 47 FINSBURY PAVEMENT LONDON MATHEMATICAL INSTRUMENT MANUFACTURER
C 202x158x47. 1890-1901. A.
Mahogany case with 17 instruments; pens, compasses, rule, dividers, four Newman ink colours; six knives.
The top of the case is labelled "S.W. NUGENT JUNR." (owner?); ink blocks signed: "NEWMAN'S SOHO SQUARE"; knives signed: "JOSEPH GILLOTT'S CROW QUILL"; contents included pen signed "SPENCER DUBLIN" (0380 RDS114) which would be dated 1845-1863, but this is probably not contemporary with the set.
The set was found to be missing in February 1990.
Harling dates from Crawforth 1988,8; Spencer dates from Morrison-Low 1989,136.

1996 RDS133 ELECTROMETER

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD NO. 25115
Sp 208; H 436; DrD 75, L 71; TeL 161. 1915. N.
Blackened metal, steel and brass; tripod stand; cylinder chamber, push spring contact on top; brass telescope.
Cylinder has glass disc windows off centre into which the telescope, on an arm from the stand, looks; below the chamber is a circular aperture over which a disc lid fits, presumably to hold the (radioactive?) sample being studied; below this aperture is a brass disc (D76) attached to an arm which can be moved up and down the stand.

1997 RDS134 ELECTROMETER

SPINDLER & HOYER GÖTTINGEN No374 MASON DUBLIN
BD 137; H 294. Second ¼ 20 C. G.
Blackened metal and stainless steel; telescope at right-angles to chamber with internal scale 60-0-60.
Screw and spring to adjust horizontal position of telescope, focus by turned knob on diameter; two sets of two electrical contacts at bottom and front of chamber; syringe type thumb press with tube moves a metal point at right-angles on top.
Firm founded in late 19 C, Brachner 1985,150.

0388 RDS080 ELECTROSTATIC GENERATOR - NAIRNE

Unsigned
B 480x350; H 425; CyD 175. Mid 19 C. G.
Glass cylinder held by mahogany supports and base; handle missing; insulated black metal conductors on glass pillars, one of which can slide back and forth in a wood slide at the base.

0425 RDS032 ERECTOR

Yeates & Son Dublin (S.M. Yeates' improved form)
H 372; MiHs 128x125x125; Mi 140x100.
Mid to late 19 C. G.
Triangular metal base; brass pillar; mahogany housing for angled mirror; lens, aperture and mirror above.
Plano convex lens in oxidised brass surround in top of housing; knob on top of pillar raises and lowers an aperture and a revolving mirror.
The instrument is described in Yeates 1880,77 as S.M. Yeates' improved form of Erector "for showing objects upright on the screen".
Debbie Griggs, Rittenhouse 7, 1992, 10-11, shows a similar optical arrangement, a "vertical lantern", exhibited by Henry Morton in New York in 1871, used as a means to project objects (like a galvanometer needle) onto the screen.

0426 RDS051 ERECTOR

Unsigned
H 558; W 115; MiS 153x125 & 170x125. Mid 19 C. G.
Mahogany frame holds fixed angle mirror; fixed (cracked) circular aperture; movable convex lens and rectangular revolving mirror.

0427 RDS052 ERECTOR

Unsigned
Pr+RaL 368; Hs 229x167x162x153. Late 19 C. G.
Rectangular mirror in triangular housing with lens system; second adjusting lens system with prism and mirror.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Sophisticated instrument for use with the Newton lantern; the housing is of oxidised brass and has a fixed plano-convex lens on one side and another plano convex lens in a telescopic system on the other; a pillar on the fixed lens side allows another lens system, with prism and mirror, to move relative to the fixed lens.

0359 RDS010 EUDIOMETER - CAVENDISH

YEATES & SON DUBLIN

BD 93; H 364; D 70. Mid to late 19 C. G.

Pear-shaped glass reaction vessel on brass foot with stop-cock; electrical contacts fused in stopper above.

Above the brass stop-cock is a brass sleeve to hold the glass vessel, which has a glass stop-cock at the bottom; the stopper is clamped in place by means of a sleeve around the neck holding two vertical rods joined by a bar secured to the rods by two screws, this clamping system being made of brass.

0360 RDS036 FLASH POINT TESTER

YEATES & SON, DUBLIN, 1886 VR 485

H 290; D 162; C 339x210x208. 1886. S.

Brass calorimeter in copper water jacket in copper cylinder; two thermometers, ivory scales 60-150/90-200°.

The brass calorimeter has a gas inlet, a slide to cover three holes on top, a sleeve for one of the thermometers, and an ivory screw plug in its removable lid; this fits into the water-jacket, which has a funnel insert on a double right-angle pipe, with an egg-shaped weight in it, another curved pipe, a thermometer sleeve, and two ring handles on its top; this in turn fits into a copper cylinder with two ring handles at its sides; this latter has an iron ring at its base and is held on three bent legs; a brass and black enamel oil burner pivots from one of the legs under the water bath; in a fitted boxwood case with two mercury thermometers having ivory scales, and signed: "YEATES & SON, OPTICIANS, DUBLIN.", that with scale 60-150° having a spherical bulb, and that with scale 90-200° having an elongated bulb; the outer cylinder is stamped with a crown, "VR", a portcullis with "886" [for 1886] below it, and the words: "GAS ONE DEGREE OVER STANDARD"; it is also stamped "486"; the crown, "VR", portcullis, "1886", and "486" are also stamped on the calorimeter.

2646 RDS143 FLASK - DEWAR

Unsigned

OD 123; ID 83; H 355; Fr 378x193x193.

Mid to late 19 C. G.

Glass; cylindrical; rounded bottom; metal foil cover outside; in wood frame - two square blocks, four supports.

Bottom held on three wood discs secured to the lower wood block.

0412 RDS074 FLASK - DEWAR

Unsigned

H 180&158; D 26&110; FrH208. Late 19 C. G.

Two; glass; cylindrical and spherical (with cylinder neck); in wood frame with space for third flask (missing).

In the case of the spherical flask, there is a little mercury between the outer and inner surface.

0411 RDS062 FURNACE - CARBON ARC

E. DUCRETET A PARIS No3

BP 279x242x22; HsH 315. Late 19 C. G.

Moissan furnace; slate plate on four iron legs; refractory housing; adjustable carbon rods; mica windows.

Doors, front and back, with windows, can be unscrewed; carbon rods can be raised or lowered into oven; plate in bottom of oven can be adjusted from below.

For more details, see Baird & Tatlock 1914,568.

0389 RDS099 GALVANOMETER

GAMBRELL BROS LTD

T. MASON 5. DAME ST., DUBLIN.

Hs 167x106x110. 1900-1916. A.

Hardwood housing; horse-shoe magnet; moving copper coil around metal cylinder; curved white scale.

Needle and torsion fibre missing; on crude wooden table with two screw legs and meccano back leg.

Gambrell Bros active in 1900, Crawforth 1988,17; Mason at 5 Dame St 1900, at 5&6 1917, Morrison-Low 1989,131.

0391 RDS109 GALVANOMETER

Made by Yeates & Son Dublin

B 113x113; Hs 108x108; H 30. Mid to late 19 C. G.

Mahogany base; slate housing for coil tapped to eight terminals +4 - -4; needle has jewel bearing; glass cover; magnetic needle reads paper scale 90-0-90.

0392 RDS075 GALVANOMETER - ASTATIC, NOBILI

YEATES & SON DUBLIN

BD 180; H 275. Mid to late 19 C. G.

Mahogany base; coil in ebonite housing; copper disc above; paper scale 90-0-90; astatic double needle.

Coil and scale can be rotated with brass handle below base; torsion fibre and glass dome missing.

0390 RDS094 GALVANOMETER - AYRTON MATHER

KIPP DELFT-HOLLAND No 14 [on base] No C48 [on housing]

BD 150; H 203; MD 112; CoHsD 17. Early 20 C. G.

Black-covered brass base; two contacts; circular magnet; bubble level; clip-in stainless steel coil housing.

Housing clips between the poles of magnet; matching galvanometer lamp 0395 RDS095.

Lamp has number which is probably a British Patent, 216950, and is thus dated 1924.

0364 RDS072 GAS GENERATOR - KIPPS

Unsigned

H500; D136 [H522; D145; BD175] Mid & late 19 C. G.

Two; glass; circular base; pear-shaped upper chambers; one has spherical, and one arched cylinder lower chamber.

0479 RDS108 GAS GOVERNOR - BALANCE

Unsigned

TH 234; T 337x204; PvH 585. Late 19 C. G.

Mahogany table on four legs; japanned pillar to pivot for centre of (broken) balance arm for gas bell and weights.

The balance arm ends in metal arcs at each end, one of which would have been attached to the bell, and the other to weights; below the bell are input and output metal pipes with stop-cocks at the bottom, and side arms with glass tubes.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Griffin 1910,444-5 calls the apparatus a "balance governor", and it is shown there connected to a gas meter in a set-up to determine the calorific value of combustible gases by Boys' method.

0482 RDS083 GAS PRESSURE REGULATOR

BEARD'S PATENT No 14607

H 161; D 61. Early 20 C. CT.

Brass cylinder housing; spring-loaded; gas input with wing nut; side arm outlet for regulated gas.

The instrument is illustrated in Beck 1909,97.

Clifton 1995,24 lists a Richard Beard, 1841-85, Downing 1988,9 a Charles Beard, 1891-1900+.

0361 RDS098 GERBER TUBE

D.R.GM Dr. Hammusihmidt's Rahmbutyrometer Funke's Original

L 195; D 23. Early 20 C. G.

Glass; screw thread on cylinder top; flat stem, scale 0-60; elongated bulb; for centrifuge 0136 RDS079.

The signature is hand-engraved on the glass cylinder; this is one of four types of similar tube for the Gerber centrifuge; there are glass vial inserts which fit in stoppers and extend into the cylinder top; in cardboard box: "GLASS WITH CARE. DIRECTOR OF MILITARY ENGINEERING, DEPT OF DEFENSE; RED HOUSE, INFIRMARY ROAD DUBLIN".

The other tubes are inscribed: "5g Cream SC NO 408 149° F"; "5 gram Cream No.746 Read at 149 Fht Fucoma Foreign Tested 61 [with star motif and qF monogram]"; "O.R.P. Praecis Einheits Butyrometer Jena Glas Fucoma Geprüft 39 Foreign [plus the qF motif]" - this last has a screw white-metal cap on the bottom of the stem, and has scale 4-55.

For more details, see Baird 1914, 888-9.

0478 RDS014 GLASS BELL JARS

Unsigned

H 137,170,190,207,335; D 103,198,158,166,202.

19 C. G.

Five; with rounded tops and glass knobs; wider rims at open bottom, ground for all but the largest.

0480 RDS048 GLASS GLOBE

Unsigned

H 120; D 65. Early to mid 19 C. G.

Hollow sphere; cylinder collar on top; circle section foot (with small hole) below; for vacuum experiments?

If the collar were attached to a balloon or bladder, and placed in a bell jar on an air pump, the balloon would inflate as the outside pressure was reduced.

0362 RDS082 GONIOMETER - CRYSTAL

Lerebours à Paris

BL 320; H 170; CrD223. 1795-1847. F.

Brass; elongated Y-shaped base; pillar to six-spoked divided circle; moving arm with telescope and vernier.

Revolving bracket opposite telescope (for clamp and tangent screw?) with similar vernier; clamp for pillar at its base; screws at single limb of Y, perhaps for light source?.

Payen 1985,175 gives firm dates "Vers 1795"-1847, after which it became Lerebours & Secretan.

0363 RDS055 GONIOMETER - CRYSTAL, WOLLASTON

Cary London

BD 111; D 108. Mid to late 19 C. G.

Mahogany base; brass disc divided on side 0-180-0° with vernier, turned by knurled knob; crystal holder.

The scale disc is supported by a single trunnion; rising from the base is a circular support for an angled black glass reflector - a brass rod along the base from the support allows it to be turned slightly, and the rod can be clamped with a brass screw on a bracket above; the crystal holder is pivoted from a right-angled bracket from the centre of the scale disc and has a push rod to secure the crystal.

0428 RDS016 HELIOSTAT - STONEY

W. WATSON & SONS, 313 HIGH HOLBORN LONDON MANUFACTURERS

B 253x252; CyH 75, D 132; MiD 113. Late 19 C. F.

Hinged mahogany base; black cylinder housing, brass top, for clockwork mechanism; circular mirror.

Angle scale on base 50-60°; crossed spirit levels and level

screws on base; Stoney pattern connectors.

Donated by Dr Malachy Powell in 1984.

Firm assumed this name in 1882, Clarke 1989,87.

0429 RDS006 HELIOSTAT - STONEY

Yeates & Son Dublin (S.M. Yeates improved form)

B 178x150; CyH 92, D 128; Mi 148x77.

Mid to late 19 C. CT.

Hinged mahogany base; red cylinder with brass top for clockwork; rectangular mirror; boxwood case; angle scale on base 40-60°; mirror broken and mechanism detached.

Instructions pasted to door of case; with the legend: "YEATES & SON DUBLIN, Scientific Instrument Makers, by Special Appointment TO THE UNIVERSITY, S.M. YEATES IMPROVED FORM OF G.J. STONEY'S HELIOSTAT".

Illustrated in Yeates 1880,5.

2657 RDS155 HYDROMETER

g/ml at 20°C. 46 dynes/cm AMB 5327 GRIFFIN. LONDON.

L 180; MxW 22. Early 20 C. G.

"B.S.S. No.734"; glass; cylinder bulb, conical base, weight of lead shot; white paper scale 1.025 30 35; lead shot held by red resin.

2662 RDS160 HYDROMETER

Unsigned

L 239; D 5; CL 293, D 14. Late 19 early 20 C. G.

Glass; straight tube; lead shot weight; paper scale on top 1050-1400; black and blue cardboard case; red resin between weight and rest of tube.

2656 RDS154 HYDROMETER

Unsigned

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L 165; MxD 19. Mid to late 19 C. G.

Glass; spherical mercury weight; cylinder bulb; scales "W 1 2 3 M" on one side; "W 1/4 1/2 3/4 M" on other; white glass[?] scale plate in stem.

0416 RDS085 HYDROMETER - TWADDELL

YEATES & SON. DUBLIN. No 1, No 3, No 5

H 208; D 29; C 329x225x146. Mid to late 19 C. G.

Three; glass; mercury weight; ivory scales 0-24, 48-74, 102-138; stem of No 3 broken; mahogany case for 6/7.

The mercury reservoirs are spherical, and the bulbs egg-shaped.

0433 RDS120 LAMP - CARBON ARC

"KALEE"

B 175x118; L 419. Mid to late 19 C. G.

Iron base; steel pillar; two brass knobs to revolve carbons vertically or horizontally; one separates them.

The latter knob is of turned ebony, and all three have springs; the carbons are in sleeves on the ends of rods, each of which has a brass electrical contact, one missing its T tightening bar; the position of the carbons can be adjusted by pivots, each of which has a rod extension on its clamping screw.

0431 RDS100 LAMP - CARBON ARC

Davenport's Patent No.142 J.H. STEWARD. LONDON

BP 150x70; H 310. Mid to late 19 C. G.

Brass; wood base; expanding pillar with rack and pinion devices to move both electrodes and to separate them.

Rotates horizontally and vertically (about 30°) with securing clamps; parts of oxidised brass; height measurement does not include carbon electrodes.

0435 RDS121 LAMP - CARBON ARC

Unsigned

B 305x118; H 300; W 575. Late 19 C. G.

Iron base; iron and steel fittings; six knobs to adjust carbons in different ways; base broken; very heavy.

The broken base has a knob to move the lamp support sideways; above this is a bracket which holds two steel pillars, and another knob raises the lamp up and down on these; another bracket above this has a pivot, and another knob revolves the carbons around this; the carbons supports are separated by rack and pinion by a further knob; two more knobs adjust the position of the upper support; electric cables still attached.

0434 RDS122 LAMP - CARBON ARC

Unsigned

B 247x98; L 488; H 250. Early 20 C. G.

Iron base; iron and steel fittings; seven knobs to adjust carbons in different ways; concave reflector at arc.

The base has two bars and four screws to secure it to them; a bracket on this with a broken knob to turn it around horizontally holds a white metal frame with two knobs which move each of the horizontal carbon rod sleeves by means of brackets across the parallel side bars; one of the sleeves in the centre of a concave reflector; two knobs adjust the position of the rod in the centre of the mirror; two more adjust the mirror.

0432 RDS081 LAMP - CARBON ARC, BROCKIE

JOHNSON & PHILLIPS MAKERS LONDON No2877

H 344; HsBo 145x68; HsTo 88x68. Late 19 C. R.

Focus keeping; inclined carbon rods with internal four-coil mechanism to adjust both; oxidised brass housing.

Latter rises at an angle to the vertical.

Described in Wright 1891,209.

0395 RDS095 LAMP - GALVANOMETER

KIPP DELFT-HOLLAND PATENT 216950 No 32

H(+B) 145, (-B) 87; L 117; D 41. 1924 Patent.

Blackened brass cylinder for bulb; vertical filament bisects two disc windows; for galvanometer 0390 RDS094.

Filament at right-angles to housing cylinder; one of the windows is magnifying; two stainless steel terminals at the back of the housing cylinder.

Date assumes that the number is a British Patent.

0436 RDS061 LAMP - MAGNESIUM

J. SOLOMON. 22 RED LION SQUARE LONDON NO 1396 MAGNESIUM LAMP BREVETE SG DG 22

H 220; CyD 53&67; DrD 120. 1849-1880. F.

Clockwork mechanism in copper-coloured brass and tin cylinder with drum for wire clamped on; fan on top.

Two feet and handle support U-shaped stage for cylinder; outlet pipe below; lid on top.

Dates from Crawforth 1988,15.

0437 RDS028 LAMP - MINER SAFETY

NEWMAN LONDON

H+Ha 325; H-Ha 260; TaD 70; OCyD 48.

1812-1856. F.

Cylinder oil tank; two concentric gauze cylinders above this; convex lens on two of four bars to lid; figure-of-eight handle.

Dates of John Frederick Newman from Clifton 1995,199.

2642 RDS140 LAMP - PENTANE

VERNON HARCOURT'S PENTANE LAMP MADE BY THE WOODHOUSE & RAWSON ELEC MANUFG CO LTD LONDON BD 206. Mid to late 19 C. G.

Turned iron base only; three small hexagonal feet below base; hole in centre for missing lamp; brass signed plate; rest gone.

The complete apparatus is illustrated in Christie 5:3:87,12, Lot 26 (£150-200).

0439 RDS002 LANTERN - TRIUNIAL

NEWTON & CO FLEET ST. LONDON OPTICIANS TO THE QUEEN NEWTON'S PATENT

B 480x480; H 940; DrH 470, D 390. 1894. AQ.

Mahogany base; four brass pillars; oxidised brass drum; cowl; used in Leinster House for Society's lectures.

The drum has three ports and three doors with circular spy holes; fittings for carbon arc lamp (missing) adjustable in three directions; with projection lens system 0440 RDS124, another lens and slit system 0441 RDS125, projection microscope

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0442 RDS126, another lens housing without slide mount, three brass Waterhouse stops, three objectives in brass cylinders 1½", 2", "convergent system", lens cylinder marked "GAS MICROSCOPE".

The British Journal of Photography, Supplement, April 6, 1894, illustrates this lantern, and notes that it had just been made for use at the Royal Society's rooms at Burlington House, being the "best and most convenient form of lantern"; this form of lantern was also in use at the Royal Institution, the RDS, the Universities of Oxford, Cambridge, Glasgow, and Dublin, and was being constructed for the School of Engineering at Chatham; it notes that: "The body of the lantern is made entirely of bronzed brass, and can be rotated so as to bring each of the three fronts in succession opposite the arc light...All the fronts are interchangeable, and are arranged so that microscopes, polariscopes, or similar instruments, can be bolted on at will."; the article also welcomes the fact that; "In these days, when goods 'Made in Germany' seem to be in many instances pushing English works out of the market", England is, in the case of scientific lanterns, "facile princeps". Wright 1891,160-62 notes that this lantern was planned and carried out for the Santa Clara College of California; he writes: "the three nozzles (which in this case carried a projection microscope capable of 5,000 diameters, a diagram front, and an optical front with all the usual accessories) are arranged at equal intervals round the whole circle, so that whichever points forwards, the others are backwards, and out of the way. There are three doors with shuttered sight-holes of darkened glass, between these nozzles, so that the arc can always be examined either from the back in the optic axis, or from either side. The foundation circle is supported on four strong pillars, standing rather outside the body, for steadiness; and the whole body revolves easily and truly upon this circle, and may be fixed at any angle, while a spring detent ensures that each front ordinarily finds its exact position...this form of lantern is the most complete, convenient, and powerful instrument for scientific demonstration with which I am acquainted, and has been adopted by the Royal Institution."

Wright 1891,160 illustrates instrument.

0438 RDS067 LANTERN - UNIAL

THOMAS MASON OPTICIAN 5 DAME ST. DUBLIN [On lens] 26IN BECK NEOSTIGMAR f7.7 PATENT NO 150894

B 1480x358; H 555; HsSe 309x233. 1900-1914. A.

Russian iron housing plus cowl; long base with Beck lens.

Base has two sliding brackets holding brass slide holder and Beck lens; housing has open back with flap, and side door with brass peep-hole.

Dates from Morrison-Low 1989,131 and Mason 1980,12.

1982 RDS132 LANTERN - UNIAL

THE "PREMIER" RILEY BROTHERS, Bradford RD NO. 230577

B 431x220x26; H 266; Hs 264x235x166. Design 1894.

Mahogany base and housing; brass fittings; cowl gone; 6" lens system RD 230577; slide inserter 0475 RDS073.

Circular windows on side doors with brass hinged covers; spring clips for slide holder; double knurled knobs rack and pinion focus (now allowing little movement); double knurled knobs and hinge for oxidised brass lens cover (with the RD NO.); original gas lamp gone and replaced with an electric lamp fitting.

Presented in 1989 by G.W.A. Fogarty, 28 Shandon Park, Belfast.

0443 RDS068 LANTERN - UNIAL

J W ESTABLISHED 1816 LONDON MADE MASON DUBLIN

B 482x329; H 575; Se 396x284. Designs 1894 & 1908.

Mahogany housing RD No519342; japanned cowl; lens in front; long extension with Mason 18" lens RD No230577.

Black curtains at back of housing; front lens in oxidised brass housing; long home-made wood extension piece (L742, W208) contains brass slide housing and sliding bracket to hold 18" lens labelled: "MASON DUBLIN 18IN RD No230577" - pinion focusing system missing.

There is a second lens 9 3/4" with the same number (230577), having two rack and pinion adjustments and a side arm with clamp for a retort.

Crawforth 1984,108 for registered design numbers.

2647 RDS144 LENS - CONCAVE CONVEX

Yeates & Son Dublin

HsD 98 & 52; LeD 87. Mid to late 19 C. G.

With slit; brass housing; smaller revolving top to adjust slit; red fabric-covered ring holds lens.

The latter slides off the edge of the housing releasing the lens; presumably part of a larger apparatus, now missing.

0445 RDS040 LENS ON STAND

YEATES & SON, DUBLIN. LABORATORY Royal Dublin Society

HBoHs 315; LeD 101. Mid to late 19 C. G.

Expanding brass pillar on iron tripod foot; hemi-spherical brass mount for biconvex lens housing of oxidised brass.

0447 RDS029 LENS SYSTEM

B1 [Thomas] Grubb Dublin 3712

H 145; D 80; Stops 73x50. Mid to late 19 C. G.

Brass cylinder barrel; three stops; plano-convex front lens; concave/convex convex/plano double lens at back.

Rack and pinion focusing, but pinion missing; red paper-covered wood cap for front lens; tin Waterhouse stops with apertures 2.5, 3 and 9mm.

0440 RDS124 LENS SYSTEM

NEWTON & CO. Opticians to Her Majesty the Queen and the Government. 3. Fleet Street, London

BP 202x200; Mo 150x150; CyD 120&60. Late 19 C. G.

Projector; double brass cylinder housing; slide mount.

Lens system with manual coarse focus, rack and pinion fine focus; spring loaded slide compartment; brass back plate; for Newton lantern 0439 RDS002.

Queen Victoria died in 1901.

0448 RDS065 LENS SYSTEM

J. Robinson & Sons Dublin & London

L 65; HsD 41. 1885-1903. F.

"Instantaneous Rectilinear"; brass cylinder housing with slit for Waterhouse stops; two element lens.

Dates from Morrison-Low 1989,133.

0446 RDS093 LENS SYSTEM

Unsigned

L 429; D 150,120&93. Late 19 C. G.

Brass three-cylinder housing with shade on front; all optics are in the front (smallest) cylinder.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Focus by rack and pinion; screw thread at back.

There is an alternative lens system with shade and (detached) rack and pinion focus which screws into the largest of the three cylinders of the first system (L223,D193).

0444 RDS066 LENS SYSTEM

Unsigned

L 50; HsD 39. Late 19 C. G.

Brass housing with one element lens and iris diaphragm; apertures f8, 11, 16, 22, 32, 44.

2645 RDS142 LEYDEN JAR

Unsigned

BD 99; H 222; ToD 69. Mid to late 19 C. G.

Glass cylinder jar with neck to smaller top; lined inside and out with metal foil; lid and conductor missing.

0358 RDS084 MEASURING CYLINDER - GAS

Unsigned Cubic Inches

H 313; D 40; LiD 71. Mid 19 C. G.

Glass; closed at top; widened opening at bottom; hand-engraved scale 1-12.

0365 RDS015 MEASURING FLASK

Unsigned

BD 94; H 229; D 94. Mid 19 C. G.

Glass; circular base; conical measuring flask with scale of one quarter to three naggins.

0481 RDS060 MERCURY TROUGH

PORZELLAN MANUFACTUR TEKNICE

L 213; H 77; W 126. Late 19 early 20 C. G.

German porcelain vessel; rounded ends; lip on thin end; double platform at wide end to half trough height.

0449 RDS024 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No.21412 (Large Stand 1A)

B 133x103; H 293; C 340x180x175. 29:10:1891. D.

Brass; U-shaped base; circular mechanical stage; double nosepiece; mahogany fitted case; H.H.Dixon's.

Spring loaded cylinder housing on triangular pillar with circular fine adjust 10-50; rack and pinion focus for tube; sub-stage mirror (plain and concave) and condenser; one eyepiece; five objectives (one oil immersion); iris diaphragm; three other condensers; parabolic reflector.

Used by Prof. H.H. Dixon and presented by his son, Professor Kendal Dixon in 1986.

Letter from Leitz notes that the final assembly was carried out by Lachmanski (no first name) on 29:10:1891.

0450 RDS011 MICROSCOPE - COMPOUND

A. ROSS, LONDON 7736

H 505; Sa 90x87; TuL 262, D 35. 1856. S.

Brass; Y-shaped base; tube raised by triangular pinion in square housing; nosepiece for four objectives.

Rotating plain or concave mirror sliding on cylinder attachment under stage; one eyepiece; three of four objectives surviving 3/8", 3/16" and 1/16", the largest having the signature "A Ross 1856".

0451 RDS047 MICROSCOPE - COMPOUND, BINOCULAR

SMITH BECK & BECK LONDON UNIVERSAL MICROSCOPE 3095 WENHAM'S BINOCULAR.

BD 136; H 290; C 317x173x160. 1857-1866. F.

Brass; chain drive focus; magnifier on knuckle arm.

Circular foot supports pillar which holds microscope and stage on pivoting limb; rectangular stage (78x70) with stage spot condenser having three apertures; condensing mirror on tubular tailpiece; coarse focus by chain-drive from knurled knob (not working) or lever; fine focus by similar device to eye-pieces; three objectives 5/8", 1/4", 5/32" on cylinder device; part of optics of one eyepiece missing; mahogany case.

Dates from Turner 1989,171 and Nuttall, Bull SIS 4,1984,16.

Christie 18:6:86,49 records that Wenham first published details of his prism arrangement for a binocular microscope in 1857, and soon after several instrument makers had applied his invention for use in binocular microscopes.

Tesseract 31,1990-91,11 offers this instrument (No. 3811), describing it as an "exotic" instrument incorporating Wenham's newly-invented binocular prism design, square main tube, sideways cylindrical turret for three objectives, sideways limb mounting, and chain-drive focus, etc. - noting that few if any microscope makers have ever included so many innovative features in a single instrument.

0452 RDS025 MICROSCOPE - DISSECTING

BAUSCH & LOMB OPTICAL CO ROCHESTER NEW YORK NEW YORK CITY N.Y. CHICAGO

B 250x91; H 90; Mi 79x75. Early 20 C. CT.

Hinged boxwood base holds two lenses; angled mirror set within housing; white metal lens holder above mirror.

Three spaces for lenses, two (19mm & 37mm) remain; dark and light background plate; glass slide-in bracket parallel to top of housing; lens holder slides on a pillar; signature includes.

As advertised in Baird 1914,262.

0442 RDS126 MICROSCOPE - PROJECTING

WRIGHT & NEWTON'S PROJECTING MICROSCOPE PATENT SOLE MAKERS NEWTON & CO. 3 Fleet Stt, London

BP 205x205; HssL 153&160, D 130&55; L 515.

1894. AQ.

Lenses; cell; nicol prism; front projection system.

Cylinder brass lens system on brass backing plate; removable cylindrical cell with glass sides; cylinder housing for removable nicol prism system; slide holder (D115) graduated 0-90-0; rack and pinion focus for front projection system; signature on microscope; on back plate: "NEWTON & CO OPTICIAN TO HER MAJESTY THE QUEEN & THE GOVERNMENT 3 Fleet St. London"; for use with Newton Lantern 0439 RDS002.

Presumably acquired with the lantern in 1894.

2649 RDS146 MICROSCOPE - PROJECTING

Yeates & Son Opticians, DUBLIN.

MnL 135; HsD 56; DiD 98. Mid 19 C. G.

Brass and oxidised brass; lens housing for lantern; slide clip; push coarse-focus lens; metal shade disc.

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Only two lenses - one in the housing which would screw into the lantern, the other in the push focus micro-cope attachment, which is in the form of a double cylinder with the lens in the narrower part; around the sleeve holding the latter lens mount is a black coloured metal (tin?) disc; below the housing is a knurled knob fine-focus which adjusts the position of the microscope lens using a cylinder and sleeve.
Lettering suggests fairly early date.

0453 RDS127 MICROSCOPE - SIMPLE

Invented by Mr Pillischer No 66 London
Ty78x32; LeHsD25; MiD19; C96x53x32. Mid 19 C. R.
Oxidised brass stage; three aperture stops on diaphragm; swinging concave mirror; three objectives 1/4, 1/16, 1/30.
Raised sides on tray; spring clip for sliders; pivoted lens holder, clamping screw; in fitted red leather-covered case lined with red silk and velvet; hinged two-part arm (broken) for mirror.
The same model of microscope, numbered 45, was offered by Tesseract 23, Winter 1988/9, Item 20, and was described as follows: "PILLISCHER'S UNIQUE 'LENTICULAR' POCKET MICROSCOPE - A STAGE WITH MICROSCOPE ATTACHED, English, c.1850, signed 'Invented by M. Pillischer, Optician, 398 Oxford St., London, No.45.' Made in very limited numbers, this remarkable Pillischer design features a spring stage for 1"x3" glass slides. Mounted to this hand-held brass stage are some fairly sophisticated accessories, including a wheel of stops, substage concave mirror in yolk on double-jointed arm, swivelling lens holder with precision fine focus control, and interchangeable high power magnifiers. The instrument is very finely machined and constructed by the innovative Moritz Pillischer. It is in very fine condition, complete with the original fitted pocket case. This very early example of Pillischer's work was illustrated and described in 1857 by the famous English physician, Dr. Golding Bird. A serious instrument of maximum portability. \$1200."
Pillischer No42 dated c1849 by Brown 1986,21; Crawforth 1988,13 gives Moritz Pillischer 1851-1887.

2655 RDS152 MICROSCOPE SLIDES

E.L. Moss [on 2] [dates from May '68-Dec '76]
75x25; C 159x87x26. 1868-1876. S.
Cardboard box for 24 slides, containing 18; home-made; mainly minerals; with magnetic particles; and pollen.
Tourmaline, Muscovite, Quartz, Beryl, Barytes, Brotilite, Axial Sections; Granite; Quinine Hydrate [x2]; magnetic particles [x3]; pollen [x2]; "Labial tentacle of Clio Proven 21 July 75 D.G."; "...Musk Ox..1 July 76 E.L. Moss"; "...Musk Ox exposed to air in our rigging since 25 August 75 put up 14 Jan 76"; "Magnetic particle from Fluebery? Dust Oolite Dust 9th July"; "Magnetic Dust from sounding 210fms 15 miles from shore Cape Sabine two large particles Shift Rudder Bay extracted with magnet"; "Magnetic particle in Syenite of 'Cleopatra's needle' from fragments chipped off by Weather picked up beside its base May 68 E.L. Moss."; "Platinocyanide of Magnesium Opaque ?".

2654 RDS151 MICROSCOPE SLIDES

EW [E. Wheeler on 1] 1862 [on 1] Polariscope [on 5]
75x25; C 93x82x39. 1862. S.
Green-covered wood lined box for 12 slides holds 11; biological and geological specimens.
"Green Aventurine Polariscope. EW"; "Chemical Salt Cane Sugar PRIZE MEDAL Polariscope with Selenite 1862"; "Scale of Gold Fish Cyprinus auratus POLARISCOPE With selenite"; "Fibrous Sulphate of Lime Polariscope."; "Section of Eozoon Canaden De Layentius[?] Serpentine Polariscope"; "Section of Spanish Mahogany TN or NT"; "Eye of Water Beetle Dytiscus Marginales"; plus parts of moth, falcon, and beetle.
EW is the monogram of E. Wheeler, 48 Tollington Road Holloway London - see 2690 TDP235.

0367 RDS111 MORTAR & PESTLE

Unsigned; (porcelain set) WEDGWOOD BEST COMPOSITION
[M] W 120, H 47, FrW 160, H 50; [P] L 158; D 34.
Late 19 C. G.
Agate; octagonal mortar and mahogany frame; mahogany handle; pestle with wood handle; also second agate set and porcelain set.
Second agate mortar and pestle with octagonal mortar and circular section pestle, ([M] W77,H32, ([P] L6,D23); also porcelain set, mortar with lip, ([M] D83,H 55, [P] L98,D31).

0368 RDS059 MORTAR & PESTLE

Unsigned No 2
[M]D 158; H 131; [P]L 135&138, D 25&44.
Mid to late 19 C. G.
Two black-painted iron circular-section mortars and pestles; larger pestle has steel grinding surface; mortars identical.

0488 RDS013 OCTANT

KINGS Patent Gregory & Wright London
R 412; AL 455. 1790-1792. F.
Ebony frame; T-shaped support; ivory scale 0-90 with ivory vernier 0-20; brass index arm with index mirror.
Vernier with brass tangent and clamping screws; two shades - red and green; horizon glass; additional slot for shades (missing); pin-hole sight hinged to leave threaded hole (D26).
Donated by Mr Robert Scanlon in 1985.
The National Maritime Museum, Greenwich, has a sextant with the signature Kings Patent Gilbert & Wright, c1791.
Dates from Clifton 1995,120.

0454 RDS039 OPTICAL BENCH

J. Duboscq-Pellin rue de l'Odeon à Paris
B 970x268x126; Bn 1152x59x10; HBeTo 335.
1883-1886. R.
Mahogany drawer base containing slits, pin-holes, lenses, etc., which slot into holders on brass bench.
Sixteen fittings with circular housings (D52,H14), many in poor repair; verniers on windows of holders 10-0-10; bench supported by brass pillars from base; scale on bench 0-14; disc table on one end of bench.
Duboscq partnered Pellin from 1882-1886, Brenni, 1988, 3-4.

2651 RDS148 OPTICAL ELEMENTS

Klein's Quartz: ¼ Wave 45° P/A.
Hs 54x25; HIsD 10;11;15-18. Late 19 early 20 C. G.
Three; oxidised brass slides; brass knob at thinner top; two have glass inserts; the third a conical hole.
The "Klein's Quartz" slide has a glass disc insert; the "¼ Wave" has glass discs with liquid between, and a revolving ring which can be set to "45°" or to P/A; the third has no glass insert; clearly these are designed to slide into a parallel sided

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bracket, presumably in an optical instrument; the slides are in a cardboard box "LABORATORY, ROYAL DUBLIN SOCIETY.", with hand-written "Kleins Quartz Quarter wave plate".

0459 RDS070 OPTICAL STAND

Unsigned

H 755; T 625x510x34. Mid to late 19 C. G.

Massive wood and iron stand, presumably for projection lantern or camera; turns; rises; fine adjust disc.

Three right-angled iron legs hold iron base disc; three wood beams above this hold another disc on top with a hole to contain a vertical bar with a heavy iron disc supporting the table, which can be rotated freely and clamped with a brass handle; another handle attaches to a cog, and a threaded pillar raises or lowers a disc (D30) with a rectangular raised centre, to fine-adjust the position of the apparatus on the table.

0380 RDS114 PEN

SPENCER DUBLIN

L 155. 1845-1863. F.

Ivory handle; circular section at top, then square; adjusting metal nib; in Harling set 0379 RDS020.

Set found to be missing in February 1990.

Dates from Morrison-Low 1989,136.

0370 RDS043 POLARIMETER

P. Harris & Co. Limited, Birmingham. G.C. James

BD 155; H 387; L 465; SD 159. Early 20 C. G.

Brass; circular scale 0-180-0° with vernier, lens and knuckle-jointed mirror; black hinged cell chamber.

Latter holds a two decametre cell of glass with brass and oxidised brass ends; a pillar rises from the circular foot to the base of the cell chamber, and can revolve around the pillar; at the eyepiece end of the instrument is the scale with a racked edge and a pinion to revolve the lens system; each end has an arc rack and pinion to move an internal optical part, presumably the nicol prisms.

0369 RDS037 POLARIMETER

J. Spencer & Son. 19 Grafton St. Dublin

BD 127; H 262; L 260; SD 100. 1866-1883. A.

Iron base; brass; pivoting horizontal arm holds nicol prism set and circular analyser, scale 0-90°.

Dates from Morrison-Low 1989,136.

0455 RDS107 POLARISCOPE - ELBOW

Made by Yeates & Son Dublin

L 492; PHs 190x102x19; D 103,92,38. 1847-1857. R.

Tin, brass and mahogany; six clear plus one black glass plates; optics; sample gap with clamp; nicol analyser.

A tin backing plate fits to a lantern; a tin elbow fitting has a mahogany tray blackened inside for the plates; three hemispherical ivory feet; optics bound in brass.

A Yeates & Son trade sheet was found under the glass; noting that they stocked Smith & Beck instruments; latter firm dates 1847-1857 - Turner 1989,171.

0371 RDS087 POT - STONEWARE

GRIFFIN LONDON

BD 183-196; H 310. Late 19 early 20 C. G.

Three cylindrical pots with decorated rims; arched tops to bung holes; brass taps at bottom.

0456 RDS057 PRINTING FRAME

W. MIDDLEMISS SOLE MAKER BRADFORD RENDELL'S PATENT 5799

219x132. 1893-1901. W.

Black wood base board with brass fittings; trap door with black velvet inside; frame on springs for plate.

The two springs, which would allow a glass photo plate to be inserted and secured, hold a wooden frame with a hole (75x75) for the plate, also with black velvet on the inside.

Crawforth 1988,18 lists William Middlemiss of Bradford in 1893 and 1901.

2644 RDS141 PRINTING PLATE

Dublin Society 1811 Mr Profefsor Davy's Chemical and Geological Lectures Admit _____ or Bearer No: _____

133x135. 1811. S.

Copper; circular S-scroll design and circle of arrows.

"The Society was of the opinion that it might be advantageous to bring over from England distinguished lecturers, and in 1810, the Royal Society was asked to allow Professor Humphry Davy to deliver a course of lectures on electro-chemical subjects, which he did; 500 guineas were paid to him, and 337 persons attended his first lecture. Next year, he gave another set of lectures on chemical philosophy, and repeated the course in geological science that he had read before the Royal Institution. Professor Davy was also asked to superintend the construction of a voltaic battery of large plates. At the conclusion of the lectures, the committee of chemistry reported that the total amount received for admission tickets was £1101,15s. 1d., all expenses amounting to £327,15s.1d., which left a credit balance of £773,6s.11d. Out of this, a sum of £750 was sent to Davy, with thanks for having 'materially increased the spirit of philosophical research in Ireland.' In a reply, dated the 9th of December 1811, Davy said that he was proud of the Society's opinion that his lectures would be useful to the Irish public; and added that as long as he lived, he would remember with gratitude the attention, candour, and indulgence of his audience." (Berry 1915,161).

0373 RDS042 PRISM - HOLLOW

Unsigned; Yeates & Son, Dublin

H 76; Sis 78; C 160x98x81; H 65; Sis 43.

Mid to late 19 C. G.

Two, oxidised brass frames, glass sides, boxwood case with partition, no lid.

Also single signed prism with oxidised brass and metal frame, with the glass sides detached.

All the prisms have brass cylinder stoppers.

0469 RDS103 RADIUM BUTTON HOLDER

R. & J. BECK. LTD LONDON

H 93; HaD 48; SdD 34. Early 20 C. CT.

Turned elliptical wooden handle; brass sleeve; lead cylinder shield; contents discarded as radioactive.

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The radium button, its lead-lined box, and the bracket for holding it were discarded in 1987.
Illustrated in Beck 1909,200; firm became Ltd in 1895, Crawforth 1988,4.

0470 RDS035 RADIUM NEEDLE CYLINDER CASE

Unsigned

LABORATORY, ROYAL DUBLIN SOCIETY. Nos 177-9
89x29x28. Early 20 C. G.

Three hinged wooden cases; purple cloth lining; black paper-covered; press stud; actual cylinders gone.

These contained metal protection cylinders for radium needles; they were present in the 1970s but have since disappeared; the RDS Laboratory label on case 177 has the hand written message: "Please return to the Royal Dublin Society - No 177"; on 178: "Please return to R.D.S. No 178."; and on 179: "To be returned to the above address No 179".

0375 RDS131 REACTION VESSELS

Unsigned

H 183; D 94; H 187, D 92. Mid 19 C. G.

Spherical copper and pear-shaped silver vessels; former with tapering neck, latter with cylinder neck.

Copper vessel has strengthening ring around centre.

0396 RDS110 RESISTANCE FRAME

Unsigned

L 388; W 260. Late 19 C. G.

Iron frame holds 21 resistance coils; handle on top connects to one of two sets of 11 contacts; slate plate with two terminals.

0397 RDS091 RHEOSTAT

Unsigned

B 378x166; Hs 354x143; HsH 182. Late 19 C. G.

Oak base and housing; pedal at one end compresses a pile of 26 carbon plates (89x64x9); asbestos lined tray.

Brass plates at sides of tray joined by copper wire to brass terminals on top of housing.

0381 RDS116 SCALE

ADIE 395 STRAND LONDON

L 161. 1848-1868. A.

Boxwood; marked "FEET" at one edge, scales 1-40 and 40-1; "100" at other edge, scales 1-60 and 60-1.

In case with Harling instruments 0379 RDS020, which was found to be missing in February 1990.

Dates from Clifton 1995,4.

0382 RDS022 SCALE

Unsigned; monogram JG [John Griffith - owner]

265x25. Late 19 early 20 C. G.

Silver-metal with four scales 1-24-1, 1-19-1, 1-7, 1-11.

This scale was owned by Sir John Pursur Griffith (1848-c1931).

Donated by Mr Vernon Harty in 1984.

0468 RDS027 SHAFT SPEED INDICATOR

L.B. TAYLOR'S PATENT SPEED INDICATOR. Manufactured only by THOMAS PACKER, Union City, Conn., U.S.A.

L196; D63; H35; C202x72x30. Late 19 early 20 C. G.

White-metal shaft; circular scales; handle; case.

Scales read unit revolutions 0-10 and hundreds 0-21; handle is mahogany; in cardboard case with instructions: "To ascertain the number of revolutions made by a shaft in any given time: Take the indicator by the handle, in the right hand, holding your watch in the left, press the point of the spindle gently against the end and centre of the shaft. To every hundred revolutions of the shaft the Hundred Pointer will make one revolution, while the Thousand Pointer will indicate one number, the dial being marked into ten parts. It may be applied to a shaft revolving to the right or left."

0457 RDS073 SLIDE INSERTER

SELF CENTRING R. BEARD'S PATENT (R.R. BEARD "ELCIPSE")

L 268; W 109; De 15; HsL 151. Late 19 early 20 C. R.

Three; open wood frame; grooves top and bottom to guide slide; rod to push slide; brass mechanism to centre.

Brass bar on bottom of carrier pulls out; slide is placed in grooves with edge contained by raised projection.

Described as "Beard's 'ECLIPSE' carrier, self-centring, with dissolving effect....10/6" in Beck 1909,97.

Two are signed "SELF CENTRING R. BEARD'S PATENT" and one "R.R. BEARD 'ECLIPSE' PATENT." - the latter came with lantern 1982 RDS190.

Advertised in Beck 1909,97; R.R. Beard was active in 1895, Anderson 1990,8.

0383 RDS018 SLIDE RULE

DRING & FAGE MAKERS 56 STAMFORD ST LONDON

L 605; W 32. Early 20 C. PC.

Boxwood base; white top; two scales 1-1-10; made for Guinness; donated by Prof. Frank Mitchell in 1986.

Label with instrument reads "Specially made for Guinness c1905 fide A. Jackson Brewer"; the scales read 1, 1.1 to 1.9, 2, 2.5, 3, 3.5, 4 to 9.5, 1, and this is repeated; the same scale is on the bottom of the rule, and on the slide; there are no scales on the upper side of the slide and rule; the slide has two white metal knobs at its ends; the slider has copper sides and clear ebonite[?] to back the moving line.

Crawforth 1988,7 gives this address from 1903-1938.

0384 RDS017 SLIDE RULE - FULLER CYLINDRICAL

FULLERS SPIRAL SLIDE RULE STANLEY, Maker, LONDON

[On lid] MANCHESTER J. HALDEN & CO LONDON & NEWCASTLE

L 438; CysD 80,63&50; C 356x111x102. Patented 1878.

Mahogany, brass, and papier maché; mahogany case.

1904 and 1944 on index arm - not clear whether dates or serial numbers; screw-in turned wood handle; outer cylinder divided; middle cylinder with scales; inner cylinder of brass; equivalent to straight rule 83'4".

The outer cylinder is divided from 100 to 999, and this spiral, "A LOGARITHMIC SCALE OF NUMBERS 41 FEET 8 INCHES IN LENGTH, WHICH IS EQUIVALENT TO A STRAIGHT SLIDE RULE 83 FEET 4 INCHES LONG.", has primary divisions as far as 650 divided into 10 parts, and from thence to 1000 into 5 parts; the inner cylinder has a variety of conversion factors and other details - e.g. decimals of weights, measures, times, weights of materials, and information on powers and roots.

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With instruction book: "PROFESSOR FULLER'S CALCULATING SLIDE RULES...GEORGE FULLER M.INST.C.E. FORMERLY PROFESSOR OF ENGINEERING IN THE QUEEN'S COLLEGE, BELFAST"

To multiply 4 by 3, move the point of the lower brass index to 400, move the left-hand marker, half way down the upper index, to 100, bring 300 to the equivalent position at the bottom of the upper index arm (as the upper marker cannot be brought to 300 in this case), and read the result - 120 - at the point of the lower index arm (the decimal points need to be reckoned separately).

Donated by J.F. Chambers, via Prof. Frank Mitchell in 1986
Crawforth gives Halden date 1890 W.

0441 RDS125 SLIT

NEWTON & CO. LONDON

SISy 81x57x7; SIAP 25x3. 1894. AQ.

For Newton lantern; brass plate and lens cylinder; slit has and screws to adjust gap vertically or horizontally.

Backing plate signed: "NEWTON & CO. Opticians to Her Majesty the Queen and the Government. 3. Fleet Street, London".
Assumed acquired with Lantern 0439 RDS002.

0458 RDS071 SPEAR FOR MICROSCOPE SPECIMEN

Unsigned

Hs 83x50x9; Spear L 66. Mid 19 C. G.

Ebonite rectangle in C-shape; brass spear on arm moved by rack and pinion; end pin held with screw clamp.

0418 RDS092 SPECIFIC GRAVITY APPARATUS

YEATES & SON 2 Grafton Street Dublin [on weight box]

H 96; D 51; We 27x26x20; C 156x70x54. 1840-1864. G.

Pear-shaped glass; brass weight; case; two boxes of weights; signature on box of weights, bottle unsigned.

Flat-bottomed bottle with ground glass female joint (broken) and stopper with capillary in centre; in fitted mahogany case (top of lid missing) which also contains housing for a slightly tapering brass cubic weight labelled: "Bottle & 1000 Grs of Distl Water at 60°"; case also contains two cylinder cardboard boxes with small weights.

Also another similar smaller bottle, hand engraved: "25 Grammes 60°F."

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

0133 RDS102 SPECTROSCOPE - DIRECT VISION

ADAM HILGER LTD. LONDON, ENGLAND. No J.10.301/20215 T. MASON, OPTICIAN, 5, DAME STREET, DUBLIN.

L 220; D 24; C 255x152x55. 1900-1916. A.

Brass and black enamel; two drum and one linear slit scales.

Lacquered brass tube with push focus eyepiece lens system incorporating a pointer in the field of view; the slit is in a mounting of black enamel at right-angles to the tube; it is in a brass slide (now bent and stuck outside the field of view) the position of the slide being measured on a linear scale 0-40, with a drum micrometer 0-90; the other white metal slit lip is spring-adjusted by a small screw divided 0-9; case.

Mason at 5 Dame Street from 1900-1916 (at 5 & 6 until 1922), Morrison-Low 1989,131.

0132 RDS033 SPECTROSCOPE - DIRECT VISION

Franz Schmidt & Haensch BERLIN S.42 [on case lid]

L 85; D 16; C 97x54x31. Early 20 C. G.

Chrome telescopic barrel; black metal eyepiece and prism housing; revolving angled mirror on side arm.

Push focus at eyepiece end; knurled ring around barrel adjusts slit width; side lever moves a small prism over or away from the front of the slit; in fitted black-covered case with purple silk and velvet lining.

Firm active between 1864 and 1914, Brachner 1985,149
and Anderson 1990,75.

0131 RDS049 SPECTROSCOPE - DIRECT VISION

Yeates & Son Dublin

H 317; L 450. Purchased 1863.

Brass and oxidised brass; iron tripod foot; side arm collimator; adjustable slit with reference prism.

Expanding brass pillar from foot, with knurled clamp knob, to pivot; prism housing, an oxidised brass cylinder, on pivot bracket; side arm collimator at eyepiece end of housing, with (stuck) rack and pinion focus; telescope on angled bracket from housing, with rack and pinion focus using double knob; sprung knob to vary white metal plates of slit; small reference prism can be rotated in front of slit.

RDS Chemistry committee Minutes of 14:11:1863 record purchase.

0128 RDS090 SPECTROSCOPE - PROJECTION

YEATES & SON OPTICIANS DUBLIN

TH 259; H 354. Mid to late 19 C. G.

Green-painted iron base; mahogany table; two hollow prisms; arm of brass for lens; S.M. Yeates projection spectroscopy.

Brass pillar from fluted base to table; this has grooves for prisms; arm adjusted by rack and pinion has housing, but lens missing; arm can be attached to either side of the table by means of a knurled brass screw.

Name from Yeates 1880,10-11 - illustrated.

0127 RDS041 SPECTROSCOPE - PROJECTION

YEATES & SON, DUBLIN

BD 104; TH 285. Mid to late 19 C. G.

Expanding brass stand; table for two quartz prisms on circular mounts; adjustable side arm with quartz lens.

Prisms adjusted together by toothed mechanism; side arm adjusted by rack and pinion; lens in brass mounting has oxidised brass circular shade.

See Yeates 1880,11.

0129 RDS004 SPECTROSCOPE - TABLE

Unsigned, but by Howard Grubb, Dublin

B 604x444; H 400. Purchased 1871.

Mahogany base and D-shaped cover; arched iron supports to oxidised brass table; three automatically adjusting prisms.

Prisms and telescope together adjusted to minimum deviation by a rack and pinion and coupled mechanical system under the telescope, with position read on a silver scale divided 0-34, with vernier, using a (missing) reflecting prism; rack and pinion focus for telescope (broken) and collimator; slit adjusted by sprung frame mechanism with a divided screw 0-40.

Grubb 1880,17 describes this type of instrument as: "a three prism Spectroscope, constructed specially for laboratory work, on massive metal frame, and automatic in principle. Telescopes of one and three-quarter inch aperture, supplied from prisms

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of five square inches of base, improved slit, prisms of reflection before slit, microscopes, and illuminating apparatus complete, as supplied to the Royal Dublin Society. Price...£50 0 0."

Minutes of Committee of Practical Science of 3:5:1871 record purchase of two Grubb spectroscopes for £58.

0130 RDS104 SPECTROSCOPE - TABLE

Unsigned, but by Howard Grubb, Dublin

H 344. Purchased 1871.

Iron and oxidised brass; tripod foot and pillar; closed prism chamber; point charts spectrum on drawing table.

Cylindrical rotating prism chamber with clamp screw and lid; the slit end is covered by a brass and oxidised brass cylinder cap, and has a screw "0-9" to adjust the white metal slit in a V-shaped bracket; a small reference prism can be rotated into the light path; at the eyepiece end is a rack and pinion device with an open work arm which allows a point to draw a line on the table at its position in the spectrum corresponding to that of a pointer in the field of view; the line is drawn by pushing down the point in its spring housing, and moving the drawing table back and forth using a rack and pinion below it.

Minutes of Committee of Practical Science of 3:5:1871 record purchase of two Grubb spectroscopes for £58.

0126 RDS113 SPECTROSCOPE - ULTRA VIOLET

R. & J. BECK. LTD. LONDON T. MASON, OPTICIAN, 5, DAME STREET, DUBLIN

L 145; C 170x96x42. Post 1909. R.

Black metal irregular shaped housing; slit at one end; rubber eye shade around brass eyepiece; lined case.

Small lens on support screws to body; small reference prism in case (unclear where it fits); black paper-covered case with (faded) blue lining.

Masons were at 5 Dame Street from 1900; instrument not in Beck 1909 so presumably later.

2652 RDS149 SPECTRUM

DISBAUDRAN. Gauthier-Villars, Editeur, Paris. Chlorure de Manganèse solution, Etincelle courte/moyenne.

104x82; Hs 197x109. Late 19 C. G.

Glass; two line-spectra on scale 60-230; wood housing.

The paper holding the glass slide in place hides another double spectrum with the heading "DISBAUDRAN"; hand-written in pencil on the paper is: "Echinvegarius pusillus Gray" and "E pusillus Gray Ireland E.P. Wright".

0494 RDS136 STANDARD YARD

Troughton & Simms London Cast in 1845

965x25x25; C 1122x104x79. 1845. S.

Gold coloured metal (Baily's Metal); square section yard; mahogany case; space for weight (missing); box.

Details engraved on yard "Copper 16oz. Tin 2½ Zinc 1 Mr. Baily's Metal No.15 STANDARD YARD at 62°.31Faht. Cast in 1845"; on case is written "British Standards of Length and Weight No 13"; case lined with green velvet; case fits in boxwood box.

0400 RDS112 SWITCH

Unsigned

B 164x75x19, H 104; B 215x131x15, H 123;

B 140x107x19 19 C. G.

Three; two with slate, one mahogany base; one has O-shaped contact; one U-shaped; and one straight.

First with O-shaped contact has break at contact point which connects or disconnects with plate; second has short pillar holding ebonite knob above two brass discs, this turns U-shaped group of five brass plates; third, with mahogany base, has two brass plates and wooden handle for brass contact to connect or disconnect with plates; all with two brass terminals.

0398 RDS117 SWITCH - BATTERY

"NEVILLE" JUNIOR AUTOMATIC BATTERY CHARGING SWITCH 25 AMPS 55 CELLS

180x104x83. Early 20 C. G.

Coil and stainless steel pivot system; one end between electro-magnetic poles, other contacts two buckets.

Rectangular black iron casing with glass front; the two small buckets are presumably for mercury.

0460 RDS038 TELESCOPE - REFLECTING

DOLLOND LONDON

D 130; L 960; PvH 475. Early 19 C. G.

Brass; folding tripod legs; pillar to mechanical part-circle and bracket for tube; finder; main mirror gone.

Pivot at centre of part circle turned by a pinion bar driving the rack on its circumference; ivory handled screw moves the tube from side to side; upper mirror moved by a long rod from the eyepiece end using a sliding bracket; the eyepiece optics and one lens of the finder are missing; one support of the finder is also gone.

There are two speculum mirrors, one too small, though that of the right size does not seem to fit either.

0405 RDS050 TESTING SET

TELEGRAPH WORKS SILVERTOWN LONDON No 1417

207x207x143. Late 19 early 20 C. G.

Mahogany case; purple lining; two brass plug resistance circles and one straight rack; meter under glass.

Resistance circles for tens and units; logarithmic meter scale 50-0-50; four contacts labelled INSULN, EARTH, BRIDGE REST (2); number on label on lid 194.

0419 RDS129 THERMO-HYDROMETER

Lactodensimeter n. Quevenne-Gerber MADE IN GERMANY

H 300; D 32; CH 321 D 39. Late 19 early 20 C. G.

Glass; mercury weight; hydrometer scale 20-40; thermometer scale 32-100°; in cylinder cardboard case.

Pear shaped mercury weight; cylinder bulb; capillary thermometer tube to small mercury bulb above the hydrometer mercury weight; hydrometer scale in the shaft above the bulb; thermometer scale in wider cylinder bulb at the top of the instrument.

2661 RDS159 THERMOMETER - BECKMANN

Unsigned

L 568; D 15 & 12; CL 595, D 27. Late 19 early 20 C. G.

Glass; brass cap; mercury capillary from long reservoir to 2x180° turns on top; white glass scale 0-68°.

Black and green cardboard case; upper part of housing with the scale inside is wider than the lower part; a wedge of cotton wool is placed at the bottom of the scale between the two parts of the housing; the bends at the top of the mercury capillary tube enclose a wider elongated egg-shaped aperture in the tube; the mercury column has now gone into this aperture and has broken between its ends.

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0414 RDS123 THERMOMETER - DEEP SEA

NEGRETTE & ZAMBRA INSTRUMENT MAKERS TO HER MAJESTY.

L 373; HsD 48; CL 482, D 52. Fourth ¼ 19 C. G.

Two; minimum marker; spirit and mercury; oak semi-circular backing; 10-100° and 30-100°; "Jamieson" cases.

Spirit in reservoir behind housing is yellow in one case and colourless in the other; U-shaped thermometer in front leading to mercury reservoir; dumb-bell minimum marker; white scales; spirit and mercury now mixed up; in cylinder copper "Jamieson" case with hinged lid and vents at each end.

Legend on case: "Improved Deep Sea Therr Negretti & Zambra London 48"; other case No."74"; thermometers Nos 24(?) and 25.

"Jamieson" case illustrated in McConnell 1981,24.

Pre 1901 when Queen Victoria died.

2643 RDS139 THERMOMETER - GLASS MERCURY

Unsigned

Hs 442x45x44; L(+Ha) 496; TuOD 25. Late 19 C. G.

Oxidised brass housing with open front; glass tube for white scale, -2 - 31°C, and broken mercury capillary.

Pivoted handle on top of housing, and four sets of nine holes around the mercury reservoir.

1139 RDS128 THERMOMETER - MAXIMUM & MINIMUM

YEATES & SON OPTICIANS. DUBLIN.

B 474x86; SP 307x67. Mid to late 19 C. G.

White painted oak base; brackets to two metal pivots for white scale on glass back; yellow alcohol and mercury.

Scales -10-120° "COLD" and 0-130° "HEAT"; three limb thermometer tube, with pear-shaped bulb of alcohol on top right-hand tube; "U" of mercury in two outer tubes; alcohol only in centre; maximum and minimum markers.

0489 RDS012 TIME BALL

YEATES & SON DUBLIN

Bk 304x248; T 257x244&253x244; D 160.

Mid to late 19 C. G.

Mahogany back holds two horizontal tables; between these, an electromagnetic release for a ball on brass pillar.

Tables 75mm apart, surrounded on three sides with glass and with mirror (damaged) at back; wind up mechanism for ball; on upper table is a brass pillar (H 490, D 15) around which the ball is raised by a string and pulley mechanism; the ball is of brass and copper-coloured paint; fall triggered by remote signal to double coil; circular brass surround on upper platform may have been for a glass bell jar.

This instrument was stolen in February 1990.

2641 RDS138 TUNING FORK

BAIRD & TATLOCK LONDON

H 202; W 27-32. Late 19 early 20 C. G.

Turned boxwood handle; white metal fork; number on fork G3 1536.

0487 RDS026 TUNING FORK ON RESONANCE BOX

YEATES & SON OPTICIANS DUBLIN C3 (VALENTINE & CARR)

H 196; W 29; Bx 298x105x63. Mid to late 19 C. G.

White metal fork; mahogany and boxwood resonance box; mahogany circular mount; "Valentine & Carr" and "C256" on fork.

2648 RDS145 UNKNOWN

YEATES & SON DUBLIN

B 587x146-110x16; SvsD 2x21&2x14.

Mid to late 19 C. G.

Mahogany base; at one end a brass arch held by two knurled screws; at other, four vertical sleeves on a brass plate.

The brass arch, secured by screws under the base, rises over a mahogany arc support, so the combination is clearly for an element with a circular section - perhaps optical; towards the other end of the base is a small revolving mount with an arc support (H34), and a hinged element (55) with another very close to it; the shaped oxidised brass plate at the far end holds two pairs of sleeves for unknown inserts

Tentative suggestions from the SIS visitors 5/90 were that it might be a holder for a weather glass or for a Crookes discharge tube.

0420 RDS101 VISCOMETER

Unsigned REDWOOD'S VISCOMETER NO 163

H 100; JD 135; TrH 281. Mid to late 19 C. G.

Redwood; iron tripod; copper double cylinder vessel; revolving paddles; brass side tap; pierced agate plug.

The tripod has level screws; the double cylinder is open on top; the agate plug is at the bottom of the inner cylinder; the four paddles are attached to a revolving cylinder between the two cylinders of the vessel - they are turned by means of a handle on a curved ring above; a closed side arm projects downwards from the bottom of the outer cylinder.

There are two glass and mercury thermometers "for Redwood's viscometer".

0404 RDS118 VOLTMETER

Electrical Power Storage Co Limited No 519 LONDON

127x120x51 Late 19 early 20 C. G.

Mahogany housing; silvered arc scale, glass cover; scale 2.5-0-2.5; two brass terminals on housing.

0402 RDS119 VOLTMETER

DEAD BEAT ELECTRO-MAGNET VOLTMETER Electrical Engineering Company of Ireland LIMITED

B 149x118; HsD 106. Late 19 early 20 C. G.

Brass cylinder; glass top; needle on hair spring.

Coil in brass cylinder; scale 0-80; green painted brass base with two terminals; Irish company label pasted over original (which includes LONDON).

0376 RDS069 WATER BATH

SUTHERLAND THOMPSON & CO 31, TOOLEY STREET LONDON S.E.1 SUPPLIED BY MASON DUBLIN

305x211x202. Late 19 early 20 C. G.

Copper plate tin rectangular box; water compartment.

Latter is attached at the middle of one longer side; there is a central hole on the lid of the main box, and two on top of the side compartment; there are two handles on the short sides of the main box.

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0421 RDS023 WATER HAMMER

Unsigned (made by H.H. Dixon 1869-1953?)

L 235; LoAD 25; ShAD 46&23. Early 20 C. G.

Glass cylinder bent about 35° and becoming figure-of-eight shaped; water inside; used by H.H. Dixon (1869-1953).

Donated by Professor Frank Mitchell in 1986, who noted on a card: "Water-hammer used by Prof. H.H. Dixon, FRS, President, RDS in lecture-demonstrations".

2428 RDS137 WATER STERILISER(?)

CASELLA LONDON 182 MADE IN ENGLAND

ToD 211; HsH 248; BoD 160. Late 19 early 20 C. G.

Metal cylinder; top plate screwed on; input and output pipes below; pivoted arm and clockwork on top.

The top disc plate is secured to the cylinder housing by six brass screws; at one side is a brass outlet with a stop-cock; at the other side is a brass cylinder containing a clockwork mechanism pivoted on a bracket, but it has no obvious function; the pivoted arm is attached to a piston and leads to a central screw rod, with adjusting nuts, attached to broken rubber diaphragm into the housing.

Has similarities with pressure water steriliser, as illustrated in Brown & Son 1936,137.

2658 RDS156 WEIGHTS

Unsigned P [crown] V [on 1 set]

Various 19-20 C. G.

Six sets of cylinder brass weights in mahogany cases; 30 "GRNS" to 10000 "GRN"; 20 grams to 2 kilograms; all incomplete.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

INSTRUMENTS RECORDED IN IRISH SALES - SAL

Note: The instruments in this section were seen in shops and in auction sales.

Their whereabouts are now unknown.

2343 SAL026 BALANCE - FOLDING COIN

STEPHEN HOUGHTON & SON, ORMSKIRK Successors to A. Wilkinson.

Hs 137x25x17. 1824-1853. A.

Mahogany housing; brass; turn and slide.

Turn on one side of pivot; slide on scale 0-12 on other above pendant hinged pan; instructions printed on paper on inside of the housing.

Mealy sale at Trudder House, Newtownmountkennedy, Co. Wicklow, 3:10:89, Lot 511.

Crawforth 1979,152 - listed in directories from 1824, moved to Liverpool around 1853.

1988 SAL010 BALANCE - EQUAL ARM

SIMPSON BELFAST WEIGHING MACHINE MAKER.

H 824; BmL 435; PasD 256&183. Early 20 C. PC.

Decorated iron four-limbed foot and arch; brass pillar and beam; one ceramic and one brass pan.

Signature on larger ceramic pan; open-work beam with legend: "CLASS B TO WEIGH 7 lbs"; plumb-bob type counterweight above brass pan.

Categories Class A, B and C were brought in to conform with 1907 regulations (Diana Crawforth-Hitchins, personal communication).

Anthony Antiques, Dublin.

R & W Simpson, scales and weights maker, listed in 1898, W R Simpson, scalemaker, listed in 1910 (DCH).

3845 SAL053 BALANCE - EQUAL ARM

[Label] Wm.. Williams & Sons, Manufacturers of SCALES, WEIGHTS & WEIGHING MACHINES, 127, Cannon Street & Abchurch Yard, London. [Beam] WILLIAMS LONDON

BmL 183; PasD 62; MxL 81; C 204x100x54.

1871-1875. PC.

Brass, with pointer and shears held by red tassel.

Box ends on the beam hold green strings for the pans; both pans are arcs of spheres, one being of silvered copper, the other of copper with a pouring spout; the hinged oak case has a trade label. The pouring spout on the pan indicates that this was a tea scale - William Williams was renowned for his tea scales (DCH).

In Mealy, Castlecomer, Co. Kilkenny, Sale, 29:5:91, with another unsigned equal arm scale (BmL 172, PasD 70; C 199x94x32)

The firm was at this address from 1871-1875 only (Diana Crawforth-Hitchins, personal communication).

4167 SAL084 BAROGRAPH - ANEROID

(DIXON & HEMPENSTALL Dublin)

No measurements available. Early 20 C. G.

"A DIXON & HEMPENSTALL mahogany cased barograph with paper drawer".

Lot 51 in Adams of Blackrock Sale at 6 De Vesci Terrace, Monkstown, 20:11:92.

Dixon & Hempenstall operated from 1904, Morrison-Low 1989, 123.

4008 SAL065 BAROGRAPH - ANEROID

ROSS 111, NEW BOND ST. LONDON.

B 369x221x58; H 206. 1893-1910. A.

Walnut drawer base and glazed cover; brass mechanism and drum; white metal pen; seven evacuated capsules.

Thermometer of mercury and glass with an ivory scale plate 30-110° F; there is a glass ink vial.

Lot 369 in the Mealy, Castlecomer, Co. Kilkenny, Sale, 19-20:11:91.

Dates from Downing 1988,113.

4389 SAL089 BAROGRAPH - ANEROID, SHORT & MASON

(S. Leighton & Son)

No measurements available. Early 20 C. R.

Glazed mahogany case; Short & Mason type with cyclo-stormograph.

"A good quality mahogany cased Barograph, with brass mounts, signed S. Leighton & Son, Lancaster", illustrated.

Lot 383 in Mealy sale of contents of Lisdonagh House, near Headford, Co. Galway, 19:7:94.

This type of barograph was patented by Short & Mason in 1904, with the evacuated chamber and first link housed underneath the base plate; the printed "cyclo-stormograph" gives seventeen different weather forecasts based on readings - Banfield 1985a,127.

Banfield 1991,128 lists John Leighton, Lancaster, w1838 - presumably S. & Son are successors.

2488 SAL037 BAROGRAPH - ANEROID, SHORT & MASON

A.E. LEWIS LONDONDERRY No J.10733 [On arm "Tycos"] PRESENTED TO John R. Hustings Esq D.L..7th FEBRY 1934 by the members of the WHOLESALE GROCERS ASSOCIATION, As a token of their Esteem.

B 368x218; H 184. 1930-1934. S.

Mahogany glazed housing; brass.

No drawer; glazed frame on top; evacuated chamber under base plate as patented by Short and Mason in 1904; glass ink vial; stack of charts; panel reads: "WEATHER FORECAST APPROXIMATE WEATHER READINGS AS INDICATED BY VARIOUS SECTIONS OF THE S. & M. CYCLO-STORMOGRAPH CHART COPYRIGHT 1930..".

Butler Antiques, Dublin.

Short & Mason design described in Banfield 1985a,127.

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3858 SAL058 BAROMETER

(Chancellor & Sons., Dublin) [Assumed Chancellor & Son]

No measurements available. 1899-1922. F.

"An oak barometer by Chancellor & Sons [sic]."

Lot 542 at sale at Auburn House, Athlone, Co. Westmeath, 18:10:90.

Other (presumably) unsigned barometers were offered: Lot 475 (part): "...a barometer in carved frame shaped as an anchor and rope." Lot 480A: "A brass ship's barometer." Lot 481A: "A mahogany stick barometer with brass mounts, early 19th Century. Lot 43: "A mahogany wheel shaped wall barometer, 55cms high." Lot 486 was: "A collection of bronze pestles and mortars (3)".

Dates of firm from Morrison-Low 1989, 122, listed as Chancellor & Son, not Chancellor & Sons.

4015 SAL072 BAROMETER - ANEROID

SMITH, JEWELLER BELFAST

H 852; MxW 325; DID 195. Early 20 C. G.

Carved oak frame in style of banjo barometer; mercury thermometer; white dial 26-31".

The fine carving includes a leaf design on top and an anchor on the bottom; the thermometer is in a rectangular glazed frame above the dial; it has scales 10-120° "Fahrenheit" and -10-0-50° "Centigrade" on a ceramic(?) scale plate with black and red markings; the ceramic(?) dial has a glazed brass-bound frame, and has a few first letters in red; it bears the legends: "FALLS FOR WET OR MORE WIND. S.WLY.S.E.S.W WITH RISING THERMOMETER", and "RISES FOR DRY OR LESS WIND. N.ELY.N.W.N.E. WITH FALLING THERMO-METER".

In Tudor Galleries, Sandycove, Co. Dublin.

Smith not listed in Burnett & Morrison-Low 1989.

4381 SAL087 BAROMETER - BANJO

(G. Bianchi, Cork)

No measurements available. Mid 19 C. G.

Mahogany, scroll top; hygrometer, thermometer, convex mirror, dial, ivory key, spirit level.

"A very fine early 19th Century Irish Provincial banjo-type barometer, in an inlaid figured mahogany case, with silvered dials. Signed G. Bianchi, Cork, in perfect order."

Lot 217 in Mealy's sale of the contents of Lisdonagh House, near Headford, Co. Galway, 19:7:94 - illustrated.

Banfield 1991, 25 lists V. Bianchi, Dublin, with estimated dates 1820-40.

4014 SAL071 BAROMETER - BANJO

Giovani Binda Cork

H 910; MxD 258; DID 200 (8"). 1846-1852. R.

Mahogany; flat top; plane mirror, glass mercury thermometer, plane mirror, dial, level.

There is light wood stringing around the edge of the housing; both the plane mirror on top (D49) and below (D89) are in ring frames; the thermometer between them is in a glazed round-top frame and has a silvered scale 10-100°; the silvered dial 28-31", in brass-bound glazing, has a blue metal and a brass hand, with an ivory adjusting disc below; a glazed spirit level in the rounded bottom is held in a signed brass disc.

Tudor Galleries, Sandycove, Co. Dublin.

Dates from Burnett & Morrison-Low 1989, 145.

1424 SAL002 BAROMETER - BANJO

JOSH.. CAPPO BELFAST GUARANTEED CORRECT

No measurements available. 1835-1880. F.

Mahogany veneer; scroll pediment; hygrometer; thermometer; mirror; silvered dial; level.

Brass bindings; black convex circular mirror mount between glass-fronted thermometer and dial; red spirit in level below.

Sylvan Nook, Dun Laoghaire, Co. Dublin.

Dates from Burnett & Morrison-Low 1989, 145.

4016 SAL073 BAROMETER - BANJO

C, Gerletti Glasgow

H 975; MxD 252; DID 200 (8"). Mid to late 19 C. G.

Mahogany; scroll top; hygrometer; spirit thermometer; convex mirror; dial; spirit level.

The case has a stringing of pale wood; the (damaged) scroll top has a turned ivory urn in the centre; the glazed hygrometer has a silvered scale 20-0-20 "dry" "damp"; the glazed thermometer is in a frame with a rounded top, and has silvered scale 10-120°; the mirror is in a fluted wood ring frame; the silvered dial, 28-31", is under a glazed brass ring and has blue metal and brass hands, with a brass adjusting disc below; the spirit level in the rounded bottom is in a signed metal disc.

Tudor Galleries, Sandycove, Co. Dublin.

Goodison 1977, 325 lists John and Dominick Gerlati 1849-58; this initial does not seem to be J, G, or D.

4447 SAL085 BAROMETER - BANJO

(S. Grassi Wolverhampton)

H 101. 1833-1834. R.

Rosewood with mother-of-pearl decoration; hygrometer, thermometer; dial 27-31"; spirit level.

"A very fine 19th Century rosewood cased Banjo Barometer with mother-o-pearl seaweed marquetry, by S. Grassi Wolverhampton" - illustrated; flat top with a wooden curved piece above, and a flat bottom.

Lot 106 in Mealy sale of contents of Wellington House, Nenagh, Co. Tipperary, 1:3:94.

Dates of Stephen Grassy [sic] of Wolverhampton from Clifton 1995, 117.

2468 SAL029 BAROMETER - BANJO

A. INTROSS & CO STROOD

H 1040; MxW 313. Mid to late 19 C. G.

Mahogany; rounded top; hygrometer; glass/mercury thermometer 0-120°; dial 28-31"; level.

Hygrometer disc scale 20-0-20 on top; thermometer in rounded frame on shaft, with green scale and large flattened bulb; decorated silvered dial; ivory adjusting knob below this; spirit level at bottom, containing pink liquid, on silvered disc with signature;

Lott 156 in Mealy sale at Evington House, Carlow - illustrated.

Goodison 1977, 352 lists Intross & Co FL 1858, Chatham, with branches in Strood and Rochester Bridge.

2492 SAL041 BAROMETER - BANJO

Malacrida Fecit

L 995; MxW 260. Early to mid 19 C. R.

Mahogany, flower and shell inlay; (damaged) broken pediment; glazed stem thermometer; silvered scale 28-31".

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Glass/mercury thermometer in frame with rounded top, silvered scale 10-110°; no hygrometer above, nor level below - flower inlays at these positions.

Edward Butler Antiques, Dublin.

Banfield 1991,138 lists Charles Malacrida & Co, Dublin and London, w1805-22; Malacrida, Manchester, 1840-60.

4013 SAL070 BAROMETER - BANJO

PORRI DUBLIN

H 963, MxD 270, DID 200 (8"). Mid to late 19 C. G.

Mahogany; scroll top; glazed hygrometer, thermometer, dial and level; mirror.

The double scroll top is damaged; the hygrometer has a silvered scale 20-0-20 "DRY" or "DAMP"; the alcohol-glass thermometer is in a glazed frame with a rounded top, and has scale 20-100°; below this is a plane mirror (some silvering gone) in a fluted brass frame; the silvered dial 28-31" has a blue steel and a brass hand; the glazed spirit level in the rounded bottom is contained in a signed silver plate.

Hamilton, Osborne, King, Dun Laoghaire, Co. Dublin, 5:12:91.

Goodison 1977,350 lists several Porri's, including Benjamim Porri, Skipton, Fl 1834-41, and others undated.

4017 SAL074 BAROMETER - BANJO

M. RHODES. BRADFORD.

H 1043; MxW 345; DID 240 (9½"). c1841. R.

Black painted wood with colourful flower decoration; onion top and bottom; silvered dial.

The dial, 28-31", is under a glazed brass ring, and has blue metal and brass hands, with a brass adjusting disc below; there is no hygrometer, thermometer, mirror, nor spirit level.

Tudor Galleries, Sandycove, Co. Dublin.

Goodison 1977,352 lists Manoah Rhodes, Jeweller, 138 Westgate, Bradford, 1841.

4386 SAL088 BAROMETER - FITZROY

(J. Chancellor, Dublin)

H 890. 1862-1898. R.

Rectangular glazed case; J-tube; thermometer; scale and instructions.

"A 19th Century Admiral Fitzroy rectangular Barometer, signed J. Chancellor, Dublin, in mahogany case" - illustrated.

Lot 216 in Mealy sale of contents of Lisdonagh House, near Headford, Co. Galway, 19:7:94.

Dates from Morrison-Low 1989,122.

2335 SAL018 BAROMETER - MARINE

Unsigned

L 910; Se 46x34. Mid 19 C. G.

Rosewood; round top; glazed ivory scales 27-32"(x2); thermometer; turned brass cistern cover.

Two slides on scales "10a.m.TO-DAY" and "10a.m.YESTER-DAY", moved by turned ivory knob; glass mercury thermometer in glazed rectangular housing on front of the rectangular cross-section stem of instrument, scale 20-120°; on brass gimbal mount.

Lot 169 in Mealy sale at Trudder House, Newtownmountkennedy, Co. Wicklow, 3:10:89 -illustrated.

2484 SAL033 BAROMETER - STICK

BENNETT OPTICIAN CORK

H 910; CiHsD 77. 1810-1867. F.

Mahogany; round top; glazed ivory scale plates 27-31"; thermometer on stem; circular cistern cover.

Slide on scale 1-10, key to move this gone; mercury and glass thermometer in rounded insert, missing frame and glazing, scales "FAHRENHEIT" 0-110° and "REAMUR" -10-0-30°; knob at bottom to adjust mercury level gone, but central pin remains.

Edward Butler Antiques, Dublin.

Dates from Burnett & Morrison-Low 1989,144.

3944 SAL061 BAROMETER - STICK

CHANCELLOR & SON DUBLIN

L 1053. Late 19 early 20 C. F.

Carved oak; pointed top; glazed double silvered scales 27-31"; front thermometer.

Pointed carving above scales; diamond-shaped carved cover over the cistern; the scales have double sliders for yesterday's and to-day's readings; the mercury glass thermometer has silvered scales -10-0-40° "Centigrade" and 10-120° "Fahrenheit".

In Herman and Wilkinson, Dublin sale on 26:9:91.

Morrison-Low 1989,122 lists Chancellor & Son from 1899-1922, but marine compass 1984 MIS032 is dated 1894.

2467 SAL028 BAROMETER - STICK

S.P. COHEN 105 BUCHANAN STT. GLASGOW

H 985; CiHsD 108. 1845-1849. A.

Mahogany; flat layered top; two glazed ivory(?) scales, one with thermometer; circular cistern cover.

Mercury and glass thermometer, scale 0-110°, incorporated in one of the scale plates; barometer scale 27-31", with slider 1-10 moved by ivory disc below the scale housing.

Lot 437 in Mealy sale at Evington House, Carlow, 28:11:89.

Dates from Bryden 1972,46.

4023 SAL075 BAROMETER - STICK

C.W. Dixey Optician to the Queen 3, New Bond Str London

H 930; MxW 112. 1838-1862. F.

Ebony; rounded top; glazed ivory scale plates 27-31"; thermometer; circular cistern cover.

The glazed covers for both the scale plates and the thermometer have gilded frames (the gilding largely gone on the scale plates frame); the ivory scale plates are inclined with the top of the barometer tube between them; one side has the wording: "FAIR Change RAIN Stormy" and the other the scale with a 1-10 slider operated by an ivory disc below; the glass-mercury thermometer on the stem has a long reservoir, and has scales 20-120° "Reaumur" and 0-30° "Fahrenheit".

Lot 581 in Mealy, Castlecomer, Co. Kilkenny. Sale, 26:2:92.

Dates from Banfield 1991,69.

2637 SAL043 BAROMETER - STICK

(J. Gatty Dublin)

No measurements available. 1801-1814. F.

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With thermometer; noted in antique shop in Powerscourt Townhouse, April 1985.

Information from A. Morrison-Low.

Dates from Morrison-Low 1989,124.

4166 SAL083 BAROMETER - STICK

(Hunt Cork)

H 914. Early to mid 19 C. G.

"A George III mahogany stick barometer by Hunt of Cork".

Lot 54 in 6 De Vesci Terrace, Monkstown Sale, by Adams of Blackrock, 20:11:92.

Various Hunts operated in Cork between 1792 and 1895, Burnett & Morrison-Low 1989,149.

3946 SAL063 BAROMETER - STICK

Lee BELFAST

L 925; SHsW 102; CiHsD 110; ThHs 280x42.

1835-1848. F.

Mahogany; round top; glazed ivory scale 27-31"; front thermometer.

The angled scales, one side with the weather indications "VERY DRY SET FAIR FAIR Change RAIN MUCH RAIN STORMY", the other with the reading 27-31", are of grey grained ivory or bone; a slider is operated by a yellow ivory knob just below the scale frame; the mercury glass thermometer is in a round top glazed frame on the stem, with ivory scales 30-110° "FAHRT" and 0-30° "REAU"; the cistern cover is circular.

In Mealy Sale, at Roseboro House, Naas, Co. Meath, 10:9:91.

Dates from Burnett & Morrison-Low 1989,149-50; Lee succeeded by Lee & Son in 1850.

4448 SAL086 BAROMETER - STICK

(Mason, Essex Bridge, Dublin)

H 914. Mid 19 C. G.

"A fine early 19th Century figured mahogany Stick Barometer, with ivory dial."

Lot 830 in Mealy, Castlecomer, Co. Kilkenny, Sale, 14:7:93.

This is presumed to be the same barometer also offered in Mealy 21:9:93, Lot 268.

3945 SAL062 BAROMETER - STICK

F.M. MOORE Dublin & Belfast

L 1040. Mid to late 19 C. F.

Carved walnut; rounded top; glazed double ivory scales 27-32"; no thermometer.

Square cistern cover; there clearly was a thermometer on front, but this is now gone; there are two sliders for the scales to give yesterday's and to-day's readings; there are several legends in red on the scales: "ADD 1-10TH FOR EACH 100 FEET ABOVE THE SEA"; "FOR RISE AFTER LOW FORETELLS STRONGER BLOW"; "LONG FORETOLD LONG LAST SHORT NOTICE SOON PAST"; the case is elaborately carved.

Herman & Wilkinson, Dublin, 26:9:91.

Burnett & Morrison-Low 1989,132&152 list the firm at Dublin and Belfast from 1864-1898, when it became a Limited Company.

2336 SAL019 BAROMETER - STICK

NEGRETTE & ZAMBRA LONDON INSTRUMENT MAKERS TO HER MAJESTY

L 927. Mid to late 19 C. G.

Oak; round top; ivory scale; thermometer.

Scale glazed with 27-31" scale on one side, weather conditions on other; single ivory marker moved with turned ivory knob; turned circular cistern cover; glass/mercury thermometer, scales 20-120° "FAHRENHEIT" and 0-50° "CENTIGRADE" in glazed frame with round top on front of the stem.

Lot 117 in Mealy sale at Trudder House, Newtown-mountkennedy, Co. Wicklow, 3:10:89 - illustrated.

4024 SAL076 BAROMETER - STICK

Unsigned

H 990; MxW 135. Mid to late 19 C. G.

Mahogany; pointed carved top; glazed scale plates and thermometer; circular cistern cover.

The triangular pointed top has a half flower carved within, and there are two urn finials on carved arms at the sides; the ivory plates each have scales 27- 31" and wording: "FAIR Change RAIN Stormy" with 1-10 sliding plates for "10 A.M. YESTERDAY" and "10 A.M. TODAY", adjusted by two turned mahogany knobs below the glass frame; the glass-mercury thermometer on the stem has a long reservoir, and has scales 20-130° "FAHRT" and 0-50° "CENTR".

Lot 582 in Mealy, Castlecomer, Co. Kilkenny, Sale, 26:2:92.

2342 SAL025 BINOCULARS

CURTIS BROS DUBLIN

MnL 152; MxHsD 62. 1893-1897. F.

Blackened brass; leather covers on housings; pull-out hoods on objectives; focus by centre knob; in leather shoulder case with missing lid.

Lot 175A in Mealy sale at Trudder House, Newtownmountkennedy, Co. Wicklow, 3:10:89; sold with Heath telescope 2344 SAL027.

Morrison-Low 1989,123 - firm at 10 Suffolk Street, continued as Dobson & Curtis Brothers.

3849 SAL057 CALCULATOR - TEXTILE

FOWLER'S TEXTILE CALCULATOR TYPE B PATENT FOWLER & CO MANCHESTER

D 86; W 10. Early 20 C. G.

Silver metal thin cylinder case.

The case, which is similar to a pocket watch, has a knob and a hinged ring on top, with another knob at about two o'clock; it has a glass front; the top knob turns a disc scale, with outer divisions 10-90, and inner divisions 1-9, below a radial red line; the other knob turns the glass front, which has a black radial line; outside the outer scale there are inscriptions, including: "COTTON", "WORSTED" "LINEN", with conversions: "Mtrs to Yds", "lbs to Kg", "cm to ins", etc.

Mealy, Castlecomer, Co. Kilkenny, Sale, 29:5:91.

2469 SAL030 CHONDROMETER

De Grave, Short & Fanner; St.. Martin le Grand

BD 71; PvH 173; BmL 288; C 309x126x60.

1845-1871. R.

Brass base, turned pillar, scale 30-70 lbs/bushel, slide weight and container; white metal beam.

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Cylindrical container (one handle support detached); box end to beam with ring for container handle hook; broken mahogany case with Trade Card and directions; instrument "made according to Act of Parliament, January 1st, 1826." Trade Card: "STANDARD SCALES WEIGHTS & MEASURES FOR CORPORATIONS DE GRAVE, SHORT, & FANNER, Late M DE GRAVE & SON, 59, ST. MARTIN LE GRAND, LONDON. Scale Makers to Her Majesty's Exchequer, ROYAL MINT, GENERAL POST OFFICE, and the Afsay Office, Goldsmith's Hall. SCALES & WEIGHING MACHINES OF EVERY DESCRIPTION, WITH ENGLISH & FOREIGN WEIGHTS, FOR EXPORTATION. Scales, Weights &c kept in repair by the Year."

Lot 186 in Mealy sale in Evington House, Carlow, 28:11:89.

Hackmann 1985,88 records that the firm at this address exhibited at the 1851 London Exhibition.

Dates from Clifton 1995,81.

2340 SAL023 CHRONOMETER - MARINE

Glashütte 9223

HsMxD 122, W 73; DIsD 91,35,21. Late 19 C. G.

Brass; cylinder housing; gimbal ring; silvered dials I-XII, 10-60, and 0-50 "AUF - "AB".

Catalogue describes this as: "A 36 hour brass Ship's Chronometer, with fusee movement".

Lot 184 in Mealy sale at Trudder House, Newtown-mountkenedy, Co. Wicklow, 3:10:89.

Not in Baillie 1947 nor Clutton 1982.

3524 SAL047 CLOCK/BAROMETER/THERMOMETER

Ralph Walsh DUBLIN.

H 2100; MxW 530; DID 355. Mid 19 C. G.

Rosewood longcase clock with carved decoration; inset mercury barometer and glass spirit thermometer.

The clock case has a rounded top with foliage decoration, and with two small urns at the top sides; the white face has roman hours, and a small (D90) seconds dial at XII hours; the mercury barometer is set in the glazed door; it has a silvered face (D192) with scale 28-31", and a brass glazed cover; the thermometer is in a glazed rectangular housing below the barometer face; it has a red spirit indicator and silvered scale 20-120°; the pendulum has a flattened circular metal bob, with a metal and wood stem; there are two brass cylinder weights with six-spoke pulley wheels on top.

Lot 76 in Mealy's sale at Shankill Castle, Co. Kilkenny, on 24:10:90 - illustrated.

Fennell 1963,38 gives dates 1828 and c1870.

3526 SAL049 CLOCK/COMPASS/THERMOMETER

W. GIBSON & CO MANUFACTURED IN PARIS

Hs 195x148x121. Early 20 C. G.

Large brass striking carriage clock; exposed escapement; inset compass and thermometer above.

Glazed gilt face with hours 1-12, and jewelled escapement in front of face at 12 hours; swing brass handle above housing; on top of housing is a glazed arc (D60) glass mercury thermometer 10-0-40° "REAMUR" and 20-120° "FAHRENHEIT", with central glazed silvered face compass (D35) 20-360°, having four marked cardinal points, and magnetic variation.

Lot 111 in Mealy sale at Shankill Castle, Paulstown, 24:10:90.

4138 SAL080 COMPASS

W. & S. JONES *LONDON*

Hs 79x77x21; DID 58. 1791-1859. R.

Hinged mahogany case; brass framed glazed compass with paper card; 31 directions and fleur-de-lys.

The edge is divided 0-90-0-90-0°; the needle is missing; a pin driven mechanism clamps the needle when the housing is closed.

Lot 269 in Mealy Sale at Kenyon, Dublin, 8:7:92.

Dates from Clifton 1995,155.

4136 SAL078 DIAL - DIPTYCH

Fecit Ephraim Senecal Dieppe

89x82x16 (closed). c1700. R.

Ivory tablets; equinoctial and polar dials; lunar and solar volvelle; horizontal dial and compass; perpetual calendar.

The two hinged ivory tablets have black foliate decoration; on top is a clock face with hours I-XII (x2) and, across its centre, curved arcs with hours 8-12-4; on the inside top is a pewter volvelle, marked 0-24 50 62 72 82 93, with its lip reading hours I-XII (x2), then a circle of days (eg 10-20-31), then months; a linear scale at the side of the ivory leaf reads 10-90, and a (broken) string gnomon leads to the lower leaf; the inside bottom leaf has horizontal dial markings on the ivory VI-XII-VI, with "78" and "45" between the two VI hour marks; within this is a glazed depression, containing a compass, and a decorated pewter arc reading hours VII-XII-V, on top of a pewter plate with a table of towns with their latitudes, including Dijon, Rochelle, Limoges, Toloufe, Troyes, together with other information; on top of the plate is an arc of angles 40-0-40°; on the bottom is a pewter perpetual calendar surrounded by months and then days, with the signature; the calendar reads: 5 7 4 12 6 3 11 2 10 0 1 9 0 0 8 1 2 3 4 5 6 7 8 9 [10][11] 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 0 0 0 0.

Lot 271 in Mealy Sale at Kenyon, Dublin, 8:7:92.

Bryden 1988,117 is a Senecal dial, dated about 1700.

4007 SAL064 DIAL - HORIZONTAL PEDESTAL

(James Davy Martinstown 1777 Dublin Fecit)

No measurements available. 1777. S.

Bronze; octagonal.

Christies and Hamilton Osborne King sale at Castletown Cox, Co. Kilkenny, September 1991.

4012 SAL069 DIAL - HORIZONTAL PEDESTAL

P. Lacy

165x167; GnH 92. Mid to late 19 C. G.

Slate; pattern of reducing squares; hours 4-12-6; 48° bronze gnomon with S insert.

Between the outer two squares (Sis155&130) are the hours; then quarter hour divisions (Sis130&119); then half hour divisions (Sis119&90); then hour divisions (Sis90&58); the simple dial sits on a chimney-pot pedestal.

Lot 773 in Mealy, Castlecomer, Co. Kilkenny, Sale 19-20:11:91.

2337 SAL020 DIAL - HORIZONTAL PEDESTAL

RD.. MELVILLE Fecit. A.D. 1840. For Latitude 54.36.

459x329; DIs 238 & 118(x4). 1840. S.

Slate; large central dial IV-XII-VIII hours; four small dials "NEW YORK ALEXANDRIA BOMBAY SIDNEY".

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Brass gnomons (four small ones replacements); inscriptions include "Tempus Fugit", "Solar & Lunar Eclipse", with diagrams for "Phases of the moon" and "Theory of the tides"; smaller dials also inscribed - "Morning", "N. America" 11-12-3 hours, "Afternoon" "Egypt Africa" 6-12-10 hours, "Evening" "SE(?) Asia" 9-12-1 hours, "Night" "Van Deimans Land" 2-12-6 hours.

Lot 176 in Mealy Sale Trudder House, Newtownmountkenedy, Co. Wicklow, 3:10:89.

The Royal Museum of Scotland purchased a pedestal horizontal dial (NMS T1987.134) dated 1871, Sotheby 23:6:87, Lot 151, with address: 9 Lower Wellington Street, Dublin. Sotheby 5:10:89, Lot 433, was another slate dial, signed: "Richd. Melvin Maker from London".

Clarke 1989,210-215 gives details of Richard Melville or Melvin, in Ireland, England and Scotland, 1838-71.

4137 SAL079 DIAL - UNIVERSAL EQUINOCTIAL

L.T.M. (Initials of L.T. Müller)

W 53x50; CD 69. Pre 1770. PC.

Decorated gilt brass irregular octagon; glazed compass insert; hinged hour ring, gnomon on diameter; case.

The turned rosewood case is missing its lid; the inset compass has eight hatched triangles on its silvered face; the hinged ring has hours III-XII-IX, with a pin gnomon on its diameter; at the side is the hinged limb to adjust the angle of the hour ring for the latitude; on the bottom of the dial are engraved towns with their latitudes "Elev. Pot.": Lisbon 39, Rome 42, Vened 45, Wien Augsp 4X, Nürnberg, Regensp 49, Prag 50, Warfch 52, Moscou 57 (some of the numbers are hidden).

Lot 270 in Mealy Sale at Kenyon, Dublin, 8:7:92.

Mary Holbrook (PC) gives dates c1710-1770 for Müller - see entry 2366 NMD071.

1421 SAL004 ELECTROMETER - LINDEMANN

Cambridge Scientific Instrument Company

No measurements available. Early 20 C. G.

Iron base; pillar to brass telescope; mount to cell with contacts; lens.

Lens on adjustable limb on other side of cell from telescope; latter focused by lever and rack; precise wording of signature not confirmed.

Adams of Blackrock, April 1987.

1721 SAL008 GLOBE - CELESTIAL

Made by D. Adams, Charing Cross, London 1798

D 330 (13"). 1798. S.

Stand missing; with matching Terrestrial Globe.

"To His Most Sacred Majesty George III, this new Celestial Globe containing all the Southern constellations lately observed at The Cape of Good Hope and all the stars...is most humbly inscribed by His Majesty's most dutiful and obliged servant G.[sic] Adams, made by D. Adams only optician and globe manufacturer, west side of Charing Cross, London 1798".

Lot 31 at Christie's and Hamilton Osborne King Sale at Mountainstown, Navan, Co. Meath, 28:9:88.

1720 SAL007 GLOBE - TERRESTRIAL

Made by D. Adams Charing Cross, London, 1796.D330 (13"). 1796. S.

Turned ebonised legs; "distressed".

"To His Most Sacred Majesty George III, King of Great Britain, This New Globe of The Earth correctly laid down according to the best observations and latest discoveries is most humbly inscribed by His Majesty's most dutiful and obliged subject and servant Dudley Adams, Made by D. Adams only globe maker to The King and Optician to His Royal Highness The Duke of York, Charing Cross, London, 1796".

Lot 31 at Christie's and Hamilton Osborne King Sale at Mountainstown, Navan, Co. Meath, 28:9:88.

4141 SAL082 GLOBE - TERRESTRIAL

Manufactured by Gilman Joslin, Boston 1860

Sp 295; H 445; GD 300. 1860. S.

Four turned boxwood legs with cross bars to horizontal ring; plaster globe; brass meridian ring.

The horizontal ring records months, constellations, and compass directions; the brass ring is divided 80-0-80° and 10-90-10°; the plaster of the globe is in distressed condition; on the globe is "AN ANALEMMA", and the legend: "Lorino's TERRESTRIAL GLOBE Containing all THE LATE DISCOVERIES AND Geographical Improve-ments. also the Tracks of the most celebrated Circum-navigators. Compiled from Smith's new English Globe with additions and improvements by Annin & Smith. Revised by G.W. Boynton."

Lot 572 in Mealy Sale at Kenyon, Dublin, 8:7:92.

4390 SAL090 GLOBE - TERRESTRIAL

(Rand McNally, Chicago, New York)

H 508; GD 305 (12"). Early 20 C. G.

Table globe on cast brass tripod base.

Lot 358 in Mealy sale, Lisdonagh House, near Headford, Co. Galway, 19:7:94.

Only small distant illustration, so dating uncertain; maker not listed in Dekker, 1993.

3523 SAL046 HYDROMETER - BATTERY TESTING

YEATES & SON LD. DUBLIN. TEMP 60°F.

L 250; W 16; TuD 6. Late 19 C. G.

Glass; flat paddle-shaped bulb with lead-shot weight, held with blue resin; paper scale 1100-1300.

The rolled scale is held in the tube stem above the paddle.

With a similar hydrometer "THE D.P. BATTERY CO LTD BAKEWELL", scale 1150-1250 (L231;W19;TuD4½), with red resin.

A third small hydrometer is of more usual shape, with a cylinder bulb, (L97;BuD13;TuD5), ""Break Not" BATTERY TESTER", also with red resin.

All three were in a blue cardboard cylinder case (L291;D29).

Lot 574 in Mealy's sale at Shankill Castle, Co. Kilkenny, 24:10:90.

4028 SAL077 HYDROMETER - SIKES

BUSS 48. HATTON GARDEN LONDON RE-ADJUSTED BY JAMES FOX & CO DUBLIN. BROWN 76 ST VINCENT ST GLASGOW

L 165, D 36; ThS 177x25; C 205x95x56. 1896-1914. A.

Gilt brass; mahogany case.

Scale on hydrometer stem 0-10; nine disc weights 10-90 plus cylinder scale cap; hydrometer signed: "BUSS 48. HATTON GARDEN LONDON No 43628 SIKES P51""; the glass-mercury thermometer, with front scale 30-100° and back scale 30-110°, has brass fittings, and an ivory scale plate, the latter signed: "BROWN 76 ST VINCENT ST GLASGOW"; the mahogany fitted case, lined with red velvet, has an unsigned ivory plaque on the top centre, with a smaller ivory plaque added later, which is signed: "RE-ADJUSTED BY JAMES FOX & CO DUBLIN.".

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Lot 34 in Hamilton Osborne King Sale in Blackrock, Co. Dublin, 29:4:92.

Dates from Crawford 1988,5 and Downing 1988,17; Fox & Co. not in Burnett & Morrison-Low 1989; Brown not in Bryden 1972.

3943 SAL060 HYDROMETER - SIKES

SIKES'S HYDROMETER No 7597 DRING & FAGE 145 STRAND LONDON MAKERS TO THE GOVERNMENT

L 178; C 204x61x51. Third ¼ 19 C. AG.

Gilt brass; 10 weights.

Scale on stem 0-10; nine disc weights 10-90 plus one cylindrical cap weight; the hinged mahogany case has an ivory signature plaque, signed as above plus Royal Arms; the hydrometer is signed: "No 7597 DRING & FAGE LONDON P CUSTOMS"; in hinged lined mahogany case. Herman & Wilkinson, Dublin, Sale, 26:9:91.

Dring & Fage were at this address from 1862-1902, Anderson 1990,24-5, Crawford 1988,6 - this looks early.

3942 SAL059 HYDROMETER - SIKES

SIKES'S HYDROMETER JAMES FOX & CO DUBLIN No 25979

L 165; C 204x97x54. Late 19 C. G.

Gilt brass; scale 0-10; nine disc and one cap weights; glass mercury thermometer; case.

The mahogany hinged case, lined with purple velvet and silk, has an ivory signature plaque on top: "SIKES'S HYDROMETER JAMES FOX & CO DUBLIN"; the stem of the hydrometer is signed: "No 25979 SIKES JAMES FOX & CO DUBLIN"; the rectangular ivory scale of the thermometer is signed: "JAMES FOX & CO DUBLIN", with the scale 30-100°; the disc weights run from 10-90.

Herman & Wilkinson, Dublin, Sale, 26:9:91.

2620 SAL001 INHALER

IMPROVED INHALER DR NELSON'S PRINCIPLE MANUFACTURED BY LYNCH & CO. 171A. ALDERSGATE ST. LONDON.

H 263; MxW 150. 1880. A.

White ceramic; pear shape; with another smaller inhaler.

Curved ceramic pipe at side of body; another glass pipe in cork on top; smaller inhaler similar, but missing the glass pipe, and without maker's name (H139 MxW100) with "DR. NELSON'S IMPROVED INHALER" and directions on side.

The larger inhaler is inscribed: "DIRECTIONS FOR USE Saturate the Sponge in hollow of Mouthpiece with medicament to be inhaled and replace in receptacle, fit Mouthpiece accurately into Earthen Vessel which should be threeparts [sic] filled with Water heated to steaming point, then Inhale and Exhale through aperture of Glass tube. N.B. When no medication is required remove the Sponge altogether."

The directions on the smaller inhaler read: "DIRECTIONS FOR USE REMOVE MOUTHPIECE:- HALF FILL INHALER WITH BOILING WATER. DROP REMEDY ON SPONGE OF MOUTH-PIECE - APPLY LIPS TO IT - BREATHE FREELY IN & OUT AS IN ORDINARY FULL RESPIRATION - WHEN ONLY THE VAPOUR OF HOT WATER OR ANY INFUSION IS DESIRED REMOVE THE SPONGE FROM MOUTHPIECE --".

Mealy, Castlecomer, Co. Kilkenny, Sale, January 1990.

Date from Downing 1988,79.

1719 SAL006 INSTRUMENT COMPENDIUM

(MADE BY Sam Yeates, N.29 Capel Street, Dublin.)

H 1168. (H1220, W 510, De 140) 1795-1810. A.

Mahogany; broken pediment; three circular dials for wind direction/barometer/clock.

The wind direction dial with 16 points is on top; below is a convex mirror; below on left the signed barometer dial; on this level also the clock I-XII; between these, a mercury glass thermometer with a rectangular scale plate; at base, a spirit level; all dials are brass-bound with glass fronts; geared mechanism mounted in the wall for the wind gauge.

Christie's and Hamilton Osborne King Sale at Mountainstown House, Navan, Co. Meath, 28:9:88.

The same instrument, now restored, was offered for sale at Mallet's at Bourdon House, 2 Davies Street, London W1Y 1LJ, in 1993. An urn has been placed at the top (at the centre of the broken pediment), a hygrometer has been added (where there appeared to be a convex mirror), the hand of the wind gauge (missing) and the rectangular glass in front of the spirit level (broken) are replaced, a turned ivory plus two turned brass(?) keys have been added. The description is: "The Yeates Instrument Compendium An important Irish late 18th century wall mounted instrument compendium with ebony stringing and broken pediment top, containing a barometer, clock, thermometer, wind gauge, hygrometer and spirit level."

Dates from Morrison-Low 1989,139.

3521 SAL044 LEVEL - SPIRIT

BESTPROVEDELEVELTUBE [sic] WARRANTED BOOTH BROTHERS' MECHANICAL TOOL WAREHOUSE, 63, UPPER STEPHEN STREET, DUBLIN.

Hs 305x42x24; StMxH 1358; C 839x146x124.

Late 19 C. G.

Brass bound mahogany housing; folding tripod.

The glass level, with yellow spirit, is set below a brass plate above the mahogany housing, which has another brass plate underneath; attached to two pivots at the bottom centre of the housing is a brass bracket, below the housing, with brass knurled adjusting screws at each end to alter the level angle; a central pin in this bracket fits into a corresponding sleeve on top of the folding tripod stand, which is made of wood with brass fittings; the instrument is contained in a boxwood case, which has a green "BOOTH BROTHERS" Trade Label in the inside top of its lid.

Lot 570 in Mealy's Sale at Shankill Castle, Paulstown, Co. Kilkenny, 24:10:90.

3522 SAL045 LEVEL - SPIRIT

H. McNEILL & CO DUBLIN WARRANTED

Hs 258x35x17(Mx). Late 19 early 20 C. G.

Brass bound mahogany housing; glass spirit level below brass plate; small perpendicular level.

The brass plate, which is widest at its centre, covers the whole of the top of the housing; only the ends of the housing are covered by brass plates on the bottom; there is a hole (D16) at one end of the housing which holds a small glass spirit level at right-angles to the larger one on top.

Lot 574 in Mealy's Sale at Shankill Castle, Paulstown, Co. Kilkenny, 24:10:90.

4140 SAL081 LEVEL - SPIRIT

MARSHALL GLASGOW WARRENTED

Hs 235x23x19. Early 20 C. G.

Oak frame with brass top plate and two brass tips on the bottom; glass level under double window on top.

Lot 574 in Mealy's Sale at Shankill Castle, Paulstown, Co. Kilkenny, 24:10:90.

Marshall not listed in Bryden 1972.

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4011 SAL068 LEVEL - TELESCOPIC

I. Pallant London (Owner - P. McCann, Dublin)
H 173; MnL 356; C 385x200x123 1839-1869. R.
Black enamelled brass; two disc four screw base; compass under tube; spirit level on top; case.
The compass (now detached) has a signed silver ring scale 10-350°; rack and pinion eyepiece focus; hinged objective lens flap; the level is in a fitted mahogany case with a brass plaque on top: "P.. Mc..Cann C E Dublin", which has a damaged hinge, and the hand-written number 43601.
Lot 377 in Mealy Sale, Castlecomer, Co. Kilkenny, 19-20:11:91.
Clifton 1995,206 lists John Pallant from 1839-1869.

2486 SAL035 LEVEL - Y

TROUGHTON & SIMMS LONDON. (REPAIRED & ADJUSTED BY W.F. STANLEY, GREAT TURNSTILE, HOLBORN, 9.5.99 22-1-1902)
L(-E) 384; H 195; C 428x222x184. Late 19 C. G.
Brass and oxidised brass; spirit level below tube.
Tribach base; bottoms of level screws clamp into three-arm piece with screw-thread hole in centre for stand; clamping and tangent screws on tribach; platform above with spirit level over its full length; two Y-brackets from ends of platform to hold telescope tube; rack and pinion eyepiece focus; objective lens flap; in fitted mahogany case; label inside lid records Stanley adjustments.
Edward Butler Antiques, Dublin.

2485 SAL034 MARINE AZIMUTH INSTRUMENT

KELVIN & JAMES WHITE LIMITED GLASGOW LORD KELVIN'S (SIR Wm THOMSON) PATENTS No 8151
B 225x55 (MxW 88); H 137; C 259x175x115.
Turn 19/20 C. R.
Oxidised brass; collimator; revolving prism.
Open frame base, circular bubble level at one end; on other end of base, angled tube with lens leading to a revolving prism, and two revolving semicircle shades; in mahogany case with printed instructions inside lid: "INSTRUCTIONS FOR THE USE OF LORD KELVIN'S AZIMUTH MIRROR Makers - KELVIN & JAMES WHITE, Ltd., 16 to 20 Cambridge Street, Glasgow."; engraving shows use on top of marine compass.
Edward Butler Antiques, Dublin.
Clarke 1989,271 illustrates this type of instrument (No 3616 c1890) and an earlier version (No 4395 c1895) and notes that it was for use with an eight inch Kelvin-type dry card compass; Clarke et. al. add: "The patents referred to are U.K. patents nos 5676 of 1883 and 8959 of 1890, although the instrument [No 4395] is of the design specified in the earlier patent. The modified design, which had a T-shaped base which spanned the compass glazing so that the breaking of its glass during the firing of heavy guns &c is prevented, was added to the specification of Thomson's 1890 patent, although the model was being made at an earlier date."
The instructions state: "BEARINGS can be taken with this instrument in two ways: - (1) By looking direct at the object over the top of the prism. The degrees of the card reflected in the prism are then seen close below the object; (2) By looking through the lens at the degree divisions of the compass card, and at the image of the object in the prism which is seen on the proper degree on the card."
Firm took this name in 1900, Bryden 1972,59 - continued use of Wm Thomson suggests early date.

3846 SAL054 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 163195
FoW 115, D 142; MnH 282; C 333x203x173. 1914. D.
Black enamelled Y-foot; brass pillar, support and tube; double nosepiece; case.
A pivot on a support from the foot holds the rectangular oxidised brass stage and the brass pillar, which has a fine-focus knurled knob on top; a support from this holds the tube, which has a double-knob coarse-focus; under the stage is a condenser and a pivoting mirror; in a boxwood case with a spare eye-piece and two objective lens tubes "No3" and "No6"; the case has a label with details of "Objectifs", and date "31,III,1914."; with addresses: "Berlin N.W. Luisenstrasse 45. St. Petersburg Woskressenski 11; New-York 30 East 18th Street; Francfort s.M. Neve Main- zerstr. 24. London W.C. 18 Bloomsbury Square."
Also a boxwood box (210x112x60) of slides, with eight trays, each holding six histology slides (only two missing), signed: "FLATTERS & GARNETT LTD. 309, OXFORD RD, MANCHESTER".
Mealy, Castlecomer, Co. Kilkenny, Sale, 29:5:91.

2338 SAL021 MICROSCOPE - COMPOUND

PILLISCHER LONDON 12895
MnH 273. Late 19 early 20 C. G.
Brass, with black enamel; V-foot; tapering pillar to limb pivot; mirror, stage, and tube on bracket.
Rotating double mirror on semicircular mount; stage has two white-metal clips for slides; tube on right-angled bracket on top of limb; focus by rack and pinion with two knurled knobs just above the pivot; objective in brass screw tube; in boxwood case; 14 glass slides in cardboard box.
Lot 175 in Mealy Sale at Trudder House, Newtown-mountkennedy, Co. Wicklow, 3:10:89.

3844 SAL052 SECTOR

MOORE DUBLIN & BELFAST
MxL 305; MxW 36; HiD 15 Third ¼ 19 C. G.
Ivory, with silvered disc hinge; variety of parallel and angled scales.
In an unsigned mahogany cased set of drawing instruments, lined in purple silk, and with a tray lined with purple velvet; instruments include compasses/dividers, with pen and pencil inserts, a pen with a turned ivory shaft, a cylindrical ivory lead holder, and an ivory scale with lines of equal parts and with one end cut in a bracketed curve
In Mealy, Castlecomer, Co. Kilkenny, Sale, 29:5:91.
F.M. Moore in Dublin and Belfast from 1864, Burnett & Morrison-Low 1989,132&152; for instruments see Pike 1856,1,15-35.

3525 SAL048 SEXTANT

Heath & Co..Ltd..Crayford London S.E. 23393 JOHN PARKES & SONS, 11 St. George's Crescent, Liverpool.
L 225; W 232; R 170. 1894. D.
Oxidised brass bell pattern; Parkes Label.
The frame has a central bell shape with a boxwood handle below; the index arm has a window vernier, with tangent and clamping screws, and a pivoted magnifier, to read the silver on brass scale 0-140; the horizon mirror has "HEZZANITH PATENT No 15917" stamped on its base mount; there are four grey shades of different degrees of darkness pivoted between the index and horizon mirrors, in square frames with a rounded corner; the objective has a rack and pinion focus, and there

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are three brass telescopes; the brass-bound case has an ivory "HEZZANITH" plaque, with the rest of the lettering rubbed out; inside the lid is a Kew certificate, dated August 1894.

Pasted on the side of the case is a Trade Label: "JOHN PARKES & SONS, Chronometer Makers to the Admiralty, COMPASS ADJUSTERS, OPTICIANS, ADMIRALTY CHART AGENTS, 11 St. George's Crescent, LIVER-POOL. TELEPHONE No 4535 BANK", with the address stroked out and with a red stamped new address: "16, SOUTH CASTLE STREET".
Lot 571 in Mealy's Sale at Shankill Castle, Paulstown, Co. Kilkenny, 24:10:90.

2470 SAL031 SEXTANT

HEATH & CO LTD. NEW ELTHAM LONDON U638 RD 517156

R 185 [6½"]; MxW 250; C 281x267x136. 1907. RD.

Brass; bell pattern; silver scale 0-150; spring clamp and tangent screw on index arm; four and three shades.

Four square index mirror shades, three circular horizon glass shades; four telescopes; mahogany fitted case; card on inside lid notes it was examined and found satisfactory by: "S. Smith & Sons (England) Ltd KELVIN HUGHES DIVISION" on 23:7:1964; ivory plaque on side of case records: "20th CENTURY MARK 1 SEXTANT"; owner's initials on brass plaque on top: "R.H.G-S."

A brass plaque near the vernier on the index arm has an inscription which is somewhat rubbed off by cleaning, but appears to read: "HEZZANITH ENGLAND"; the RD number is stamped on the reverse; there is a hole in the handle which is used to secure the instrument in its box, from which it must be released by a button at the edge of the case; Bennett notes that the same hole in the sextant illustrated (1987,181) is for mounting on a stand.

Lot 584 in Mealy Sale, Evington House, Carlow, 28:11:89.

2489 SAL038 SEXTANT

Sewill, Maker to the Royal Navy, Liverpool

R 166; MxW 234. Third ¼ 19 C. G.

Brass; three circle frame; silver scale 0-150, pivoted magnifier; three telescopes; four and three shades.

Four index mirror and three horizon mirror shades, all circular; tangent and clamping screws on index arm, which is strengthened with a central perpendicular bar.

Edward Butler Antiques, Dublin.

Clifton 1995,249 lists John Sewill in Liverpool between 1837 and 1900+.

2493 SAL042 SHIP'S LOG

T. WALKER PATENT HARPOON SHIP LOG A2 London

No measurements available. Third ¼ 19 C. G.

Brass; four fins; conical front with tow ring; three scale needles reading to 1, 10, and 100 on white back.

Signature is somewhat unclear; fin has "T.W." and an anchor in a circle.

Edward Butler Antiques, Dublin.

Edward Massey patented his mechanical log in 1802, and took out further patents up to 1857; his nephew, Thomas Walker continued his firm after his death, and patented a mechanical sounder in 1866 - Turner 1983,266&268.

2341 SAL024 SHIP'S LOG REGISTER

WALKER'S PATENT "CHERUB" (MARK II) SHIPS LOG 900

MxD 100; L 263. Late 19 C. G.

Brass housing; pivoted mount; black writing on white dial

10-100; smaller dial below 0-9 "1 MILE".

Lot 183 in Mealy Sale, Trudder House, Newtown-mountkennedy, Co. Wicklow, 3:10:89.

Edward Massey patented his mechanical log in 1802, and took out further patents up to 1857; his nephew, Thomas Walker continued his firm after his death, and patented a mechanical sounder in 1866 - Turner 1983,266&268.

1420 SAL005 SPECTROSCOPE - TABLE

YEATES & SON

TH 223; TD 243; TeL 160; CIL 140. Third ¼ 19 C. G.

Iron tripod base; tapering brass pillar; six-spoke scale circle; identical to 2487 SAL036.

Silvered scale; fixed brass collimator; moving brass telescope, rack and pinion focus, vernier at base to read scale; raised oxidised brass prism table with added right-angle support screwed on; brown-coloured base.

Recognised as from UCD Physics Department, but sale not challenged.

Adams Blackrock, 1986.

2487 SAL036 SPECTROSCOPE - TABLE

Unsigned - attributed to Yeates & Son, Dublin

Sp 222; CrD 242; CrH 200. Third ¼ 19 C. G.

Red painted iron tripod base; tapering brass pillar to six-spoke scale circle; identical to signed 1420 SAL005.

Circle scale 0-350°; raised oxidised brass prism table on this, with detached right-angled bracket; telescope has vernier below its mount to read the circle, and is focused by eyepiece rack and pinion; collimator has push focus and screw to adjust one of the two slit plates.

Edward Butler Antiques, Dublin.

3681 SAL051 SPYGLASS

(Bleuler, London)

MxL 100. 1790-1829. R.

"AN IVORY TELESCOPE OPERA GLASS with rolled gold mounts, by 'Bleuler', London"; in original leather case.

Lot 474 in Mountainstown House Sale, Navan, Co. Meath, 28:9:88.

Taylor 1966,280 records that John Bleuler (1757-1829) succeeded to the business of Thomas Whitford in 1791; a dated microscope by him (1788) is known, as are a sextant and an ivory thermometer.

Tesseract 30,1990,16 notes that Bleuler had apprenticed to Henry Shuttleworth, himself a onetime apprentice to John Cuff; Clifton 1995,32 gives dates 1790-1829.

Lot 475 comprised a pair of mother-of-pearl opera glasses, an ivory reading glass, a brass two-stage magnifier, and a gilt metal pocket compass, in fitted cases.

1994 SAL016 STANDARD VOLUME - IMPERIAL

BAIRD & TATLOCK, GLASGOW & EDINBURGH 1898 62°F 4707 IMPERIAL STANDARD QUARTER GILL COUNTY OF LANARK

D 38; H 54. 1898. S.

Brass cylinder; some date stamps.

Anthony Antiques, Dublin.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3527 SAL050 STANDARD VOLUMES - IMPERIAL

AUSTEN & SON CORK IMPERIAL 94 NORTH MAIN STREET

BD 161-51; H 287-72. Mid 19 C. G.

Pewter; seven jugs with handles at side and tapering lips on top; from gallon to half-noggin.

The largest "GALLON" has the signature: "MUNSTER IRON CO. CORK 94 NORTH MAIN STREET", the others are signed: "AUSTEN & SON"; the smallest has no volume marked; the others have: "½ GALLON", "1 QUART", "1 PINT", "1 HALF PINT", "1 NOGGIN".

Lot 103 in Mealy's Sale at Shankill Castle, Paulstown, Co. Kilkenny, 24:10:90 - illustrated.

1992 SAL014 STANDARD VOLUMES - IMPERIAL

LANARK COUNTY COUNCIL DE GRAVE SHORT & CO LTD LONDON

D c50-c225; H c45-c235. Early 20 C. R.

Brass cylinders; eight - 2 gallons to ½ gill; wood handles on two largest.

Handles on arms from bases; 2 gallons; gallon; ½ gallon, quart, pint, ½ pint; gill; ½ gill; all stamped 4707; portcullis and crown (G V I R & E R) date stamps 1937-1956.

Anthony Antiques, Dublin.

Crawforth 1979,147 notes that the firm was absorbed by W. & T. Avery in the early 20th century.

1995 SAL017 STANDARD VOLUMES - IMPERIAL

Unsigned (12 S e 29 C23 stamped on gallon jug)

BD 101-300; H 107-364. Early 19 C. G.

Copper jugs with handles and lips; six - 2 gallon to ½ pint; claimed to be Irish.

Only gallon jug has stamped markings on a lead disc on the lip; two smallest have ribbing around base so are not part of original set; 2 gallon, gallon, ½ gallon, (¼ gallon - not marked), pint, ½ pint.

Anthony Antiques, Dublin.

3848 SAL056 STANDARD VOLUME - PINT

MUNSTER IRON CO CORK 94, NORTH MAIN STREET 1 PINT

BD 92; H 154; ToD 54. Mid 19 C. G.

Pewter jug vessel; widens from the base to the bottom of handle, then narrows.

The narrowest part is the neck, and the top is tapered above this; the signature is stamped on the base around a lion on a crown.

In Mealy, Castlecomer, Co. Kilkenny, Sale, 29:5:91.

1989 SAL011 STANDARD WEIGHT - IMPERIAL

Unsigned Standard Weight COUNTY OF LANARK NO 3 56lb

D 170; H 230; C 294x270x310. Mid 19 C. G.

Brass; spherical; 56lbs; handle on top from one side to other; red-painted wood case.

Anthony Antiques, Dublin.

1990 SAL012 STANDARD WEIGHTS - IMPERIAL

BURGH OF AYR R.B. Bate, No.17. POULTRY, LONDON 1824

D 170-7; H 230-7. 1824. S.

Brass spherical; 11 - 56, 28, 14lbs - handles; 2, 1lb, 8, 4, 2oz, 8, 2, 1dr - knobs; three cases.

Largest weight inscribed: "BURGH OF AYR BATE LONDON 56 PD AVS 1824"; trade label in case reads: "R.B.Bate, Mathematical Instrument Maker, Wholesale, Retail & for Exportation, No.17. POULTRY, LONDON."; card reads: "Custodian. Robert Adam Inspector of Weights & Measures Town Buildings Ayr"; date stamps to 1948; cases for 56lb weight; for 28 and 14lbs; and for eight smallest weights.

Anthony Antiques, Dublin.

1993 SAL015 STANDARD WEIGHTS - IMPERIAL

H. Pooley & Son Ld Birmingham 3359 Standard Weights 7lb to ½ Grain. COUNTY OF DUMBARTON.

D 21-83; H 28-125; C 396x202x165. Early 20 C. G.

Spherical brass; seven left - 7lb-2oz.

Largest weight has handle, others have knobs; 7, 4, 2, 1 lb, 8, 4, 2 oz; brass plaque on brass-bound mahogany case; date stamp 1920.

Anthony Antiques, Dublin.

1991 SAL013 STANDARD WEIGHTS - IMPERIAL

Unsigned COUNTY OF LANARK 1860 1906

BD 46-190; H 92-330; C 662x390x248. 1860. S.

Turned brass with handles; seven - "56lb AVOIR" to 1lb(?); case; date stamps to 1923.

Card on lid of case reads: "Weights and Measures Office, 3 HAMILTON ROAD, Cambuslang,...19...No 1308" - the number hand-written; the 1860 is engraved on the front of the base, and the 1906 in the centre of the pillar of each weight.

Anthony Antiques, Dublin.

4010 SAL067 TELESCOPE - REFRACTING

BANKS 440 Strand LONDON

Sp 334; PvH 355; TuL 953. D 66&31; LeD 55.

1795-1804. A.

Brass; folding cabriole legs; tapering pillar to pivot; bracket to tube; single tube support.

The main tube has a crudely attached eyepiece tube; the tube support is adjusted by a pinion and knob rack, and runs from the eyepiece end of the main tube to the base of the pillar; objective lens cover.

Lot 382 in Mealy, Castlecomer, Co. Kilkenny, Sale, 19-20:11:91.

Lot 378 was a hand-held refracting telescope (L390-914) with a brass-bound mahogany outer tube, plus two brass draw tubes (mid to late 19 C. G).

Dates for Robert Ban(c)ks from Clifton 1995,16.

1422 SAL003 TELESCOPE - REFRACTING

CARY LONDON

L c170; D c130. Mid to late 19 C. G.

Brass; drawpiece at eyepiece end focused by knurled knob.

Small flap covers eyepiece lens; two strengthening bands around main barrel; no objective cover nor stand.

Denis Drum, Malahide, Co. Dublin, 3:9:1987.

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4009 SAL066 TELESCOPE - REFRACTING

DOLLOND LONDON (G. Dollond, 59 St. Paul's Church Yard)

Sp 360; TasH 423,498,640; TuL 1180(1485) LeD 66.

1813-1851. F.

Brass; tripod cabriole legs; complex alt-azimuth adjust; two telescopic tube supports; finder.

The folding cabriole legs have holes above their pad feet into which the two telescopic supports, stored parallel to the tube, can be fitted; above the feet is a pillar to a table (D113), allowing horizontal rotation and vertical adjustment measured by an upwards arc 0-90°; trunnions from this table rise to a pivot below a second table (114x73); keys above and below this are adjusted by a hooks joint with a turned wooden handle; trunnions from this table rise to pivots on the telescope tube (D71), and attached to the tube near one pivot is a semicircular rack under the tube; there are clamping and adjusting screws to allow the tube to be set at different horizontal and vertical positions; the main tube has a short eyepiece tube (D36), to which a longer tube, made of five screw-together parts, is ill-attached - it appears not to be original, and has certainly not been used as much as the rest of the telescope since its brass is much cleaner; above the tube is a finder (L255,D23); the eyepiece has a green shade and a stop; the objective has a lens cover.

A leaflet: "DESCRIPTION OF AN ACHROMATIC REFRACTING TELESCOPE, Made and Sold by G. DOLLOND, 59, St. Paul's Church Yard, London." accompanies the instrument, which, according to the catalogue entry, also has an alternative folding mahogany floor stand.

Lot 386 in Mealy, Castlecomer, Co. Kilkenny, Sale, 19-20:11:91.

Dates of George Dollond at the leaflet address from Clifton 1995,86.

2344 SAL027 TELESCOPE - REFRACTING

Heath Plymouth

L 199-413; MxD 49. Mid to late 19 C. G.

Oxidised brass; leather-covered outer tapering tube and two draws; leather objective hood on strap.

In Mealy Sale at Trudder House, Newtownmountkennedy, Co. Wicklow, 3:10:89, sold with Curtis binoculars 2342 SAL025.

2490 SAL039 TELESCOPE - REFRACTING

H. Hughes & Son, 59 Fenchurch St. London

L 773-998; TuMxD 68. Turn 19/20 C. A.

Tapering leather-covered tube; two short white-metal draws from this; brass eyepiece, with slide.

White-metal sleeves at eyepiece and objective ends of main tube, latter with white-metal lens hood.

Edward Butler Antiques, Dublin.

Firm at this address from 1877, Downing 1988,65; Ltd by 1905, Anderson 1990,42.

2339 SAL022 TELESCOPE - REFRACTING

THE LORD BURY TELESCOPE J.H. STEWARD 406 & 457 STRAND NO 5363 LONDON

L 263-760; MxD 51. 1886-1904. A.

Brass; leather-covered outer tube plus three draws; in leather case; signature (as above) on plaque.

Telescope draw signed: "J.H. STEWARD 406 & 457 STRAND. LONDON."

Lot 185 in Mealy Sale at Trudder House, Newtownmountkennedy, Co. Wicklow, 3:10:89.

Dates from Downing 1988,128 and Anderson 1990,82.

2483 SAL032 THEODOLITE - PLAIN

Spencer & Son 23, Nassau St., Dublin.

H 280; HoCrHsD 130; C 314x259x115. 1884-1886. A.

Brass and oxidised brass; double disc base; compass; trunnions; vertical half-circle; no telescope; case.

Tangent and clamping screws on top disc of base, level screws gone; silver horizontal circle 10-360° with vernier, tangent and clamping screws; compass inset between trunnions which hold vertical semi-circle, scale 30-0-30 in brass on one side and 60-0-90 in silver on other; a platform above diameter of semicircle holds two Y-brackets for missing telescope; in fitted mahogany case.

Edward Butler Antiques, Dublin.

Dates from Morrison-Low 1989,136

2491 SAL040 THEODOLITE - SIMPLE

HALL BROS

H 105; L 186. Late 19/early 20 C. G.

Brass and black enamel; silvered horizontal circle above disc base; turning bracket, pivot for tube.

The base disc has a hole with a screw thread in the centre, and has three short feet to position the instrument on a horizontal floor if not used with a stand; circle divided 10-360°; the bracket above this holds a pivot to which the tube is attached at mid-point; an adjusting screw at one end can tilt the tube; a spirit level (glass and liquid gone), with a hinged mirror above, is parallel to the tube at its side.

Edward Butler Antiques, Dublin.

What appears to be an identical instrument is illustrated in Watts 1927,78, called "The 'Quickset' Level"; this notes: "The Main Bubble Support is in one casting with the telescope body, a practice followed in all our Standard Levels, and the mirror, in which the position of the air bubble is viewed, folds down when not in use and thus protects both itself and the bubble."

Pearsall 1974,267 lists Hall Brothers at 53 Spencer Street, London EC, 1894, surveying instrument makers.

1987 SAL009 WEIGHTS - IMPERIAL

J. NEWMAN DUBLIN

D 71-34. Mid to late 19 C. G.

Four; circular brass postal weights; 1lb, 8, 4, and 2 oz.; with four smaller non-matching weights.

Anthony Antiques, Dublin

For sale with Simpson, Belfast, beam balance 1988 SAL010.

J. Newman, 156 Capel Street, Dublin, was active from about 1840 until taken over by W & T Avery Ltd in 1914 (Crawforth-Hitchins 1994,1828).

3847 SAL055 YARN TESTER

HENRY BAER & CO ZURICH

Sp 435; H 1407; SR 250. Early 20 C. G.

Iron tripod foot; steel pillar to arc brass scale; brass piston below.

The foot has one brass level screw, with holes for two more; the steel pillar has an acorn finial; the scale on the brass arc is 0-16 OZ and 0-12 lbs; at the side is a vertical grey metal and brass sliding scale 0-12; below a chain over a half circle at the pivot of a pointer to the brass arc scale; a heavy piston arrangement with pulley wheel guides is held by the main pillar and a smaller one parallel to it; a hook enables the piston to be raised.

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Presumably the yarn is attached to the chain and to the mechanism below, which can be adjusted to see the breaking weight.
Mealy, Castlecomer, Co. Kilkenny, 29:5:91.

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STATE LABORATORY - STL

Abbotstown

Castleknock

Dublin 15

Telephone (01) 821-7700

4474 STL002 BALANCE - BERANGER

Unsigned

B 460x190x115; PasD 202. c1914. R.

Wood housing, white marble top; two removable brass pans on cradles on four brass rods; glazed indicator.

The latter is on the front of the base, and has two brass pointers at the sides of a brass plate, marked F (top) 5 (centre) and K (bottom).

The balance is illustrated in Maiben 1914,26, where it is described: "Balances, Beranger's principle. French scales, on stained walnut box, and marble top, with two round brass removable pans", being offered in three sizes, diameter of pans 6.25, 7 and 8 inches, to weigh 1, 2 and 5 kilos (this one is the largest), at prices 21/-, 24/- and 30/-.

The principle of the instrument was patented by Joseph Beranger in 1849 (Crawforth 1984,20).

4473 STL001 BAROMETER - FORTIN

STANDARD BAROMETER RD NO 420297 J.M. MAIBEN & CO DUBLIN No. 1019

H 1102; B 1170x129; C 1258x234x172. c1914. R.

Black enamelled metal and brass on mahogany base board; brass scales 69-81 cm and 27-32 inch; black glazed case.

A knob at the bottom right of the brass scale plates on top moves a curved vernier (25-100 and 1-5) over the tube; on front of the cylindrical shaft is a glass-mercury thermometer 0-50 "CENTE" and 30-120 "FAHRT"; the glass viewing cylinder for the mercury surface has three brass pillars beyond the glass, separating the upper parts and the cistern of the instrument, and a knob at the very bottom allows the mercury level to be adjusted so that an ivory peg touches its reflection in the surface.

The instrument is illustrated in Maiben 1914,80, where it is described: "257. Barometer, Standard, Fortin's principle. superior finish, polished mahogany board, tube .5 in. scale divided into 1/10 in. on one side and millimetres on the other, with double vernier, reading to .002 in. and .05 millimetre and thermometer divided into °F and °C....net £8 5 0 258. Barometer Case, bright ebonised, with sheet glass sides and door, complete with lock and key...each £2 5 0."

4475 STL003 COLORIMETER

Ernst Leitz Wetzlar No 1106

H 320; W 150; De 160; CyD 82. Early to mid 20 C. G.

Mainly black enamelled metal; U-shaped foot; cylindrical surround for glass sample tubes; eyepiece on top.

The foot has a short stem behind; above the foot is a revolving plane mirror or frosted glass disc; the samples to be compared are placed in glass vials, each with a central glass rod (one now detached) whose height can be varied by knobs at the sides, both with a scale 0-70 in mirror image, read using reflecting prisms; a narrower cylinder surrounds the flat six-sided glass viewer below the eyepiece.

Although this has a very low serial number, it appears to be a 20 C instrument.

4484 STL012 GAS GENERATOR - KIPPS

Unsigned

BD 200; H 745. Mid to late 19 C. G.

Glass; shallow domed base chamber leads to spherical central bulb; into this fits tapered funnel with upper spherical bulb.

The base chamber has an outlet pipe at the side, and the central bulb an outlet on the upper side; the top bulb has an outlet on top, into which is fitted a protective bubble chamber (with two small spherical bulbs, tubes turning 180° and a thistle funnel on top), and its tapered funnel below reaches to the bottom of the base chamber.

4477 STL005 HYDROMETER - SIKES

[With crest on case] SIKES'S HYDROMETER DRING & FAGE MAKERS TO H.M. CUSTOMS & EXCISE OF THE UNITED KINGDOM AND COLONIES, &c. 56, STAMFORD STREET, LONDON. [On instrument] DRING & FAGE LONDON No16014 H 184; BuD 40; C 199x79x58. 1903-1938. R.

Gilt brass; stem scales 0-10; spherical bulb; in fitted mahogany case with no provision for weights.

The case is lined in black and has space for a missing thermometer; the instrument has a trade mark of a horizontal crescent above a dagger; note paper with some calibration details records "checked 8/8/46".

Dates at this address from Crawforth 1988,6.

4478 STL006 HYDROMETER - SIKES

[On case] SIKES' HYDROMETER Standard [and] T. MASON OPTICIAN 5 DAME STREET DUBLIN.

[On instrument] No 86947 SIKES TEMP 5° F

H 188; BuD 40; C 288x83x55. 1900-1917. A.

Gilt brass; stem scales 0-10; spherical bulb; nine disc weights 10-90; cap weight; fitted mahogany case.

The "SIKES' HYDROMETER Standard" is on an ivory plaque on top of the case; the Mason details are on a small elliptical black label inside the case lid, which is lined with red silk, with orange velvet lining around the instrument; there is space for a missing thermometer; the weights are numbered 86947.

In the case is an unrelated spherical brass weight revolving on a rod with a screw thread.

The Mason address became 5 & 6 Dame Street in 1917, Morrison-Low 1989,131.

4479 STL007 HYDROMETER - TAR TESTER

[On case] HUTCHINSON'S TAR TESTER [and] HUTCHINSON'S TESTING APPARATUS LTD 21, GT. PETER ST. WESTMINSTER S.W.1 LTD

H 170; BuD 30; WeD 9; C 222x60x42.

Early to mid 20 C. G.

Silver metal; rod with central bulb; small spherical brass weight; two disc marks on stem; thermometer; case.

There are two ivory signature plaques on the outside of the case - a disc on top, and a rectangle on the side; inside the case is a trade mark: "THA LTD ROAD MATERIAL LABORATORY"; on the instrument is: "HUTCHINSON'S TAR TESTER 211";

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the central bulb is in the shape of a flying saucer, circular with tapering top and bottom, the latter being deeper; the case, which is of boxwood, is stained black on the outside and contains a glass mercury thermometer 50-110° F. Although of fairly late date, this instrument is included since it is an interesting variation of the common hydrometer.

4482 STL010 MICROSCOPE - COMPOUND, WITH MICRO-SPECTROSCOPE

CARL ZEISS ZENA Nr. 144531 T.H. MASON OPTICIAN DUBLIN [On spectroscope] CARL ZEISS ZENA Nr. 1192
Fo 170x100; MnH 410; TuD 34. 1913-1935. R.

Black enamelled metal and brass; curved limb to tube; triple nose piece; spectroscope with reference vial on top.

The U-shaped foot (with a small Y-stem) holds a support to a pivot, above which is a curved limb; above the pivot is the rectangular stage, which has a frame for a slide and knobs to move this in two right-angled directions, each with a scale and vernier; below the stage is a mount for a condensing system, which has no optics, and a rotating bar to a mount for a rotating plane and concave mirror; the curved limb leads to the tube, which has double-knob rack and pinion coarse focus, and a further fine focus knob incorporating a drum micrometer; the tube has a triple nose piece, with three Zeiss lenses "Homogene Immersion 1/12 26375", "A41880 8 0,2 iD 40", "0.65 D.O.17 31534".

Fitting into the top of the microscope tube is the micro-spectroscope, which incorporates an eyepiece on top and two side tubes at right-angles, each with a rotating mirror at the end; the lower of these has clips to hold a vial of blue liquid.

Thomas Holmes took over the Mason business in 1913, becoming T.H. Mason & Sons Ltd in 1935 (Mason 1980).

4481 STL009 PULVERISER

Unsigned

Sp 260&265; H 533; CyD 82, H 110.

Early to mid 20 C. G.

Cast iron, steel, brass and copper; two shaped trunnions to rod with angled cog-wheels; serrated ball in cylinder.

A handle at the side rotates the horizontal steel rod, which has a copper-coloured angled cogwheel driving another at right-angles; a rod below the latter passes through a brass sleeve and rotates the serrated ball in a serrated cylinder chamber.

This is a robust instrument which would effectively pulverise material introduced into the cylinder.

4476 STL004 SACCHAROMETER

[With crest on case] EXCISE 2846 BATE'S SACCHAROMETER L. OERTLING MAKER TO THE INLAND REVENUE LONDON [On instrument] L. OERTLING. LONDON. No2846 EXCISE

H 187; BuD 36&49; WesMnD 12.5-20; C 206x76x52.

Mid 19 C. G.

Gilt brass; stem scales 0-30; elliptical bulb; rounded open mount at bottom for five elliptical weights; case.

The weights are marked 970 1000 1030 1060 and 1090, and each has a short rod on top which fits into the corresponding hole in the mount, and it is contained in a fitted mahogany case with black lining inside with space for a missing thermometer.

Robert Brettell Bate died in 1847, and Ludwig Oertling set up in London in 1849, Crawforth 1989,3&13.

4483 STL011 SPECTROSCOPE - MICRO

CARL ZEISS ZENA Nr. 1192

See entry 4482 STL010: Microscope - compound, with Micro-Spectroscope.

4480 STL008 SPECTROSCOPE - TABLE

Yeates & Son, DUBLIN.

Sp 200; TaH 213; TaD 168; TeMnL 134; CIL 111.

Mid to late 19 C. G.

Brass; cast iron tripod foot; tapering pillar to circular table; cylindrical prism cover; telescope; collimator.

The tripod foot is painted black; the table is partly divided 0-130°; the collimator is secured to the table, and has an adjustable slit at the outside; a small support with a screw clamp holds a rod leading to a specimen holder beyond the slit; the rotating telescope has a vernier 0-30 to read the scale, and also has tangent and clamping screws; focus is by rack and pinion at the eyepiece; there is a small rotating frame for a missing magnifier above the scale; between the telescope and collimator is a closed cylinder with two windows, in which the prism is housed.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

STROKESTOWN PARK HOUSE - STR

Strokestown

Co. Roscommon

Telephone 078-33013

1551 STR010 BALANCE - EQUAL ARM

J & I: CLARKE ASTON QUAY DUBLIN 1800

BmL 1150; AsW 58-33. 1800. S.

Newly painted (black) cast iron; shears with pointer; bob below fulcrum; swan beam ends with double hooks.

Initials of maker not very clear.

1557 STR016 BALANCE - STEELYARD

Unsigned RT

BmL 418, D 8½-12½. 17 C. G.

Tapering brass beam; hanging loops on both sides, iron and brass, and load hook for wares; brass slider.

Another hole slightly further along beam; slider plate has hole for weights and is inscribed RT; one scale 24, 30, 40, 50, 60;

another has two scales mixed up 8, 2, 10, 3, 15, 5, 20, 7; X and O decoration at wares end of beam, which ends in a button.

This unusual steelyard is discussed by Diana Crawforth-Hitchins in *Equilibrium* 1994, No.4, pp1847-8, who gives it a "possibly 17th century" date; the two loops indicate that it is a turn-over type, with low graduations on one side of the beam, and a higher set on the other; the "muddling" of the two sets is unique in her experience; perhaps it was carried in a ship for trade in two countries.

1542 STR001 BAROMETER - STICK

J. Margas from London now in Capel-Street DUBLIN.

L 920; BD 115; SW 79. 1761-1767. A.

Mahogany; hump top; metal scale 28-31", with sliding vernier, also 26-30"; circular cistern cover missing.

Scale is covered in discoloured lacquer, but does not appear to be brass; inches in scale for vernier are divided into tenths, and vernier has a screw clamp; other scale does not match the first, has inches divided into 20ths, and has no vernier slide.

Dates from Morrison-Low 1989,130.

1560 STR019 BATTERY - LECLANCHÉ

Unsigned CARPOROUS

167x103x103 & 162x94x91. Late 19 early 20 C. G.

One standard cell bottle; three CARPORUS bottles; three standard carbon and porous pot electrodes.

The standard cell consists of a carbon plate surrounded by peroxide of manganese and coke, enclosed in a porous pot, in a glass cell with sal ammoniac; the carporus cell consists of a combined porous pot made of an inner perforated porous cylinder and an outer perforated carbon cylinder, this carporus pot contains the depolarising peroxide of manganese, and insulates the zinc which it surrounds.

Described in Griffin 1910,706&709.

1552 STR011 CHEMICAL GLASSWARE

Hicks' Patent on white flasks, D*R 1905 on one cylinder

Various. Late 19 early 20 C. G.

Conical, cylinder and bell measuring flasks (five white Hicks' Patent); two spirit heaters; one proof hydrometer.

Hicks' Patent flasks have white glazed outsides with strip through to clear glass to see liquid level - two conical, two cylinder and one bell (H69-148,BD28-64) for fluid ounces, drams, minims, tea, table, dessert spoons.

About 20 plain glass flasks also for imperial pints, some have measures on frosted panels, others hand engraved.

Three cylinders (H305-361,CyD18-50) 1-500 ccm/cc, two with D*R, one with date.

Hydrometer 40-P-70.

D*R means German high precision, Crawforth 1984,115.

1549 STR008 CHEMICALS

Various signatures

Various sizes. Late 19 early 20 C. G.

Large collection of chemical elements, compounds, and

reagents in room set aside as a laboratory.

Includes a dark room and photographic reagents, but many other chemicals as well.

1561 STR020 CONDENSER

W.M. STILL & CO SOLE MAKERS PARAGON CONDENSER NACHELL'S PATENT 24 CHARLES STREET HATTON GARDEN LONDON E.C.

Hs 268x240x239. Late 19 early 20 C. G.

Copper and brass; four heating compartments; draining tap.

A nearly square housing has four V-shaped compartments, the full width and depth of the housing, with a run-off brass tap and two brass and wood handles.

Presumably water is boiled to heat the underside of these compartments to dry whatever is in them (photographic plates?).

Also present a tin vessel (233x221x 115) with a hinged lid and a brass screw valve on top.

Pearsall 1974,266 lists Still & Co. at 20 Charles Street in 1894.

1543 STR002 DIAL - HORIZONTAL PEDESTAL

Lynch Dublin

252x252; GnH 145. 1784-1807. G.

Brass or bronze; heptagonal; gnomon angle 53° with S-insert; hours IIII-XII-VIII; eight compass points; on stone pedestal in garden.

There were several Lynches active between 1784 and 1844; this one may well be the James Lynch who made "a large horizontal dial for ye Garden" of TCD between 1788 and 1793 - he was active between 1784 and 1807; another James Lynch was active between 1826 and 1839 - Morrison-Low 1989,129.

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1544 STR003 DIAL - HORIZONTAL PEDESTAL

J.D. O MAHONY strokestown May 1859 Latitude 53°49'

MxD 222; GnH 72. May 1859. S.

Slate; heptagonal; solid metal gnomon; hours IV-XII- VIII; eight compass points; home-made; "Longitude 8".

Names of cities faintly engraved on rim - e.g. "Dublin, Paris, Sydney, Petersburg"; also "Clock + Dub = 15th April...." (?)

1558 STR017 LAMP - MINER SAFETY

NAYLOR WIGAN 110

BD 86; H(-Ha) 272. Late 19 early 20 C. G.

Brass base and reservoir; five bars to brass sleeve for glass cylinder globe; white metal surround for gauze.

Brass knob on base raises or lowers two wicks by cog mechanism; S-shaped handle on ring on white metal lid.

Displayed with red fibre-covered cylinder case (H340, MxD162) with leather handle but lid missing, having Royal Arms (lion and unicorn) painted on side.

1548 STR007 LENS - BICONVEX

Unsigned

D 350; Hs 509x413. Late 19 early 20 C. G.

Glass; one side of greater curvature than the other; in boxwood housing with four brass rings.

1547 STR006 LENS SYSTEM

J.H. Dallmeyer LONDON 3¼x3¼ Rapid Rectilinear Patent No. 37657

HsL 45; HsMxD 67. Patent 1915?

Brass housing; central lever for iris diaphragm.

Leather on cardboard lens cap (top detached) at small end; oxidised brass screw cap at other end.

Also cylinder brass housing (HsL85, MxHsD68) for single

concave/convex lens in screw-in housing with circle of apertures (f8,16,32,128) at end away from lens.

Firm was working at least until 1918 (see Telescope - Refracting 1782 MAY265); Patent no could be 1915, when they went from 1-100000.

1546 STR005 LENS SYSTEM

TRIPLE ACHROMATIC LENS J.H. Dallmeyer LONDON No..11176

HsL 120; HsMxD 87. Late 19 early 20 C. G.

Brass cylinder housing for three lenses; screw thread at one end; lens cap at other; Waterhouse stops in case.

Unscrews into three parts; top of red lens cap missing; green flap case has three original stops (L93,W37) numbered 1, 3, and 5 with apertures of diameters 8-33, plus a home-made metal stop (aperture 13), and one of paper (aperture 23).

Firm was working until at least 1918 - see previous entry.

1545 STR004 LENS SYSTEM

HOWARD GRUBB, DUBLIN. APLANATIC DOUBLET. Sole Agents Watson & Sons 313 High Holborn London

HsL 85; HsMxD 66. 1883-1899. A.

Brass cylinder housing; iris diaphragm from f8-f44.

At the centre of the housing is a raised brass ridge which blocks out part of the Watson signature; on this is a metal ring which turns to vary the aperture; one side of the housing has a screw thread to attach to a camera; the other has a red leather-covered lens cap with blue lining.

Crawforth 1988,16 gives dates for Watson & Sons at this address.

1554 STR013 MORTAR & PESTLE

Unsigned

MxW 513, D 420, H 269; MxD 105, L 158.

Late 19 early 20 C. G.

Porcelain; mortar has four side lugs on raised top edge; pestle has replacement turned wood handle.

Also small hexagonal agate mortar (W52,H23).

1556 STR015 PENDULUM

SHEW INVENTOR LONDON

L925; BbD183; SFW30,De12. Mid 19 C. R.

Two-piece laminated mahogany shaft; heavy circular cast iron bob with signature; brass hanging bracket incorporating small wheel (D20).

Clifton 1995,250 lists a James Fleyder Shew, Optician, in 1831, who attended the London Mechanics Institute.

The collection also has a J.F. Shew & Co Eclipse folding camera (c1890 - see Lothrop 1982,55), and the company are well known camera makers, so the pendulum may be later and may have a photographic purpose.

There is also a "THORNTON-PICKARD PATENT TIME SHUTTER" - see Beck 1909,64.

1563 STR022 PRISM

Unsigned

Various. Late 19 early 20 C. G.

Two glass prisms; third has top cut off and metal sides; one prism bottle with rounded back; one spectral diagram.

First (Sis73,51&52,W48) slightly chipped; second more chipped (Sis67,49&48,W50); cut off (Sis64,32&32,W76) has metal plates at sides; hollow prism (H+To102,W60) in form of bottle with ground glass stopper is painted black except for windows on the two flat sides (one now detached); diagram home-made on paper has central prism and red, blue and yellow circles (D550) from corners with element positions and colours noted.

1555 STR014 RAIN GAUGE

W. ROLLASTON 15/17 VINE HILL LONDON MC (orCM) 3188/43

BD 218; H 495; HsD 132. Late 19 early 20 C. G.

Copper; wide bottom vessel to fit cylinder jug with handle; top with funnel and tube fits into this.

3188/43 serial number may mean 1943.

1559 STR018 SCALE - MARQUOIS

ELLIOTT 449 STRAND LONDON G. ROWNEY & CO LONDON

Ss 309x37x5; Sq 300x107; C 336x136x23. 1864-1886. A.

Two boxwood scales and set square in mahogany slide-lid case; scales from 40-0-40 to 120-0-120, 1-22 to 1-70.

Similar to "Marquoi's Parallel Scales" 1385 TCE068 for drawing plans; but divisions different; scale one, side one, 120-0-120 1-70 60-0-60 1-34, side two, 100-0 -100 1-58 50-0-50 1-28; scale two, side one, 90-0-90 1-52 70-0-70 1-40, side two, 40-0-

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40 1-22 80-0-80 1-46; set square, long side, 1-8; scales signed Elliott, set square signed Rowney; one scale marked "F" and one "R".
Dates from Crawford 1988,8.

1550 STR009 SPINTHARISCOPE

RADIUM Crooke's Spinthariscopes W. Watson & Sons 313 HIGH HOLBORN LONDON. For the microscope c65x27. Early 20 C. F.

Ebonite slide; sintered disc in centre; brass pointer.

Signature on glass slide on top, in handwriting except for Watson & Sons name and address printed on paper disc; red case (lid detached).

"An instrument in which the rays emitted from the metal radium are evidenced by the production of tiny sparks." - Oxford 1973,2077 - word introduced 1903.

Firm assumed this name in 1882, Clarke 1989,87.

1553 STR012 TELESCOPE - REFRACTING

Watson & Sons, 313, High Holborn, London.

L 244; MxD 45. Late 19 C. F.

Eye-piece section only; brass and oxidised brass; three lens magnifying system; lens at eye and two more in brass tube.

Eye lens has screw-on cover with disc slide insert protector; two lens system in brass tube (L77MxD33) which screws into eye-piece system tube; sleeve with screw thread on outside of system tube for push focus in complete telescope.

Firm assumed this name in 1882, Clarke 1989,87.

1562 STR021 WIND INDICATOR

PATENT ELECTRICAL WIND INDICATOR J. HICKS MAKER 8, 9 & 10. HATTON GARDEN LONDON

H 398; W 260. Late 19 early 20 C. A.

Mahogany and glass housing for eight double-coil indicators.

Nine brass contacts on top of backing board; push button at bottom; hinged mahogany frame for black glass with eight disc windows over black and white ivory indicators moved by double coil electromagnets; the disc windows are marked with compass points, and the eight intermediate points are also marked - but without windows; connections to battery and external vane not present.

Firm at this address from 1885-1913+, Downing 1988,59, Anderson 1990,40.

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TRINITY COLLEGE DUBLIN, CHEMISTRY - TDC

Dublin 2

Telephone (01) 677-2941

4346 TDC037 AMMETER & VOLTMETER

KELVIN, BOTTOMLEY & BAIRD LTD., GLASGOW & LONDON AMPERES VOLTS No208740
C 330x187x156. Early to mid 20 C. R.

Hinged oak case; brass handle and four wing nuts outside; inside, four terminals and two scale plates.

The terminals are ebonite-covered and sit on an ebonite plate; the glass-covered scales are both white with curved parallax mirrors; they read 1-15 and 0-5 "AMPERES", and 0-15 "VOLTS"; the voltmeter also has the inscription: "600 VOLT RANGE X READING BY 40", and "300 ditto X ditto 20", "150 ditto X ditto 10".

Kelvin & James White Ltd became Kelvin, Bottomley & Baird in 1913, and Kelvin & Hughes Ltd in 1947; James T. Bottomley was a nephew of Lord Kelvin (who had died in 1907); Alfred W. Baird, had been a partner in Kelvin & James White Ltd; Clarke 1989,262.

4317 TDC013 ATOMETER

Unsigned

VL 420,160 D 25; CyBD 103, MxD 160, H 188.

Late 19 C. G.

Glass; cylinder with wider top rim; test tube vessel with closed jacket except for long capillary tube.

The jacketed test-tube vessel is a reproduction, not the original, and its long vertical side tube is not divided as it would have been in the original.

The name of the apparatus, a diagram and description, are given on pages 58-62 of the 1887 book "Experimental Chemistry Part I - Introductory" by James Emerson Reynolds (1844-1920) who was Professor of Chemistry in Trinity College from 1875-1903; it is a device for comparing the specific heats of metals in order to determine atomic weights, and allowing elements to be correctly placed in the Periodic Table; Reynolds determined the atomic weight of Beryllium, confirming it as a congener of Aluminium in Group III.

The atometer is really a large spirit thermometer with a test tube inserted in the bulb; alcohol and a small piece of cotton are placed in this bulb; two metals are heated to 100° in a steam bath and then in turn dropped into the alcohol, the readings of the alcohol being taken on the divided stem, thus comparing a known with an unknown specific heat; the outer cylinder vessel contains cotton wool, and is used to allow the apparatus to attain steady heat before the metal is dropped in; the cotton in the alcohol is to stop the falling metal from breaking the vessel.

4305 TDC001 BALANCE - PRECISION

Grubb Dublin

C 615x459x222; BmL 470; PrD 50. c1835. R.

Glazed mahogany case; brass; wide central pillar; double triangle open beam with central circle.

The case has a removable glass top, and two small doors near the pans, but the front or back do not open; a brass base square has two spirit levels at right angles, and it holds the central pillar leading to a trunnion mount for the knife edges holding the beam; pointers at the ends of the beam read two curved ivory scales 30-0-30; hooks hold strings to the pans which rest, when not in use, on brass discs lined with green velvet on short brass pillars whose height can be adjusted; on the front of the case is a key-hole for a square-section bar turned to raise the beam and pans. This balance was exhibited in the Royal Dublin Society Bi-Centenary Exhibition in 1931 (Official Handbook, page 40), where it was described: "29.-CHEMICAL BALANCE. Made about 1835 by Thomas Grubb for use in the construction of instruments for Dr. Humphrey Lloyd (afterwards Provost of Trinity College, Dublin) for the new Magnetic Observatory in Trinity College. It was specially designed for the weighing of heavy objects to a high degree of accuracy, and was awarded the silver medal of the Royal Dublin Society (included in exhibit) in 1844."

4329 TDC025 BALANCE - PRECISION

Wilh. H.F. Kuhlmann...HAMBURG... T. MASON 5, DAME ST. DUBLIN

383x318x222; BmL 85. 1900-1916. A.

Marble base on three legs; glazed mahogany case; brass pillar to short beam; magnifier for riders.

Two of the three legs on the base are for levelling; the curved beam is silver metal with, on top, a horizontal divided bar 0-10 for riders, placed using a sliding arm with the help of a magnifying lens; attached to the beam is a vertical bar ending in an open rectangle below, with a pointer whose position is read by means of a rectangular concave mirror reflecting a small ivory scale in front; the small silver metal pans are suspended on wires from the beam.

Wilhelm Kuhlmann exhibited Berlin 1896, Brachner 1985,144; Masons at this address 1900-16, Morrison-Low 1989,131.

4316 TDC012 BALANCE - PRECISION

OERTLING LONDON

600x561x310; BmL 370. Pre 1887. R.

Mahogany glazed housing; brass pillar to beam raised by knob in front; open triangular beam with riders.

The housing has four brass levelling feet, and two drawers; the glazed front and back lift up for access; the base below the pillar is of glass over green silk; the pillar plinth is square with two spirit levels at right-angles; the pillar tapers and leads to a horizontal open frame; the double triangular beam sits on steel knife edges on an agate plate; silver metal pans on strings from the beam sit on ivory discs held on brass bases with short pillars; the arms of the beam are divided 1-9 for riders placed using knobs at each side; the sensitivity is given on a card as 0.006 grams.

This balance is illustrated by an etching on page 12 of "Experimental Chemistry Part I - Intro-ductory" by James Emerson Reynolds, published by Longmans, Green & Co., London, in 1887 - see entry for Atometer 4317 TDC013.

4340 TDC031 BASIN WITH GUTTERED BEEHIVE TOP

Unsigned

BD 160, H 330. Early to mid 19 C. G.

Glass; a cylindrical basin has a rim on top; above this is the beehive vessel with inner gutter and top opening.

The apparatus is reminiscent of an alembic, but it has no side arm; the gutter is around an opening between the lower and upper parts, which are now stuck together; on top is a narrow ground glass joint.

The apparatus could be used as a desiccator, evacuated through the ground glass top.

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4326 TDC022 BURETTE

Unsigned

H 310; MxD 54; TuD 24. Mid to late 19 C. G.

Glass; vertical tube, graduated 0-90, has a funnel on top, a stop-cock below, and a tapered capillary output.

The divisions start at the conical top and are not confined to the tube; at the other side of the scale are inscribed: "Grains 1000" (at 0 mark); "Soda" (at 23.5); "Potash" (at 48.6); "Carb Soda" (at 54.6), and "Carb Potash" (at 65.0).

4321 TDC017 BURETTE - BINK

Unsigned

BD 80,98; H 385,438. Mid to late 19 C. G.

Two; glass, one with a turned boxwood base; tall cylinders with bent "horn" and thumb stop on top.

Each burette sits on a disc base, the smaller one has a turned boxwood base and sleeve, the larger a disc fused to the cylinder; the cylinders are divided 0-800 or 0-900 grains.

A burette is an instrument for delivering a measured volume of liquid; in this case the liquid is dispensed by turning the vessel upside down and regulating the liquid output through the bent tapering "horn" by using a finger or thumb on the angled opening beside the horn.

A card notes that Bink's burette replaced that of Gay-Lussac, and was itself replaced by that of Dr Mohr (see 4322 TDC018).

4322 TDC018 BURETTE - MOHR

Unsigned

L(+Ck) 680,690; D 19,19. Mid to late 19 C. G.

Two; glass; graduated tubes 0-100 [CC], one with a glass stop-cock, the other with a rubber pinch cock.

The burette introduced by Carl Friderich Mohr (1806-1879) replaced that of Bink (see 4321 TDC017); the required volume of liquid is delivered through the bottom of the tube, and the readings taken on the graduated stem; this type of burette has universal use in present-day laboratories.

4353 TDC044 CARBON DIOXIDE APPARATUS - ROHRBECK

Unsigned

MxD 55; H(+SO) 154. Late 19 C. G.

Glass; cut-off sphere has side and top vents plus one top tube; above are two cylinder vessels with stoppers.

The vent on top holds a cylindrical dropping funnel with a stop-cock and stopper; its bottom end is in the form of a tube bent 180° inside the spherical vessel; the tube from the top of the spherical vessel rises vertically and turns 180°; it is surrounded by the other vertical cylindrical vessel with a stopper.

The apparatus is illustrated in Griffin 1915,238 - used for the estimation of carbon dioxide in carbonates.

4352 TDC043 CARBON DIOXIDE APPARATUS - ROSE

Unsigned

MxD 60; H 150. Late 19 C. G.

Glass; cut off sphere has side vent plus two tubes above, both connected to a pear-shaped vessel.

One of the tubes rises into the centre of the pear-shaped bulb, and there turns 180°; this vessel has a vent at the top side; the other tube continues a tube which starts inside the spherical vessel, turned there 180°, and leads above the vessel into the side of the pear-shaped vessel.

The apparatus is illustrated in Griffin 1915,238 - used for the estimation of carbon dioxide in carbonates.

4308 TDC004 CHEMICAL FLASKS - PRECIPITATING AND OTHER CYLINDERS

Unsigned

BD 105; H 453; ToD 88. Late 18 early 19 C. D.

Glass; one has a disc base and a short pillar to a tall vessel with a wider, open top; plus five other cylinders.

A card with the first cylinder records that this was a general purpose reaction vessel, whose tall form allowed solids to settle out so that the "supernatant" liquid could be poured off easily; it was also often used for electrolysis experiments.

Two smaller cylinders on disc bases (BD79&86;H-So274,H+So 365) differ from the former in having a neck and skirt, with a ground glass stopper (one pointed), on top.

A fourth cylinder (D301,H121) is in the form of a tall beaker, without a disc base or constriction at the bottom, but with an open top; this could have been used, filled with water, upside down in a pneumatic trough, to collect gas, and such a use is illustrated in extant notes by Ebenezer Warren, of the lectures of Robert Percival MD (at TCD from 1783-1809), dated 1792, for the preparation of nitrous acid.

A fifth cylinder (D100,H202), squatter than the last, has a pouring lip at the top edge.

A sixth cylindrical vessel (D76,H(+To)195) has a ground glass opening on top with a squashed circular stopper.

4338 TDC029 CHEMICAL FLASK

Unsigned

BD 130; H(+To) 340; CyD 74. Early 19 C. G.

Glass; cylindrical flask with wider diameters at base, and varying diameters on top; tapered stopper.

In shape like a wooden pillar turned on a lathe, about half the height being the cylinder of uniform diameter, but with varied diameters at the bottom and top; the stopper is now stuck, the vessel is cracked, and it contains a yellow liquid with some brown solid.

4325 TDC021 CHEMICAL FLASK

Unsigned

BD 70; H(-So) 147. Early to Mid 19 C. G.

Tall beehive-shaped flask with shoulders to ground-glass joint; glass stopper with hollow spherical knob.

This may be a general-purpose flask, or have some special purpose but, either way, it is an attractive item.

4348 TDC039 CHEMICAL FLASK WITH SWAN NECK

Unsigned

H 189; MxD 108. Early to mid 19 C. G.

Tear-drop shaped flask with narrow open lipped top; from near the bottom rises a spout as on a tea-pot.

4309 TDC005 CHEMICAL FLASKS - ROUND BOTTOMED

Unsigned

H 270,270,420; D 210,160,200. Late 18 C. D.

Three glass "tubulated" and "quilled" receivers; bulbous flasks with one opening and tapering side arms.

A "tubulated" flask is one with a short necked opening which can hold a stopper; a "quilled" flask is one with a tapering side arm or arms (Hill 1971,19); two of these have one tubulure and one quilled arm each; the third has one tubulure and two quilled arms.

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A diagram in the extant lecture notes of Ebenezer Warren, taken from the lectures of Robert Percival MD (at TCD from 1783-1809), and dated 1792, shows such vessels connected up with a chemical retort and other apparatus for the preparation of nitrous acid, and these may well be the original tubulated and quilled receivers used by Percival.

4312 TDC008 CHEMICAL GLASSWARE - ADAPTORS

Old unsigned; other MADE IN CZECHOSLOVAKIA

L 373,400; MxD 78,69. Late 18 to early 20 C. G.

Two; old one is a slim bulbous vessel with bent tapered end; the other is a long funnel curved at the narrow end.

These are equivalent adaptors, but from different ages; each would have been used to take the output from a chemical retort or other flask, and direct it into another vessel; the older adaptor has a neck at one end (D47), widening into a slightly tapering cylinder, before the 135° bend into a narrowing tube; the other has no neck, and the bend at the bottom is nearer 90°, leading to a short tube (D27).

4306 TDC002 CHEMICAL RETORTS

Two old retorts unsigned, plus modern retort signed PYREX MADE IN ENGLAND

L 530,330,285; H 330,240,150. Late 18 to early 20 C. G.

Three; glass; two old (c1800 G) one modern (early 20 C); bulbous vessels with arms, each with a small neck on top.

The mid-sized retort has its arm drawn into a short narrow tube (D13).

Such retorts, which incorporate a stoppered neck in the vessel are called "tubulated retorts", distinguished from "plain retorts" with no such stoppered neck, which must be filled with a long funnel - see 4307 TCC003 (Hill 1971,16); the stoppers have not survived.

4307 TDC003 CHEMICAL RETORT FILLING FUNNEL

Unsigned

L 320; MxD 112; H 130. Late 18 early 19 C. G.

A glass funnel has its narrow end bent in a right-angle leading to a long tube.

Used to fill a plain retort; a "plain retort" has no stoppered neck on the body (see Chemical Retort entry 4306 TCC002) and liquid must be poured into the body using a funnel like this if the arm is not to be contaminated.

A second funnel (L295;MxD100) has no bend.

4310 TDC006 COLORIMETER

COGIT Paris

B 157x127x30; H 395. Late 19 early 20 C. G.

Brass and enamelled metal; eyepiece viewer compares the colour of two glass cylinders in sample vials.

The base holds a vertical brass plate, with the eye-piece tube on top; two adjustable brackets with vernier scales 0-70, at the bottom of the plate, allow the position of the two cylindrical sample vials to be set around the two glass cylinders, whose position does not vary; below the vials is a revolving rectangular mirror used to pass light up through the vials to the eyepiece; a hinged metal flap covers the vials.

Cogit is not listed in Payen 1985.

4351 TDC042 CONNECTING AND ISOLATING VESSELS

Unsigned

BD 46; H(+To) 195; CysD 45&33. Mid to late 19 C. G.

Glass; two cylindrical vessels with ground glass joints top and bottom; can be connected and ventilated or not.

Disc base incorporates a hollow stopper, which can open or close a horizontal outlet pipe; this stopper is at the base of the lower, larger vertical cylinder; in its female ground glass joint sits the male joint from the upper cylindrical vessel, such that the two vessels can be connected or isolated from each other; on top of the upper vessel is a stopper which can be turned to close the vessel or open it to a horizontal tube.

4314 TDC010 EUDIOMETER - CAVENDISH

Unsigned

BD 92; H 266; BuMxD 81. Mid to late 19 C. G.

Turned mahogany base; brass stop-cock to sleeve for heavy glass bulb with stop-cock; brass frame for stopper.

The stopper, which has two wire electrodes fused into it, is held on by a horizontal brass bar screwed to two vertical rods attached to a ring around the neck of the bulbous vessel.

A spark eudiometer, of which this is one type (for another see 4313 TDC009), is used to measure oxygen content, for example of air, by exploding it with a known volume of hydrogen; by means of the stop-cocks, the vessel is exhausted of air using an air pump, and then the oxygen and hydrogen are added to the evacuated flask; a spark is then sent between two wire electrodes fused into the stopper, and the reduction in volume gives the amount of oxygen present, which is converted to water by reaction with the hydrogen.

This type of apparatus is named after the English scientist Henry Cavendish (1731-1810), although he had no hand in its design; he did however demonstrate, using a glass "firing globe", that, when two volumes of hydrogen and one of oxygen are mixed and exploded, they are completely converted into their own weight of water, a result published in 1784. (This information was given in a display in the Science Museum, South Kensington, in August 1993.)

4313 TDC009 EUDIOMETER - URE

Unsigned

L 370; TuD 15. Mid to late 19 C. G.

Glass U-tube, open at one end and closed at the other with two wire electrodes at the closed end.

The closed side is graduated 10-200 "100° = 1 Cubic Inch".

A eudiometer is used to measure oxygen content (for example of air) by exploding it with a known amount of hydrogen; the gas to be studied is introduced into the closed end of the tube, and the bend of the tube holds mercury; volume readings are taken before and after the gas mixture is ignited by a spark across the wire electrodes.

Instrument name from Baird 1914,596.

4331 TDC027 FRACTIONAL DISTILLATION COLUMNS

Unsigned, but made by Sydney Young (1857-1937)

(One made by Pyrex)

L 510-1165. Early 20 C. R.

A collection of seven assorted columns, six made by Sydney Young, Professor of Chemistry 1903-1922.

Made using sophisticated glass blowing, these columns were used to separate by distillation liquids whose boiling points were close together.

4318 TDC014 FURNACE - GAS

Unsigned

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L 710; H 340. Late 19 c. G.

Black metal frame holds horizontal gas pipe with 25 burning tubes; eight ceramic tiles remain on top. Each burning tube has a stop-cock and an air vent at the bottom; the material to be heated is placed in a tube above the burners, and heat proof tiles are laid at an angle on frames at each side (eight of the original sixteen remain, a few broken). A card records that the apparatus was used for organic analysis - the compound being tested was heated in a stream of oxygen, or with Copper Oxide CuO, and the amount of water and carbon dioxide produced gave the hydrogen and carbon content of the compound.

4327 TDC023 GAS VALVE - SCHIFF

Unsigned

L 177; MxW 37; TuD 6; BusD 15. Mid to late 19 C. G.

Two; glass; egg-shaped vessel with two thin bent tubes, one in mercury, each leading to a bulb and then a tube.

The overall apparatus is linear; the input tube, with its bulb, leads to the thin tube within the egg-shape, and this bends in a right-angle into a pool of mercury at the bottom; at the top of the egg is a similar bent tube, but this is open, leading to the output tube with its bulb; thus gas will pass through the apparatus only when its pressure is sufficient to displace the mercury in which the first thin tube is immersed.

A card with the apparatus records that Hugo Schiff (1834-1915) was born in Frankfurt and became a Professor in Florence.

"A resourceful experimentalist, he often succeeded in surmounting or avoiding difficulties by original and inexpensive means.

This gas valve is an example."

The second example does not now contain mercury, and one of its outlet pipes is bent.

4311 TDC007 GLASS BELL JARS

Unsigned

MxD 92-284; H 174-425. Late 18 to mid 19 C. G.

Six; cylinder and beehive with glass knob on top; four cylinders with brass sleeves on top.

The two widest are closed on top; the other four have narrow openings with brass sleeves, three of which retain stop cocks; one of the latter is divided from "½ Litre" on top to "5 L" near bottom; all would have been used for pneumatic experiments.

Dimensions - closed MxD 284,224; H 360,322. Open with stop-cock MxD 186,166,115; H 425,390,321. Open without stop-cock MxD 92; H 174.

4330 TDC026 LAMP - LIME LIGHT

Unsigned

L267; W 51. Mid to late 19 C. G.

Brass; inputs for oxygen and hydrogen gas with stop cocks; joined before burning on (missing) lime cylinder.

The cylinder would have been placed on a spike, whose position can be adjusted using a clamping screw below the gas pipes; between this and the stop-cocks is a sleeve with a clamp to position the lamp on a stand.

4339 TDC030 MANOMETER - DOUBLE BULB

Unsigned

H(+Tos) 360; W 191; SrsD 84&83. Mid to late 19 C. G.

Glass; a U-shaped tube has two spheres on top, with exit-pipe stoppers; the limbs are joined by a stop-cock.

Turning the stoppers allows the spherical vessels on top of the two manometer limbs to be closed or opened to short tubes at right angles to the necks; at the top of the U-tube, before the spheres, is a pipe at right angles joining the limbs, incorporating a stop-cock which, when open, would equalise the pressure above the limbs; presumably the apparatus is for observing reactions involving pressure differences.

4323 TDC019 MEASURING CYLINDERS

Unsigned

BD 75,79,62; H 286,342(-Ck),268. Mid to late 19 C. G.

Three; glass; one with open top and pouring indent; others with ground glass joints, larger retains stopper.

Graduated: 2-10 "ONZE 62°F."; 20-300 "ccm 20°C"; 100-1000 "Grains 62°F."

4347 TDC038 POLARIMETER

11436 FRANZ SCHMIDT & HAENSCH BERLIN

Sp 278; H 495; : 580. Early 20 C. G.

Brass and black enamelled metal; tripod foot; pillar to hinged sample chamber, optics and divided circle.

The tapering pillar supports a frame holding the horizontal cylindrical sample chamber with a hinged lid; at the objective end is a lever to a small scale 0-20 for the internal nicol prism; at the other end is a vertical divided circle 0-350°, covered but with two window verniers each with a magnifier; a pair of angled mirrors on top of the circle housing is used to aid readings; below the housing are tangent and clamping screws; in the centre is the eyepiece optical system.

4350 TDC041 POTASH BULBS

Unsigned

BD 80; H 245; CyD 33. Late 19 C. G.

Glass; turned wood base holds vertical cylinder containing two spheres; input and output tubes above.

The two spheres within the cylinder contain bent input and output pipes above and below which do not connect but overlap each other; from the top one leads a tube to an external sphere and further tube; the bottom exits to the vertical cylinder, which has a top opening having a ground glass joint; to this is attached a calcium chloride tube with a bulb and bent pipe. This apparatus is a variation of Delisle's potash bulbs, illustrated in Baird 1914,715.

4349 TDC040 POTASH BULBS - LIEBIG

Unsigned

W 90; H 105. Late 19 C. G.

Glass; central and two side spheres; two bent pipes lead through larger spheres to bent outlet pipes.

Name from Griffin 1915,103.

4328 TDC024 POTASH BULBS - MOHR

Unsigned

H 118,123,140. Mid to late 19 C. G.

Three sets; glass; each has five bulbous vessels joined by bent tubes, three of which extend into vessels.

A bent pipe leads into a bulbous vessel, and an output pipe from this extends to the bottom of a lower vessel; a side pipe from this bends into another of the lower vessels, again extending to its bottom; the same happens once again, but this time the side pipe goes into an upper vessel and out through a final bent pipe; two of the sets have ground-glass joints for a straight drying tube, and one has also a U-shaped drying tube, with stop-cocks on top of the limbs, and side arms, one of

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which is connected by a rubber tube to the bulbs; a second U-shaped drying tube is also present, but not connected to the bulbs.

The three lower bulbs contain a solution of potash (potassium hydroxide), and the apparatus is used to absorb carbon dioxide.

4342 TDC033 PRISM

Unsigned

B 181x54; H 50. Mid to late 19 C. G.

In the shape of a narrow house roof; the base is mirrored; there is black paint part way up the gable sides.

4324 TDC020 SPECIFIC GRAVITY FLASK - SCHUMANN

Unsigned

BD 73; H 578; TuD 14. Mid to late 19 C. G.

Glass; short cylindrical vessel, ground glass top into which fits graduated tube 0-40ccm, with open conical top.

The lower vessel is a slightly tapering cylinder with a closed bottom and with shoulders on top to the ground glass joint.

The apparatus is illustrated in Griffin 1915,370, where it is described as "Schumann's Specific Gravity Flask".

4341 TDC032 SPECTROSCOPE - TABLE

JOHN BROWNING 138 STRAND LONDON W.C.2. 7389

Sp 165,183,190; H 205. Early 20 C. G.

Brass and oxidised brass; three feet; divided circle; pillar to double prism table; telescope and collimator.

One foot supports a tangent and clamping screw for fine adjustment of the prism table; the divided silver circle, 10-360°, has two window verniers on its covering disc; a pillar above the disc supports the double prism table, which has three spring screws separating the two discs; one foot supports a pillar to the collimator, which has an adjustable slit; the telescope is connected to the divided circle and has tangent and clamping screws; the telescope has rack and pinion eyepiece focus; a small gallows supports the (missing) prism.

4344 TDC035 STAND - CONDENSER

BAIRD & TATLOCK LONDON. LTD

BD 177; H 537. Early 20 C. G.

Iron; circular base with cast signature; central pillar to vertical bar with central cut-out for clamping sleeve.

Along the cut out runs a bolt with a butterfly nut, holding the clamping sleeve - curved at one side, and with a 90° angle at the other, the distance apart being held by a tightening wing nut.

Griffin 1915,123 illustrates a somewhat similar stand, though partly in mahogany, for holding glass condensers.

4345 TDC036 STORAGE CASE - STEPPED

Unsigned

H 280; W 280; De 230. Mid to late 19 C. G.

Black enamelled metal (rusting); series of seven shelves with parallel sides and circular backs; hinged door.

The insides of the shelves are painted green; the door opens from the narrower top, with its hinge at the wide bottom; this is evidently a storage case for a series of similar items of reducing size, though the nature of these items is unclear, although they presumably had rounded ends.

4320 TDC016 THIOUREA CRYSTALS

Prepared by James Emerson Reynolds

Up to H 60. 1869. D.

The original crystals of thiourea - first prepared by J.E. Reynolds (1844-1920) in the Royal Dublin Society.

W.J. Davis (in Mollan 1985,58) records that Reynolds was keeper of minerals at the National Museum in Dublin, Analyst to the Royal Dublin Society (1868), Professor of Chemistry at the Royal College of Surgeons (1870), then Professor of Chemistry at Trinity College, Dublin (1875-1903); "One of his outstanding achievements was the synthesis of thiourea [OCN₂H₄] in 1869. The compound urea has a special historical significance in chemistry. The German chemist, Wohler, had shown that this organic compound, a typical animal product, can be made from the purely inorganic substance, ammonium cyanate, by heating. Thus a unifying link was established between two branches of chemistry which had been thought of previously as distinct and separate. Urea was much studied in the nineteenth century especially in the large German schools of chemistry. All attempts to synthesise the corresponding compound thiourea [SCN₂H₄], in which the oxygen atom is replaced by sulphur, had failed. In 1879 [*sic* - actually 1869], by using a carefully designed procedure, Reynolds succeeded in making it while working in the laboratory of the Royal Dublin Society. The original specimen is displayed in the Chemistry Department, Trinity College."

Also preserved is a compound of thiourea and ammonium thiocyanate prepared by Reynolds.

4343 TDC034 TONGS

Unsigned

L 555; RiW 70. Late 18 C. G.

Hinge at one end; long bent arms, each leading to a semi-circle at right angles for a round neck or vessel.

4319 TDC015 VAPOUR DENSITY APPARATUS - MEYER

Unsigned

OVH 402, MxD 85, D 50; IVH 620. Late 19 C. G.

Glass; outer cylindrical vessel with bulbous bottom; inner cylindrical bulb with long stem and bent side pipe.

The outer vessel holds water which is heated with a bunsen burner; this expels air out of the inner bulb; at the required temperature a known weight of the liquid being investigated is dropped into the inner bulb through the wider stoppered end on top, while the side pipe is placed under an inverted measuring cylinder filled with mercury in a mercury trough; the volume of displaced air at equilibrium is thus measured; "The result of the whole process is that the space previously occupied by this mass of air in the bulb is now occupied by a known mass of vapour at the same temperature and pressure. The relative vapour density is consequently found by dividing the mass of the vapour by the mass of the air displaced." - Preston 1894,338; the volume of the inner bulb is about 100 cc, and the measuring cylinder (which is also preserved) is divided 0-100 "CCM 15°C".

A card with the apparatus records that vapour density measurements were important as they permitted the molecular weights of volatile substances to be determined - for example, the method showed that the halogens are diatomic species in the gas phase.

Introduced by Victor Meyer (1848-1897) in *Berichte* Volume XI 1867 (1878).

4332 TDC028 VAPOUR PRESSURE APPARATUS

Unsigned - but after Thomas Andrews (1813-1885)

B 675x172x20; H 982. Late 19 early 20 C. G.

Wood base; horizontal iron pipe with piston and three vertical sleeves for glass manometer tubes.

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This apparatus for the determination of vapour pressure at temperatures higher than the ordinary boiling point is similar to that used by Andrews in his studies on carbon dioxide, and it can also be used to determine the specific volumes of liquids and saturated vapours, and the compressibilities of liquids, vapours or gases; mercury is placed in the iron pipe, and high pressure and moderate pressure air manometers are placed in two of the sleeves, these manometers being surrounded by jackets for heating or cooling, with thermometers; the liquid to be investigated is placed in a third manometer in the other sleeve, the jacket in this case incorporating a round bottomed vessel and condenser for the liquid which is boiled to obtain the necessary temperature for the manometer.

Details of the use of the apparatus are given in Young 1918,122-126.

4315 TDC011 WEIGHTS - METRIC

[On ivory plaque on case] YEATES & SON DUBLIN [On label] YEATES & SON OPTICIANS DUBLIN

C 127x84x36. Mid to late 19 C. G.

Mahogany case with indigo velvet lining holds nine brass cylindrical weights, plus twelve metal foil weights.

The brass weights have knobs on top and are for 1, 1, 1, 2, 5, 10, 10, 20, and 50 grams; as well as the foil weights, there is a rider for a balance, and a pair of brass and ivory tweezers.

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TRINITY COLLEGE DUBLIN, ENGINEERING - TDE

Dublin 2

Telephone (01) 677-2941

1382 TDE065 ABACUS

Unsigned

316x181. Second ½ 19 C. R.

Seventy seven black wood beads, in sets of five and two on ivory rods; sliding base of red stained wood; two rods replaced with brass; case bound with silver.

A card with the instrument notes it is made of cherrywood and chinese ironwood.

Presented by Professor George Tweney of Seattle in 1986.

Turner 1983, 281 shows a similar instrument bought 1877; the Chinese type has sets of five and two beads, and the Japanese five and one.

1364 TDE036 ALIDADE

Unsigned

L 527; H 135; W 40. Mid 19 C. G.

Oxidised brass; without scale; double wire and window vertical sights on ends.

1363 TDE029 ALIDADE - TELESCOPIC

STANLEY. GREAT TURNSTILE, HOLBORN, LONDON.

B 507x60; H 152; TuD 31,24&18. Turn 19/20 C. G.

Brass and oxidised brass; variation compass; pillar to pivot for telescope; rack and pinion eyepiece focus.

Brass base rule; scale 0-6, with diagonals 2-8; compass in rectangular box on base.

1377 TDE057 ANEMOMETER - BIRAM

Unsigned NO. 147

HsD 108; W 34; ScHsD 44. Turn 19/20 C. G.

Brass ring frame holds scale housing on diameter, with two dials; eight black-coated angled metal vanes.

White surround to dials, both 0-9, read by watch hands; hinged suspension piece on top.

1104 TDE013 ARTIFICIAL HORIZON

Unsigned

D 103; LgsH 33; W 14; C 125x130x50. Mid 19 C. G.

Brass-bound drum, black inside, glass top, containing liquid; three brass level screws; mahogany case.

Tight fitting six sided case with "TCD" engraved on brass plate on top; drum no longer full of liquid.

1091 TDE012 CIRCUMFERENTOR

T & J Mason DUBLIN

CpHsD 163; L 451; H 314. 1805-1817. F.

Brass; compass scales 10-360 and 10-80-10-80-10; lid; double line and window sights; stand head below.

Replacement glass top to compass; sights on side extension pieces held together with wing nuts; metal needle bearing;

clamping piece unattached; ball and socket below, with clamping screw, attached to screw thread head for missing stand.

Dates from Morrison-Low 1989,130.

2579 TDE071 CLINOMETER

J. CASARTELLI & SON, MANCHESTER NO 872

L 236; H 231. c1918. PC.

"Indian pattern"; brass, oxidised brass, silver metal; hinged arms, one divided with moving sight; spirit level; pivot to one side of centre; one level screw.

Described as: "INDIAN CLINOMETER, Government patt-ern, with face of vane divided on one side for elevation and depression in degrees, and on the other side with scale of tangents, with bubble and levelling screw." in Watts 1927,100.

Card with instrument suggests 1918.

1358 TDE032 CLINOMETER

GRUBB'S PATENT J. HICKS. MAKER LONDON NO. 2 [On case] DIXON & HEMPENSTALL OPTICIANS 12 SUFFOLK ST. DUBLIN, [sic]

D 71; CyH 18; MxH 53; C D87, W 33. Early 20 C. R.

Oxidised brass drum; hinged glass plate; scale 0-55.

Hinged housing (38x31) for plate above glass disc; at side, small window for metal scale 0-55 which revolves as cylinder is rotated in vertical plane; four screw holes for window in front - parts in red leather-covered case with blue lining.

"The general form of the Clinometer is very similar to that commonly used, with the exception that the 'Grubb' Clinometer has a hinged frame near the centre of the box which can be raised to an angle of about 45°, and carries a piece of semi-transparent glass...In using the instrument there is no necessity to look through a pair of small holes as in the ordinary form. The observer simply looks through the inclined semi-transparent mirror, holding the Clinometer in the usual position, and a scale of half degrees will then be seen projected upon the object. There is no fiducial line. The elevation of any object is read off by noting the particular division of the scale which is superposed upon that object. The advantages over the ordinary clinometer are: - (1) It is not necessary to make a double coincidence. (2) The scale is seen sharply projected upon the object. (3) It is not necessary to hold the instrument perfectly steady as in the ordinary clinometer. (4) The field of view is not confined."

H. Grubb, Transactions of the Institution of Civil Engineers of Ireland, XXXI,1903,168-160.

2833 TDE072 CLOCK - TIME SYSTEM

J. BOOTH & SON. 4. STEPHEN'S GREEN. DUBLIN.

H 1830; W 790; De 420; FD 462. c1875. PC

Mahogany tapering case, double horse-shoe magnet pendulum; white-metal ring face 10-60; two inner dials (D138) - 10-60 seconds and I-XII hours.

The case has three glass sides and a narrow rounded top; the magnet is demagnetised, now driven by a heavy weight in the wall behind.

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The clock is located on stairway of Museum Building and was one of the slave clocks controlled by the "Booth Mean Time" clock 2846 TDP307.

A card with the clock notes it was installed in 1875, with electrical arrangement by Yeates, and was connected with Dunsink Wayman 1987a,132-7 describes the Dunsink time system control.

1374 TDE051 COMPASS - BEAM

YEATES & SON Opticians TO THE UNIVERSITY OF DUBLIN

L 518; D 8; C 552x54x22. c1887. CT.

White-metal rod; two brass and oxidised brass sleeve fittings; five varied inserts, including pencil lead and pen; black case, purple lining.

Probably Yeates & Son's improved beam compass, electrum £2:12:6, Yeates 1887,11.

1362 TDE034 COMPASS - PLANE TABLE

Unsigned

L 166; W 85; CpHsD 66. Second ½ 18 C. G.

Shaped mahogany housing; basically octagonal; sleeve for table; glass-covered brass-bound compass.

Paper rose, scale 0-90-0-90-0, with North fleur-de-lys and 31 marked directions.

Very similar to compass illustrated in Brown 1982a,11 by G. Adams, dated c1750.

1095 TDE006 CROSS STAFF HEAD

Unsigned

H 204; CyD 79, H 90. Late 19 C. G.

French form; brass; cylinder divided in two parts with silver scale 0-3500 and two verniers 0-60 around centre.

Knobs below to turn the half of cylinder with the verniers, and for clamping; two windows for wires (missing) and two line sights on top, one of each below (with wire present); underneath ball and socket joint with clamping wing nut

and sleeve for stand; screw thread on top of upper part of cylinder, presumably for missing compass - see Turner 1983,260. Named and illustrated in Stanley 1901,523.

1092 TDE070 DIAL - MINER, HEDLEY

Stanley, London

H 212; W 303; DIHsD 148. Early 20 C. G.

Brass and oxidised brass; glazed silvered compass face; pivoting ring with folding line and window sights.

The compass scales are 10-80(x4) and 10-360°, with a vernier; the elevation of the sights is measured on a a semicircular scale 90-0-90°; one sight is bent; below the compass housing are tangent and clamping screws, and a boss for a stand.

1368 TDE044 DIPLEIDOSCOPE

E.I. DENT LONDON PATENTEE 2132 [Number scratched on base]

B 111x107x11; H 101; SD 100; HsD 59, W 24. c1880. N.

Oxidised brass; one level screw; variation compass; spirit level; silver metal half ring scale; blue prism.

Compass in rectangular housing, scale 5-35 with screw clamp; at an angle to the base rises a semi-circle ring scale, with hours IX-I-III and with 15, 30 and 45 minute divisions; prism in drum housing on rotating pillar with a pointer at the bottom to the scale.

Turner 1983,37-8 gives No 752 c1845, No 1592 c1870; the instrument was patented by Edward John Dent in 1843.

1381 TDE064 DIVIDERS - PROPORTIONAL

Unsigned

L 370; W 25. Mid 19 C. G.

Boxwood, brass, and white metal; scales "CIRCLES" 7- 20, "LINES" 2-9.

Also a 1940 Horwood brass and steel set, signed "W. HORWOOD & SONS 1940".

1387 TDE069 DRAWING INSTRUMENTS - SET

BRITISH MANUFACTURED BY Aston & Mander 61. OLD COMPTON ST LONDON. WORKS - SOHO & ?O?ERTON

W.J. Onlum [owner's name on brass plate on top]

C 197x132x53. Post 1898. A.

Mahogany case, purple lining, tray; nine instruments, pen, dividers, compasses; three under green cushion.

Firm moved to 61 Old Compton Street in 1898, Downing, 1988,5.

1376 TDE053 DRAWING INSTRUMENTS - SET

DIXON & HEMPENSTALL Opticians 12, SUFFOLK ST., DUBLIN.

C 198x106x27. First ½ 20 C. G.

Red leather-covered case, blue lining; 17 instruments including pens and compasses; press stud to close case.

Price scratched on hinge £/ac/-, also 47 and 5/37x, perhaps latter is date 1937.

1102 TDE026 EIDOGRAPH

DUNN EDINR.

L 1030; BD 165; LmsSe 25x25&13x13. 1824-1867. F.

Brass; main scale limb 20-130 in sleeve rotates on base; pulley discs at ends for two thinner arms 70-0-70.

Main scale sleeve uses three wheels to revolve on base; discs at ends (D950) have sleeves below for arms, one with pricker on end away from pulley and other with pencil sleeve and four disc weights on end near pulley; windows and clamping screws in pulley discs, which are joined by a wire, to adjust arms.

Historical Technology 107,1973,8 records that the eido-graph is a much improved form of the pantograph, offering far greater rigidity and hence accuracy, and requiring less operating space than the conventional four-bar type, so it replaced the pantograph for large-scale precision map and chart work.

Hambly 1988,132 records that the instrument was designed by William Wallace (1768-1843), Professor of Mathematics in Edinburgh, in 1821; it was both more accurate and easier to use than the pantograph, since its feet and joints did not obscure the drawing surface, as was the case with the pantograph.

John Dunn 1824-1842 or his brother Thomas 1843-1867, Bryden 1972,48.

1100 TDE048 ELLIPTOGRAPH

MADE BY YEATES & SON. DUBLIN. Professor Alexander's Elliptograph Royal Irish Academy

TH 99; RiH 83, D 187; W 217; H 184. Late 19 C. G.

Brass; four feet; double circle and discs mechanism.

Some oxidised brass parts; feet have spikes; legs support ring table; under this another ring runs on four pulley wheels on legs; a handle on top, running in a diagonal slit on the top ring, turns the lower, which is attached to a mechanism involving

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three discs to drive a pencil-lead holder below; a bracket for this can be adjusted along a slit with two scales 0-40 and 0-60, and has a clamping nut.

The traditional contrivance for mechanically drawing an ellipse was the elliptical trammel, in which a bar with two sliding points, at a fixed distance apart, ran in two straight grooves at right-angles to each other. When rotated, the bar described an ellipse, and its size depended on the point on the bar to which the pen was attached. However, this arrangement had a number of disadvantages, one of which, in Alexander's opinion, rendered it "almost practically useless". This was that it could not draw a clean ink-line with an ordinary drawing pen. Other problems were that the mechanism got in the way of the pencil, so that a full ellipse could not be drawn, and there was a "considerable shake". Alexander's instrument overcame these difficulties.

Professor Alexander took up his chair in TCD in 1882, having previously been in Japan; for more information see Mollan 1995,30-31; the instrument is described in the Transactions of the Royal Irish Academy, 29,1892,673-713.

1380 TDE062 GEOMETRICAL MODELS

YEATES & SON DUBLIN

H138,155,113; D114,95; B97x96. Mid to late 19 C. G.

Boxwood; cone; cone with sections detachable to give parabola and hyperbola; pyramid; all without point tops.

The first cone has one hole on its horizontal top; the second cone has two knobs on its inclined top; the pyramid has two holes on its horizontal top.

There is also a later bottle-shape model with two detachable sides.

1360 TDE033 GRAPHOMETER

GRUBB'S PATENT J. HICKS. MAKER. LONDON NO. 12

B 248x147; H 184; TuD 21. Early 20 C. G.

White metal set square; vertical optical tube at corner with rectangular window and angled glass.

Log scale on side of set square 15-20; tube of oxidised brass; eyepiece with darkened glass scale 0-120 on top; pricker and lever to operate it at corner of square.

The initials "HG" are scraped on the instrument - was it Howard Grubb's own?

"This instrument is constructed in such a manner that it can be used either as a simple Plane Table for plotting angles, the necessary distances being obtained by direct measurement, or it can be used as a Telemeter combined with a Plane Table, no direct measurements in that case being necessary."

H. Grubb, Transactions of the Institution of Civil Engineers in Ireland XXXI,1903,160-162.

1361 TDE035 LAND CHAIN

CHESTERMAN J C SHEFFIELD ENGLAND

L 4 perches; HaW 84. Late 19 early 20 C. G.

Brass handles and markers; black metal links.

The signature is also on a 100ft steel tape (no 2324) and a leather-bound 50ft tape.

There are also four 100 ft chains, one signed "DIXON & HEMPENSTALL DUBLIN".

Turner 1983,260 shows a Chesterman Gunter chain, 22 yds, late 19 C; the firm lasted until 1968+, Brown,1982a,7.

1080 TDE030 LEVEL - BUREL

Unsigned T.C.D. [engraved on base]

BD 32; H 106; TuD 27. Late 19 C. G.

Brass; screw-on cylinder housing; base for vertical plate; top window with half-mirrored glass; suspension links on top.

Instrument named and illustrated in Stanley 1901,145.

There is also a "DIXON & HEMPENSTALL" hand-held level - black coated brass, square-section, with spirit level on top - 20 C.

1359 TDE031 LEVEL - HAND

GRUBB'S PATENT J. HICKS. MAKER. LONDON NO. 8

H 65; Hs 94x44x22; CyD 35, H 15. Early 20 C. G.

Oxidised brass housing; windows at ends; on top, white metal revolving divided cylinder, spirit level inside.

Windows blackened on bottom half; cylinder divided 0-180-0; spirit level under hinged lid with pointer to scale 5-0-5.

"The general form of the Level is very similar to that of the 'Abney' level. In using the 'Grubb' instrument a + which forms the fiducial mark is seen projected upon the object which is observed through the rectangular tube. A portion of the spirit level is also seen distinctly visible."

H. Grubb, Transactions of the Institution of Civil Engineers in Ireland XXXI,1903,162-163.

1366 TDE040 LEVEL - TELESCOPIC

T. MASON DUBLIN

L 358; H 180; TuD 52,43&20. Late 19 early 20 C. G.

Brass and oxidised brass; two disc four screw base; two spirit levels on top; rack and pinion eyepiece focus.

Smaller spirit level at right-angles to larger two-window level; screw for missing objective lens flap.

Presented by the Technical Services Department, Eastern Health Board, St Ita's Hospital, Portrane, in 1986.

Morrison-Low 1989,131 lists Thomas Mason II from 1866-1922.

1365 TDE038 LEVEL - TELESCOPIC

STANLEY, GREAT TURNSTILE, HOLBORN. LONDON

H 115; L 272(-15); TuD 31,27&19. Turn 19/20 C. G.

Oxidised brass; flat, three limb base; sleeve to level; knob under to tilt tube; cracked spirit level on top.

Most of the oxidised brass coating has been removed; push focus for eyepiece (now stuck); spike pointer in field of view.

Another similar oxidised brass "STANLEY, GT TURN-STILE, NO 91238 HOLBORN LONDON Board of Works" level has a two plate four screw base, no tilt screw; rack and pinion eye-piece focus, level with double window on top, and objective lens hood (L258,H130) - date 20 C.

1079 TDE039 LEVEL - Y

TROUGHTON & SIMMS LONDON. MADE FOR DIXON & HEMPENSTALL 12. SUFFOLK. ST. DUBLIN

L 478; H 263; TuD 60,51&20. Early 20 C. G.

Oxidised brass; tribach base; spirit level below.

Brass fittings; three level screws on base fit into three-limbed foot plate; horizontal bar with spirit level revolves around base; Y-supports at ends of this for tube; rack and pinion objective focus; lens shielded with hinged flap.

Brown 1982a,35 shows same instrument c1900; this one is pre 1922, when Cooke joined the firm of Troughton & Simms.

1357 TDE028 MECHANICAL MODEL - GIRDER BRIDGE

DIXON & HEMPENSTALL Opticians DUBLIN.

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H 604; W 481. Early 20 C. G.

Model railway engine on bridge to show bending moments using pointers on chart; wood, brass/oxidised brass.

As the brass and oxidised brass model engine runs over tracks on the bridge, pointers move over a chart on one side of the model; the wheels are labelled 5, 5, 11, 12, 9; with accompanying photo of model.

Dates from Morrison-Low 1989,123.

1356 TDE027 MECHANICAL MODEL - GIRDER BRIDGE

YEATES & SON OPTICIANS DUBLIN

H 470; W 459. Mid to late 19 C. G.

Model railway engine on bridge to show bending moments using pointers on chart; wood, brass and tin; with booklet.

As the model engine runs over tracks on the bridge, pointers move over charts on the sides to show moments; wheels 6, 12 and 18 tons.

A "private circulation only" booklet by Thomas Alexander TCD and A.W. Thomson, Poona; records: "The Model is made by Messrs Yeates & Son, Grafton-street, Dublin, and may be seen in Dublin at the Engineering School, Trinity College, or at the College of Science, St. Stephen's-green."

1082 TDE003 OCTANT

For The Revnd Mr Charles Jones 1752.

R 333; L 380; W 322. 1752. S.

Mahogany A-frame and index arm with brass cut-away for 3-27 "MINUTES"; boxwood, brass top, arc scale 0-90.

Sight with two pin-holes; index and horizon mirror brass frames but mirrors gone; slot for shades present but shades gone; laminated boxwood back to brass scale.

Information with the instrument notes that Charles Jones was a son of Lewis Jones, Sub-Auditor- General of Dublin.

Stuart Talbot - PC 5/90 - reckoned that this must be one of the earliest octants to be divided on brass - previously they were divided on boxwood.

1367 TDE041 OPTICAL SQUARE

CARL ZEISS JENA Nr. 9247

H 57; PmHsD 31, H 21; CyD 15. c1875. N.

Black coated brass cut-away cylinder for right-angled prism; on top, serrated white metal cylinder sight with two sighting holes.

No 7197 c1870 & No 73931 c1910, Nuttall 1973,38; No 30127 c1885, Turner 1981,83.

1378 TDE058 PARALLEL RULE

[On rule] ELLIOTT BROS. LONDON [On case] DIXON & HEMPENSTALL, OPTICIANS, 12 SUFFOLK STREET, DUBLIN, [sic]

L 617; W 80; C 648x111x49. Early 20 C. G.

Oxidised brass and brass; knurled knobs in centre joined by serrated bar for rolling; holding knobs at ends; mahogany case; price "t/ar/-".

Morrison-Low 1989,123 lists Dixon & Hempenstall at address from 1904-1922, but they remained there after this.

1369 TDE045 PARALLEL RULE

SPENCER & SON DUBLIN

L 384; W 71. 1864-1886. F.

Ebony with brass hinges; splinter cracked off.

Two smaller but similar unsigned examples.

Dates from Morrison-Low 1989,136.

1375 TDE052 PARALLEL RULE

Unsigned

L 461; W 52. Mid 19 C. G.

Brass; double parallel rule; central piece pointed; two side arms on hinges fold to encompass central piece.

1097 TDE055 PLANIMETER

Unsigned

Fr 334x172; W 216; DisD 77. Mid 19 C. G.

Brass; frame of four parallel bars and two side pieces; two handles for discs to move point; divided wheel and disc.

Handles move plotting point in mutually perpendicular directions; divided wheel 0-9 and disc 0-15 measure area.

Howard Dawes - PC 5/90 - thinks this is a home-made "integrator" using parts of an Amsler planimeter.

1096 TDE054 PLANIMETER - AMSLER

Unsigned

L 237; AsSe 5½x5½. Early 20 C. G.

German silver; arm, point at one end, in sleeve; pivot for side arm which moves wheel scale and a cog and disc scale.

The main limb has marks 10mm 0,0001f 0,01in 5mm 20570 20538 21782 on top; pivoted side arm moves wheel with scale 0-9 and vernier, and this turns, by an endless screw and cog, a disc scale 0-9.

A card with the instrument notes: "Owned by Thomas Beddington Garvey of the Dept of Agriculture Technical Instruction Branch. Presented by J. Garvey, 1984."

This is Model No.4 of the instrument invented by Jacob Amsler (1823-1912), professor of Mathematics at Schaffhausen, Switzerland, about 1854 (see Bull SIS No.35,1992,27).

2839 TDE073 PLUMB BOB & TRIPOD BASE

Unsigned

TrSp 160, DiD 70, H 52; BbMxD 43, H 59. Late 19 C. G.

Oxidised brass tripod foot has central disc with raised sleeve and screw thread; heart-shaped iron bob.

A card with the two pieces calls them "Wall Tripod & Plumb Bob".

1099 TDE063 PROTRACTOR - CIRCULAR

Troughton & Simms, LONDON

D 158; W 332 Mid 19 C. G.

Brass; four-spoke circle, cog edge; silver scale 10-360°; cog knob on arm turns two fold-out limbs on diameter.

Arm at right-angles to limbs which have verniers to scale; glass disc in middle with central +.

1101 TDE023 PROTRACTOR - CIRCULAR

Yeates, 2 Grafton St. Dublin.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

D 236. 1843-1858. G.

Brass; ring divided 10-360° with one diagonal; central hole to one side of diagonal.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

1108 TDE018 SCALE

F.M. MOORE DUBLIN & BELFAST SHRUNK PERCHES 6 INS TO A MILE FEET 25.344 = 1 MILE

162x18. 1864-1899. F.

Ivory; scales both sides, 0-320, 0-5000, 1-12, 1-19.

All scales repeated in reverse, the 1-12 as 12-0.

Burnett & Morrison-Low 1989,152 list the firm in Belfast and Dublin from 1864-99, when it became a Limited Company.

1109 TDE021 SCALE

SPEAR * DUBLIN 13 1/3 CHAINS OR 53 1/3 PERCHES TO AN INCH PERCHES ACRES

311x27. 1791-1837. R.

Ivory; scales one side only, 20-640, 640-20, 5-80, 80-5.

Dates from Morrison-Low 1989,135.

1106 TDE019 SCALE

SPENCER DUBLIN

312x27. 1845-1853. F.

Ivory; scales one side only; 0-20 ½ inches, 0-11 inches, 0-47 ¼ ins; 0-92 1/8 ins; first division subdivided x12.

Dates from Morrison-Low 1989,136.

1107 TDE017 SCALE

SPENCER & SON. DUBLIN. SHRUNK PERCHES & ACRES 6 INS TO A MILE

85x26. 1864-1886. F.

Ivory; scales one side only; 0-160 and 160-0.

Dates from Morrison-Low 1989,136.

1353 TDE022 SCALE

TROUGHTON & SIMMS LONDON

134x17; C 343x60x43. Mid 19 C. G.

Ivory; six inches and two inches to a mile.

Also five more ivory scales in mahogany case.

The case also contains the five ivory scales with Irish signatures, listed separately; one foot scale, broken and unsigned (290x24); one with no scale (151x19); three signed "C.H.E." 30/60, 40/80, and 50/100 (51x 28); one wood diagonal scale, unsigned (152x43).

1110 TDE020 SCALE

YEATES DUBLIN

313X27. 1826-1858. G.

Ivory; scales both sides; front 1-60,60-1,0-90,1-24, 24-1; back 1-11 inches, 1-15 3/4, 1-23 ½, 1-47 ¼ ins.

First section of inch scales subdivided x12.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

1388 TDE042 SCALES - ENGINEERS'

W.H. HARLING 47 FINSBURY PAVEMENT LONDON. MATHEMATICAL INSTRUMENT MANUFACTURER

C 342x58x49; Ss 315x32 & 51x32. 1890-1901. A.

Mahogany case, purple lining, with six long and six short boxwood engine-divided scales.

Dates from Crawforth 1988,8.

1385 TDE068 SCALE - MARQUOIS

MARQUOI'S PARALLEL SCALES [on instruction booklet]

Sq 321x303x108; C 338x130x23. Early 19 C. PC.

Mahogany case, sliding lid; boxwood set square with scale on one side 1-22; two twelve inch rules needed but missing.

Descriptive eight-page booklet records: "They answer every Purpose of a pleasant Parallel Ruler...They preclude, in a great Measure, the Use of the Compasses...most Plans, particularly those of Fortifications, may be drawn with uncommon accuracy in half the usual Time."

Tesseract 9,1985,52 records that the scales were invented by T. Marquois, 1 Charing Cross, a teacher of military scientists.

1373 TDE050 SECTOR

Unsigned

L 159 [folded]; W 34. Mid 19 C. SI.

Ivory; brass hinge; straight scales eg 1-6,7-11,2-9, 1-9; inclined eg 10-60,1-10; labels L S C S T T POL.

Letters mean: line of equal parts (L); line of sines (S); line of chords (C); line of tangents (T); line of polygons (POL).

Similar instrument illustrated in Turner 1983,286 by Thomas Jones c1850; letters indicate English make.

1083 TDE004 SEXTANT

J. Bennett London

R 405; L 456; W 475. 1743-1770. R.

Mahogany frame; three curved struts; brass index arm and scale 0-120, window and vernier; index/horizon mirrors.

Clamping screw for index arm window; sighting hole missing; slot for missing shades; two of curved struts in shape of curved V, other curved across top of V, with ivory plate; handle on brass supports behind.

Dates from Crawforth 1988,4.

0287 TDE005 SEXTANT

DIXON & HEMPENSTALL No 9444 [4338 on base]

R 185; L 238; W 239. Early 20 C. G.

Brass and oxidised brass; silver scale 0-140; index arm, window vernier, reading glass; sets of four and three shades.

Tangent and clamping screws on index arm; index and half-horizon mirrors; former with four square-housed shades and latter with three ring-housed; circle (D92) in centre of frame with struts to sides and scale; two telescopes (L185&81,D20); mahogany handle below.

Dates from Morrison-Low 1989,123.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1085 TDE008 SEXTANT - BOX

Robinson London

D 75; H 36. 1823-1841. R.

Brass and oxidised brass; drum housing; silver scale 0-130 and vernier; knob to turn index arm/mirror housing.

Index mirror missing; reading lens housing on end of arm but lens gone; red and green shades with trap-door below; clampable slide to give pin-hole sight or housing for missing telescope; numbers around side of screw-on drum lid: 1-12; 4-45; 34-8-46.

Dates for Thomas Charles Robinson from Clifton 1995, 235.

1084 TDE007 SEXTANT - BOX

Troughton & Simms London

D 74; H 38. Mid 19 C. G.

Brass; drum housing; silver scale 0-150 and 90-220 and vernier; knob to turn index arm and mirror; reading lens.

Screw-on drum lid, also used as handle; green shade and mount for broken off red shade with trap-door below; clamping slide to give small or large sighting hole.

1086 TDE009 SEXTANT - BOX

Yeates & Son, Dublin

D 77; H 41; TeL 80, D 12&14. Mid to late 19 C. G.

Brass; drum housing; silver scale 0-140 and vernier; knob to turn index arm and mirror; reading lens on arm.

Screw-on drum lid; shades gone; slide with sight hole and housing for two-draw telescope; price on inside H/BO/-.

1372 TDE049 SLIDE RULE

Unsigned

215x61 c1900. PC.

Oak; brass window runner; scales relating to turbines - eg Pelton & Francis; slide scales, Umdrehungen etc.

Scales 40-30,000 and 0,15-100,000 Liter pro Sekunde; slide 10-8000 Umdrehungen and 0,2-1500 Gefälle Meter pro Minute.

1098 TDE056 SLIDE RULE - FULLER CYLINDRICAL

STANLEY, Maker, LONDON FULLERS SPIRAL SLIDE RULE 2982 11

MnL 437; D 89; CysD 81,64&50. 1911. S.

Wood and brass; two papier maché cylinder scales; brass draw tube with divided arm .02-.98; turned handle; pointer rises from wood handle.

Printed instructions are dated 1916; for operation, see 0384 RDS017.

The 11 in the serial number is assumed to mean 1911 (instrument patented 1878).

1383 TDE066 SLIDE RULE - HANNYNGTON

FROM ASTON & MANDER 25, Old Compton St., London. W.C. Mathematical Instrument Makers.

ARRANGED BY MAJOR GENL HANNYNGTON, [s/c]

661x161x16; C 692x193x35. 1871-1897. A.

Mahogany case; nine boxwood scales on mahogany base with five-piece metal bound boxwood slide running along them.

Scales 10-26, 16-41, 25-65, 39-100, 61-100-16, 10-26, 16-41, 25-65, 39-100; on slide 10-16, 16-26, 25-41, 39-65, 61-100.

Historical Technology 133,1990,212 offers such a rule, and notes that no two of the very few known to them are identical, suggesting possibly that it never became popular as it was more difficult to use than the Fuller or Thatcher 'super' slide rules - the date given is c1885.

Dates at 25 Old Compton Street from Downing 1988,5.

1371 TDE047 SLIDE RULE - MANNHEIM

W. FARRAR BENSON'S BUILDINGS LEEDS ENGLAND

261X27. Late 19 C. R.

Boxwood; scales 1-10 and 1-10; other side of slide 1- 40 and 1-70; under slide 27-51; brass E-shaped runner.

On sides of rule, scales 1-25 and 0-25; on back, useful numbers and conversion factors; runner has two short arms between longer arms at sides of rule (rather than one as in E).

P. Delehar - PC 5/90 - notes that is a Mannheim rule, after Amédée Mannheim (1831-1906) who described the first mass-produced slide rule in 1851 - the initial makers were Gravet-Lenoir of Paris, and then Tavernier-Gravet, who probably made this one.

See also P. Delehar, Bull SIS 3,1984,5.

1386 TDE061 SLIDE RULE - SPIRAL

LILLY'S IMPROVED SPIRAL SLIDE RULE,PATENT NO28603,1912

D 340. 1912. S.

Plywood disc with white spiral scale 10-100 and two brass divided radial arms 0-9; circle scale 0-99 round edge; instructions on back.

This rule was designed and patented by Dr Walter E. Lilly (1867-1940), Assistant to Thomas Alexander, Professor of Engineering in Trinity College, 1887-1921 (see Mollan 1995,30); it corresponds to a straight slide rule 30 feet 0 inches long.

The other example of this slide rule (4414 PRI256) has an instruction sheet which records that it was "To be obtained from Messrs. DIXON & HEMPENSTALL, 12, SUFFOLK STREET, DUBLIN."

1103 TDE001 SPIRIT LEVEL APPARATUS

J. SPENCER & SON, 19 GRAFTON STREET, DUBLIN.

B 355x190x34; C 387x213x108. 1873-1883. R.

Black metal base; T-shaped frame on this; clip-on mahogany table; mahogany case; various spirit levels.

Base and T-shaped frame have three brass level screws each; one of those on the frame has a disc scale 0-10; the frame fits in grooves on the heavy base; on sides of the small table are two V-shaped supports; fitted mahogany case contains three sealed spirit levels, one bent and one with six divisions each side of the bubble, and four glass tubes, one drawn out at the ends; also one brass rod divided into eight segments.

The trade label has a separate entry 1352 TDE059.

The label describes the firm as Makers to Board of Works, as noted in Directories from 1873, Morrison-Low 1989, 136; the address was 23 Nassau Street in 1884.

1081 TDE014 STATION POINTER

Unsigned

L 361; RiD 108. Turn 19/20 C. G.

Brass and oxidised brass; divided silver ring 0-180-0; one central fixed arm; two adjustable arms with verniers.

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Tangent and clamping screws; central pricker on spring.
Very similar, though later than, Cary instrument dated mid 19 C in Bennett 1987,206.

1370 TDE046 SURVEYING RULE

YEATES & SON DUBLIN
627x36; W 68. Late 19 C. G.
Boxwood; scales 0-12, 12-24, "6 CHAINS TO THE INCH", "ACRES"; metal slide with side window moves in groove.
Slide has vernier 0-40; rectangular side window moves along edge of scale.
A card with the instrument notes that it is a computing scale for strips of area on plotted plans; another 613x39, signed "DIXON & HEMPENSTALL DUBLIN" "1/2500 ACRES" is missing its slide.
Not in Yeates 1887.

1355 TDE025 SURVEYING STAFF

SPENCER & SON IMPROVED LEVELLING STAFF DUBLIN
L 3538; W 61&76; De 28&36. 1864-1886. F.
Mahogany bound 11 foot 8 inch staff; white and black scale; in two parts joined in centre with wider housing.
Dates from Morrison-Low 1989,136.

1384 TDE067 TABLES

TABLES SHOWING THE CONTENTS OF EX-CAVATION, AREA OF SLOPES, &C. BY GEORGE P. BIDDER CIVIL ENGINEER. NEW EDITION, 1863. PUBLISHED BY VACHER & SONS, LITHOGRAPHERS AND PRINTERS, 29, PARLIAMENT STREET WEST-MINSTER
424x407. 1863. S.
On red bound card; for contents of evacuation, etc.

1094 TDE037 THEODOLITE - PLAIN

W. Elliott, 268 High Holborn London
H 256; L 253or343; CrsD 133&135. 1835-1849. A.
Brass; two disk four screw base; silver circle; compass and trunnions; vertical half-circle; tube over spirit level.
Horizontal circle 10-360°; plate turns on this with two spirit levels, central compass (HsD78), silver vernier, reading glass, trunnions to axis of half-circle with silver scale on one side 90-0-50 and brass scale on other 30-0-30 "Diff of Hypo & Base"; spirit level on plate on top of half-circle and below tube (D28); latter on two Y-supports; with second extra-long objective and brass conical plumb bob.
Dates from Clifton 1995,95.

1087 TDE002 THEODOLITE - PLAIN

Spear Dublin
BD 200&175; L 296; TuD 31; CpHsD 106. 1791-1837. F.
Brass; divided base; plate turns on this with compass and trunnions to hold half-circle; spirit level below tube.
Base circle 10-360°; two spirit levels at right-angles on plate; compass divided 0-90-0-90-0 below and 10-360 above; cogged edge to vertical half-circle, turned by knob; scales 30-0-30 "Diff of Hypo & Base" and 100-0-100 on different sides; spirit level between Y- supports below tube; rack and pinion focus of eye-piece and objective; eyepiece now stuck.
Dates from Morrison-Low 1989,135.

1093 TDE011 THEODOLITE - PLAIN

Troughton & Simms, London.
H 289; CrsD 160&153; CpHsD 91. Second ¼ 19 C. G.
Brass; two disc four screw base; silver circle 10-360°; revolving plate and trunnions; half-circle above; no tube.
Plate has one spirit level and incorporates compass; angle of turn measured with silver vernier and magnifier; vertical semicircle with silver scale 90-0-90 on one side and brass scale 30-0-30 "Diff of Hypo & Base" on other; bracket for missing reading microscope; Y-supports for missing telescope.
Brass rather than oxidised brass suggests early Troughton & Simms instrument.

1379 TDE060 THEODOLITE - PLAIN

Horatio Yeates, 12 Wicklow St., Dublin
H 219; CrsD 110&110; CpHsD 61. 1859-1864. R.
Brass; two disc four screw base; silver circle; plate with two verniers, compass, trunnions to half-circle; tube gone.
Horizontal circle divided 10-360°; two spirit levels on plate above circle, revolved with tangent screw; pierced half vertical circle has silver scale on one side 90-0-60 with vernier, and brass scale "Diff.of Hypo.& Base" 30-0-30 on other; Y-supports present but telescope is missing.
Horatio Yeates in Directories 1859-1864, but not at this address, nearest 29 Wicklow St, Morrison-Low 1989,139.

1088 TDE010 THEODOLITE - PLAIN

Unsigned
H 260; W 268; CrsD 142&137; CpHsD 74.
Second ½ 19 C. G.
Brass and oxidised brass; two disc four screw base; silver circle; compass and trunnions to half-circle; tube on top.
Horizontal circle 10-360°; plate turns on this with silver vernier, two spirit levels at right-angles, compass, and trunnions to axis of half vertical circle; silver scale 0-90-50 with reading glass, and brass scale 30-0-30 "Diff of Hypo & Base"; spirit level on top of half circle between Y-supports below tube; rack and pinion objective focus.

0176 TDE015 THEODOLITE - SIMPLE

Unsigned
L 455; D 298; CpHsD 147. Early to mid 19 C. G.
Brass; central circumferentor compass attached to two arms with spirit levels and windows to divided ring.
Compass scales, upper and lower, 10-360°; spirit levels at right-angles; ring, divided 10-360°, has two diagonals at right-angles; holes on ends of arms for missing sights.

1090 TDE043 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON
Sp 184; H 428; CrsD 171&169; L 294.
Second ½ 19 C. G.
Brass and oxidised brass; tribach base; silver scales; variation compass; spirit lamp; spirit level on top.
Horizontal circle 0-360°; plate above turns with two spirit levels, two verniers, two reading glasses, and trunnions for full vertical circle 0-90-0-90-0 with two verniers and two reading glasses; spirit lamp at side of trunnions; rack and pinion objective

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tube focus; spirit level on top of tube; wood knob and cracked spirit level on removable bridge over vertical circle; tribach fits into three limb base plate with screw thread for stand.

1089 TDE016 THEODOLITE - TRANSIT

Troughton & Simms, London. B.76

Sp 149; H 362; L 256; CrsD 160&151. Turn 19/20 C. G.

Brass and oxidised brass; complex three-limb base; silver circles; central compass; spirit level at tube side.

Base has three level screws below and adjusting screws above these; plate with compass (HsD119), one spirit level, two silver verniers, one reading glass, trunnions, turns on horizontal circle; full vertical circle 0-90-0-90-0, with reading glasses; spirit level on top of diagonal of vertical circle at side of tube; objective focus of tube (D32) by rack and pinion.

1352 TDE059 TRADE LABEL

J. SPENCER & SON, Opticians & Scientific Instrument Makers To The Queen, BOARD OF PUBLIC WORKS AND BOARD OF TRADE, 19 Grafton Street, DUBLIN. On lid of spirit level apparatus 1103 TCE001.

Dates 1864-1886 F, listed as Opticians & Engineering Instrument Manufacturers to the Board of Works from 1873; address 23 Nassau Street from 1884 - thus trade label dates 1873-1884 - Morrison-Low 1989,136.

1354 TDE024 WEIGHTS

YEATES & SON OPTICIANS DUBLIN

D 71; H 26. Mid to late 19 C. G.

Four lead weights; drum shape; sewn leather covers; one ripped and top gone to show wood disc base below lead.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

TRINITY COLLEGE DUBLIN, PHYSICS - TDP

Dublin 2

Telephone (01) 677-2941

1198 TDP032 AIR PUMP

PULSOMETER ENG CO LTD 9 ELMS IRON WORKS READING

B 500x257x70; H 852. Late 19 early 20 C. G.

Oil packed piston and oil non-return valve; iron and brass; large and small wheels; beam to piston.

Large wheel (D507) with handle turns smaller (D172) with arm on circumference; this is joined to the centre of a beam pivoted at one end; the other end is attached to the piston; outlet at base of piston cylinder.

Illustrated in Kohl 1911,391.

1199 TDP030 AIR PUMP

Unsigned

B 566x240x77; H 670. Late 19 early 20 C. G.

"Duplex" vacuum pump with oil packed piston and non-return valve; iron and brass; two connected pistons.

Large wheel (D455) with handle turns smaller (D83) with arm at circumference; this connects off-centre to a double beam which alternately plunges pistons into the two cylinders; a pipe joins the bottom of one cylinder to the top of the other; outlet at bottom of latter cylinder.

Illustrated in Kohl 1911,392.

2686 TDP230 AIR PUMP - DOUBLE BARREL

NEWMAN & SON 122, Regent Strt.. London

B 444x314x57; BdH 405. 1827-1856. A.

Mahogany base; brass cylinders with mahogany bridge above; turned wood and brass handle; one sprocket broken.

One of four shaped feet missing; a brass pipe extends along the base from the bottom of the cylinders ending in a horizontal disc (D80); half way along this pipe is a right-angled pipe with a stop-cock leading to a screw-thread sleeve; in distressed condition.

Dates from Clifton 1995,199.

2755 TDP299 AIR PUMP - DOUBLE BARREL

PULSOMETER ENGR CO LD 9. ELMS IRON WORKS LONDON

B 434x314x45; H 740; PvH 596. Late 19 early 20 C. G.

Cast iron base and two pillars to pivot; handle at one side, arch frame at other for piston rods to brass barrels.

The trunnion pillars have a cross-shaped section and reduce in size as they rise; the handle has a hinge and can be folded down out of the way; the barrels are cylinders with three wider reinforced sections; a copper pipe connects the bottom of one barrel to the top of the other.

2738 TDP282 AIR PUMP - SYRINGE

BAIRD & TATLOCK LONDON

L 391; CyL 212, D 38. Late 19 early 20 C. G.

Wood handle at right-angles to iron piston rod; brass cylinder with two pipes at end opposite to handle.

1347 TDP024 AIR PUMP - SYRINGE

ELLIOTT BROS. 5 CHARING CROSS & 56 STRAND LONDON

B 253x214x43; L 366; TuD 34. 1856-1858. A.

Mahogany base; brass syringe; wood handle; pipe from handle end to openings above syringe and at base side.

Two feet missing; four holes on base probably for missing table.

Dates from Chaldecott 1989,161.

2679 TDP223 AIR PUMP - SYRINGE

Unsigned

B 248x248; H 338; TuL 458, D 47. Mid to late 19 C. G.

Brass; four arch legs from base to central boss; syringe juts out each side of this; stop cocks and pipe above.

The boss is in the middle of the syringe tube, which has a turned wood handle on an iron piston rod [now stuck]; at the handle end of the tube is a thin curved side pipe; at the other end is a screw-on cylinder block (L40.D36); on top of the boss is a pipe with two stop-cocks, ending in a screw-thread; at right-angles to the top is another pipe, ending in a right-angled bend leading to a screw-on brass disc (D64).

2678 TDP222 AIR PUMP - SYRINGE

Unsigned [signature plaque gone]

B 305x215x47; L 445; TuD 34. Mid 19 C. G.

Mahogany base; brass; horizontal syringe; turned wood handle; two stop-cocks and side arm from brass cube.

The syringe pump ends in a brass cube (46x49x49); on the top surface is a screw thread and a central hole; on the other sides are two brass arms with elliptical ends which turn (one stuck) and presumably function as stop-cocks; on the final side, at right-angles to the syringe tube, is an outlet pipe with a screw thread; under the base are three legs and a block, also brass brackets for missing parts.

1326 TDP206 AIR PUMP PLATE

YEATES & SON, DUBLIN.

L 380; HsD 188, W 13. Mid to late 19 C. G.

Double; brass and glass; limb, screw thread and stop-cock, branches into two, each with stop-cock, to plates above.

Plates have glass tops and red resin between glass and brass housing.

2698 TDP242 AIR PUMP PLATE

Unsigned

Sp 231; BD 287; H 75. Mid 19 C. G.

Cast iron base on three feet, one with brass pipe and stop-cock passing through; red resin under top glass plate.

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1348 TDP207 AIR PUMP PLATE

Unsigned

Sp 212; H 142; D 330. Second ½ 19 C. G.

Iron tripod base; brass stop-cock outlet; glass plate (broken) on red resin on reinforced iron base plate with six reinforcing struts.

2736 TDP280 AMMETER

HARVEY & PEAK

BD 135, H 27; H 48. 1884-1909. F.

Boxwood disc base; glazed brass cylinder housing; coil mechanism hidden under brass disc; silver-metal scale 0-4 "AMPS"; two brass contacts on base.

Dates from Downing 1988,57.

1226 TDP007 AMMETER

WESTON ELECTRICAL INSTRUMENT CO NEWARK, N.J., U.S.A. PATENTED NOV. 6th..1888. NO 4792

ELLIOTT BROTHERS LONDON

B 169x152x34; C 190x170x103. Late 19 C. CT.

Mahogany case and base; red enamel housing; 0-500mamps.

Arc top and window for scale; two contacts on base; moving coil with pointer to scale.

A label on the sliding lid of the case reads: "Standardized by Elliott Brothers. Century Works, Lewisham. 18th June 1921".

Weston instruments supplied by Elliott Brothers in 1895 (Elliott 1895,150); patents listed up to 1890.

1255 TDP102 AMMETER & VOLTMETER

Stanley Patent 3018 C.I 2056 D.I

HsMxD 211; H 64; SHsD 168. Late 19 early 20 C. G.

Two matching meters; copper cylinder housing, glass top; silvered arc scales 0-50 AMPERES and 0-80 VOLTS.

1280 TDP190 AMPERE APPARATUS

Yeates & Son Dublin.

B 410x200x42; H 513. Mid to late 19 C. G.

Mahogany base and turned pillar at one side; two parallel brass rods on top, cups at one end and contacts at other.

Coils missing; contacts near pillar; cups extending out to side away from pillar.

1180 TDP123 ANEMOMETER

JULES RICHARD CONSTRUCTEUR PARIS BREVETES SGDG 526

L 184; ScHsD 60; VasHsD 93; C 202x107x71.

Late 19 C. R.

Silver-metal; eight vanes in circular housing; endless screw and cog wheel to scale 0-90; cylinder housing; case.

Glass top to scale; black cloth-covered case with purple lining; scale housing and vanes' housing separate as in Lowne's anemometer, but there are no small scales.

Payen 1986,160 lists two Jules Richards, 1876-82, and 1891 (no final date); Lowne's anemometer is illustrated in Stanley 1901,544.

1162 TDP173 ANEMOMETER - ROBINSON

Unsigned

Sp 195; H 407; CusD 80. 1850-1868. RD.

Iron tripod foot; brass pillar; four black-painted copper hemispheres; endless screw and brass cogwheel at side.

The foot was painted blue but some paint has now worn off.

A "Robinson's anemometer" was one of a list of instruments presented to TCD by Rev. Humphrey Lloyd in 1868 (TCD/MUN/V/5/12 p298).

This is a model of the now familiar four cup anemometer invented by Thomas Romney Robinson (1792-1882) at Armagh Observatory and described in 1850: "Among the various branches of meteorology, none has been less successfully cultivated than anemometry. As a necessary consequence, we are almost totally ignorant of the causes which originate and the laws which govern the currents of the atmosphere." Robinson's anemometer rotated at about one third the velocity of the wind. The axle of the cups was connected via an endless screw to scales which could measure the number of revolutions (and thus the average wind speed) over a period of time - see Mollan 1995,10-12 and Transactions of the Royal Irish Academy, 22,1850,155-178.

4154 TDP320 APERTURE - ADJUSTABLE

NEWMAN'S PATENT 2564

H 215; W 81; ApD 50; TuD 28. 1812-1856. R.

Mahogany frame bound in oxidised brass; circular aperture; adjustable metal plate across aperture.

The aperture hole is bound in blue velvet; the plate, which has a rounded top, is moved by a brass knob on the housing; the knob also moves a piston disc within a brass tube below, which has a rotating cap at its end, divided 1/50 1/32 1/18 1/8 1/4 1/2 1 2; this does not now have any effect on the aperture when turned; but presumably did originally.

Clifton 1995,199 lists John Frederick Newman from 1812-1856.

1275 TDP137 ARAGO DISC APPARATUS

Unsigned

Hs 217x217x216; PD 193. Late 19 early 20 C. G.

Mahogany case; goatskin top; handle at side, via cog wheel system inside, drives brass plate below skin; magnetic needle no longer present.

1300 TDP039 ATLANTIC CABLE SAMPLES

Cartagena Cable Oran Siemens Halske & Co.. London [on one piece]

C 319x320x73. c1870. CO.

Red leather-covered display case, glass top; samples of cable, cross-sections and parts, 1858, 1865 & 1866.

Signature on one piece only - coaxial cable with outer copper spiral; there appears to be one piece missing.

Tesseract, Spring 1993, 23, describes a sample of the 1858 cable: "seven-strand copper core, three coatings gutta percha, saturated hemp, spiral sheath consisting of an armor of 126 iron wires, and a final tar coating" - this cable was completed on August 5, 1858.

The Encyclopaedia Britannica 1968, Vol.21, p.771 records that the first transatlantic attempt in 1857 was a failure when the cable broke at 2,000 fathoms' depth during laying, and could not be recovered; however, the Atlantic was spanned in 1858 between Ireland and Newfoundland; after a few weeks, the cable's insulation failed, and it had to be abandoned; it was 1866 before the first permanently successful transatlantic cable was laid and, in the same year another cable, partly laid in 1865,

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was also completed; the U.S. financier Cyrus Field, and Lord Kelvin, were closely associated with the successful cables, and these remained the only transatlantic cables until 1869, when the French laid a cable.

4155 TDP321 ATWOOD MACHINE

CUSSONS' PATENT RIBBON ATWOOD MACHINE Manufactured and Sold by G. CUSSONS, Ltd.,...Manchester
C 248x170x89; Wes D 40, H 64 (x1), D 31, H 58 (x2)
Early to mid 20 C. G.

A hinged boxwood case now contains a brass and lead cylinder weight, two brass cylinder weights, and a ribbon. The brass weights ".75lb" each have two cylinder inserts with a central pillar; the ribbon is 19mm wide; there is a brass disc weight "1/100lb", and three U-shaped brass pieces ".01 .015 .02"; the case contains printed instructions, with a diagram showing a wall-mounted arm, and a pulley system for the weights and paper roll, both now missing. On the instructions is given the firm's address: The Technical Works, Broughton, Manchester", and the information: "CUSSONS' PATENT RIBBON ATWOOD MACHINE has been purchased by many leading colleges, and gives entire satisfaction. It is a high-class, strong, and accurate Instrument at a low price, AND SUPERSEDES ALL OTHER FALL MACHINES."

1336 TDP018 BALANCE - ELECTRIC

LORD KELVIN'S PATENTS ELECTRIC BALANCE J. WHITE, GLASGOW

B 507x220x60; H 180; W 325. 1892-1900. R.

No 311; black metal base; two black coil housings; silvered log scale 4-50; shunt behind; glass cover.

Copper and brass laminated limb behind for shunts; three level screws on base; switch below for "VOLTS" or "WATTS"; bubble level on base; broken glass cover is brass-bound.

The instrument looks most like the "Standard centi-amp balance" illustrated in White 1898,4.

Kelvin was raised to the peerage in 1892, Smith 1989,799; the firm became Kelvin & James White in 1900, Bryden 1972,59.

1276 TDP189 BALANCE - EQUAL ARM

Unsigned

BD 48; H 225; BmL 120. Early 19 C. G.

Turned brass base and pillar; white-metal crook supports shears with pointer; white metal beam; swan neck ends; balance pans missing.

2719 TDP263 BALANCE - PRECISION

OERTLING LONDON

Hs 704x512x302; BmL 420. Late 19 C. G.

Mahogany glazed housing; open beam, calibrated 1-9 each side; mechanism from side to add riders to beam.

Knob on front to free beam; agate knife edges on beam for agate brackets with hooks below for pans; pointer from beam pivot to uncalibrated ivory scale below; two glazed push-up doors in front; one side glass panel broken.

1159 TDP167 BAROGRAPH - ANEROID

R.F. PARIS BREVETES SGDG NO 50257 (M.O. 190)

Hs 403x256x188. 1882-1891. R.

Mahogany case; glass front gone; 12 evacuated capsules; brass recording drum; thermometer 40-100°F.

Presumed to be monogram for Richard Frères - dates from Payen 1986,160.

1253 TDP135 BAROMETER - ANEROID, PORTABLE

W.H. Harling. 47 Finsbury Pavement. LONDON

MxD 126; W 50. 1890-1901. A.

"Surveying Aneroid Compensated"; white-metal housing, glass front; scale magnifier; leather carrying case.

Silver metal scales 0-3000 and 27-31; knob on top turns outer part of scale with a short scale of divisions 0-10 labelled "ASCENT".

Dates from Crawford 1988,8.

1213 TDP136 BAROMETER - FORTIN

DIXON & HEMPENSTALL DUBLIN 1517

L 1050; TuD 27; B 1103x138x21. Early 20 C. G.

Standard instrument; black painted metal and brass; mahogany backing board with white glazed panels.

Silvered scales 69-83 and 27-32 with verniers; thermometer on front of tube 10-60°C and 0-140°F; mercury reservoir now opaque; white panels behind scales and mercury reservoir.

Date from Morrison-Low 1989,123.

2696 TDP240 BAROMETER - PORTABLE

J. Newman, 122 Regent St. London.

L 912; Se 19x19; CiCyL 93, D 36. 1827-1856. A.

Two; oxidised brass; sliding silver-metal scale 20-31"; tripod, ring on top; thermometer; leather case.

The body of the instrument is of square-section with a cylinder cistern cover; above the cistern is a glass mercury thermometer 20-110°; the scale, with a small window hole on top to align with the mercury in the glass tube, slides in the frame, with a vernier on the housing 1-5; two pivot bars mid-frame sit in triangular notches in the ring on top of the folding legs of the stand; triangular section leather case.

On the back side of the scale, which moves with the front, is inscribed: "Neutral Point 29.976 Cap: Act- ion +.050 Capacities 1/62 Tempere. 62°" on one instrument, and: "Neutral Point 30.002 Cap: Action +.036 Capacities 1/50 Tempere. 32°" on the other.

Dates from Clifton 1995,199.

2748 TDP292 BAROMETER - STICK

Unsigned

H 864; DiD 103; CiD 45, H 37; TuD 11.

Late 19 C. G.

Wood cistern with iron disc above holds uncalibrated glass tube for mercury; on modern laboratory stand.

Clear demonstration of simple stick barometer, usually hidden in more-or-less elaborate housing.

2681 TDP225 BASE

J. ROBINSON & SONS, 65 GRAFTON ST DUBLIN.

B183x150x37; H138; PrH95,D8; DiD20. 1885-1903. F.

Mahogany base on four feet; to one side is a vertical brass pillar on a disc; a similar disc, with no pillar, is on the other side; nuts under the base secure the discs on top.

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The original use of the base is unknown.
Dates from Morrison-Low 1989,133.

4150 TDP316 BASE WITH DIVIDED CIRCLE

Unsigned

Sp 277; TH 77; CrD 236. Early 20 C. G.

Brass; tribach base holds a disc with a silver divided circle 0-350°; plate above for component supports.

There are two verniers on the rotating plate above the circle, which are read with pivoted magnifiers; the plate has cross-members, two of them with a threaded hole (D22), and the other two with a pair of V-supports.

The apparatus is presumably for optical experiments requiring accurate determination of the angles between components.

2671 TDP215 BATTERY - BICHROMATE

Yeates & Son Dublin

BD 104; H 295; FIMxD 128. Mid 19 C. G.

Bulbous glass flask; brass sleeve on top; on this, ebonite disc holding two carbon plates and central rod.

The central zinc electrode is missing; one of the carbon plates is detached; there are three brass contacts on top of the ebonite disc.

There are more bichromate cells, including at least six of small size (BD63, DiH150), but the others appear to be unsigned.

1168 TDP147 BATTERY - DRY PILE, ZAMBONI

Yeates, Dublin

BD 158; H 174; HsD 22. 1826-1858. G.

Mahogany base; central brass plate; two piles with brass sleeves and glass covers ending in brass spheres (D19).

Knobs at sides of base to move piles in or out; groove around base for missing dome.

Zamboni's battery with 2000 discs mounted in two columns, with pendulum, on stand, with glass shade, is offered in Yeates 1877,20. This would have been used as a fake "perpetual motion machine" with the pendulum moving to and fro between the piles - see Hackmann Bull SIS 45,1995,2. The pendulum is missing from this example.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates.

1251 TDP131 BATTERY - LECLANCHÉ

Litton ENGLAND

Hs 164x94x94 & 152x97x96. Late 19 early 20 C. G.

Two; second unsigned; glass housing, black coated on top; carbon electrode in porous pot; only one zinc rod.

Spare rectangular carbon electrode without its porous pot and contents of pyrolusite and gas graphite; zinc rod positive electrode.

Details of cell given in Ganot 1890,786; cell originated in 1867 - Turner 1983,198.

1239 TDP113 BIOT APPARATUS

Unsigned

BD 195, H345, SrD 130; CusD 135. Mid 19 C. G.

Weighted turned mahogany base; insulated pillar to brass sphere; two brass cups on glass handles.

Another single copper cup with turned glass handle - could be older.

1289 TDP087 BOW

Unsigned

L 680&642. Second ½ 19 C. G.

Two mahogany bows with horse hair; ebony keys at end for tightening.

2741 TDP285 BURNER - BUNSEN

ROBINSON & SONS DUBLIN

BD 73; H 137. 1885-1903. F.

Four; signature cast on iron base; side arm inlet, turning sleeve; also burners by Griffin, Baird & Tatlock.

The side arm inlet is above the base; the sleeve revolves to alter the size of the hole at the bottom of the burner pipe; two are rusted, one is missing its burner pipe.

There are seven burners by "BAIRD & TATLOCK LONDON" - two retain a pivoted cover under the base to change size of hole under the burner pipe.

There is one by "GRIFFIN LONDON"; this has a hole at the side of the mount for the pipe.

There are also four different unsigned burners; one, with a decorated base, has an internal pipe rising into the bottom of the burner pipe.

Dates of Robinson & Sons from Morrison-Low 1989,133.

1273 TDP188 BURNER - OIL

Unsigned

H 126; MxD 95. First ½ 19 C. G.

Glass vessel, squashed sphere shape; neck with metal inset for wick; arched glass wick cover (stuck).

1287 TDP101 BUZZER

Unsigned

L 197; MxD 38. Second ½ 19 C. G.

Turned wood mouthpiece has leather diaphragm at other end; when blown, this makes a buzz.

1302 TDP209 CALCULATOR

BRUNSVIGA NO 4484 Grimme, Natalis & Co. Braunschweig-Brunswick System W.T. Odhner.

B 475x195x22; W 397; Cover 445x170x130. H 138.

Patented 1891. R.

Mahogany base; black metal; hand-cranked Odhner wheel; black metal cover.

Calculators with the Leibnitz stepped cylinder were replaced with a wheel having a variable number of projecting teeth, first patented by F.S. Baldwin in 1875, but the more important patent was that of W.T. Odhner in 1891; the calculator performs multiplication by repeated addition; Odhner sold his patent to Grimme, Natalis & Co of Brunswick.

Details from Turner 1983,283-4, who dates No.262 to 1892.

1144 TDP168 CALLIPER - VERNIER

[Howard?] Grubb Dublin

L 242; W 36; C 263x57x27. Late 19 C. G.

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Brass plate, raised scale 0-25; one fixed silver-metal bracket, other on silver-metal slide with vernier; fitted mahogany case, with both closing hooks broken off.

2688 TDP232 CALORIMETER - FUEL, DARLING

A. GALLINKAMP & CO. LTD. SOLE MAKERS 19/21, Sun St., Finsbury, LONDON Darling's Patent Oxygen Combustion Fuel Calorimeter

Cys L 215&228, D 118&134; C 544x165x160.

Early 20 C. G.

Brass base; glass jar; sample vial; copper cylinders.

Double disc brass base, with pillar between discs, supports a glass jar which rises to a neck with a stopper; inside the glass jar are three vertical supports for a silver-metal vial; through the stopper are two bent brass electrical wires and a gas inlet; the whole fits into a copper cylinder, and that fits into another copper cylinder; in boxwood case with printed instructions, referring to dates 1902 and 1906 ("Engineering" 20 June 1902 and Sept 21 1906).

1203 TDP150 CALORIMETER - JOLY STEAM

Unsigned - attributed to John Joly (1857-1933)

B 603x535; H 1390; To 585x530. Introduced 1886.

Not original; balance gone; wood; tall chamber, inlet and outlet pipes; electrical contacts.

Wood base with three of four brass level screws.

Preston 1894,236 notes: "In 1886...Dr. J. Joly proved that the steam calorimeter was not only an accurate scientific instrument, but that, besides being of more general application, it was probably susceptible of greater accuracy than any other method hitherto employed...The simplest form of Dr. Joly's apparatus consists essentially of a thin metal enclosure, which we shall call the steam-chamber, in which hangs from the arm of a balance a small platinum pan carrying the body to be experimented on. Steam is admitted into this chamber at the upper end, through a tube, and escapes through a tube leading from the lower extremity. The steam can be admitted rapidly and shut off at pleasure, or allowed to flow gently through the apparatus..."; Preston goes on to give detailed instructions.

See J. Joly, Proceedings of the Royal Society, xli, 1886, 352; Glazebrook 1922, Vol.1, 50-3.

2727 TDP271 CAMERA - BELLOWS

MEAGHER, MANUFACTURER 21 SOUTHAMPTON ROW HIGH HOLBORN London W.C.

B 1190x309x17; LaFr 309x302x91. Late 19 C. G.

Mahogany; sliding base; three sets of fibre bellows; focus plate adjusted by brass handle and screw; no lenses.

Historical Technology 125, 1983, 202 records that P. Meagher had worked for T. Ottewill, and he won prizes for his cameras at London, Berlin, Paris, Dublin, and Edinburgh in 1862-3; his greatest contribution to camera design was the introduction of the wing support to the back focus camera, giving the camera greater stability.

2725 TDP269 CAMERA - BELLOWS

KORESCO W. MIDDLEMISS SOLE MAKER BRADFORD

B 1240x252x17; Frs 478x419x63 & 208x162.

Early 20 C. G.

Mahogany; sliding base; two sets of fibre bellows; one reducing in size, one not; focus plate; no lens.

The bellows from the large frame, which holds the focusing plate, reduce in size to the first smaller frame; a second set of bellows extends to the front frame for the (missing) lens.

Crawforth 1988, 18 lists William Middlemiss in Bradford in 1893 and 1901.

2726 TDP270 CAMERA - BOX

W. WATSON & SONS MANUFACTURERS 313 HIGH HOLBORN LONDON

Hs 669x303x303; L 800; Fr 262x251x36.

Late 19 early 20C. F.

Mahogany housing, four feet; circular holes each end (Ds 187&177); short bellows to frame; no lenses or plates.

The smaller circular hole is brass bound; focus uses rack and pinion.

Firm assumed this name in 1882, Clarke 189, 87.

1158 TDP175 CAMERA - CINEMATOGRAPHIC

MADE BY THE WILLIAMSON KINEMATOGRAPH CO LTD SOLE DISTRIBUTERS W. BUTCHER & SONS LTD LONDON E.C.4. NO 502

Hs 238x236x120. Patented 1908.

Mahogany housing; patent mechanism; black box holders.

Grab to advance film "PAT NO 21787/08" (presumably 1908); inside housing blackened; two spool holders with ivory plates on sides; brass fittings, including handle stem (handle missing) to turn mechanism inside; lens missing.

2840 TDP301 CAMERA - FALLING PLATE

CAMBRIDGE INSTRUMENT CO. LTD. LONDON & CAMBRIDGE C83580

B 334x192x21; H 672; Hs 600x244x132. 1926. N.

For string galvanometer; mahogany housing; door at back; dark chamber; damping brass cylinder at side.

Removable lid; falling frame inside dark chamber, controlled by cylinder (L273, D58) via pulley wheels; three fibre-covered black wood photographic plate holders inside; black bag in door frame; slit in front with white-metal scale below 40-0-40; three knobs, each to shut off or open one third of the slit.

2728 TDP272 CAMERA - FOLDING

J. LANCASTER & SON, BIRMINGHAM

B 818x238x21; LaFr 279x236x62. 1874-1889. W.

Mahogany; open base with two hinged folds; brass fittings; two sets of fibre bellows; focus plate; no lenses.

Lothrop 1982, 18, 32, 51 records Lancaster cameras 1880-89; Anderson 1990, 49 lists catalogues 1874 and c1880.

2707 TDP251 CAMERA - FOLDING

TIME SHUTTER THORNTON PICKARD PATENT

Hs(Mn) 161x81x144; MxL 380. Late 19 early 20 C. G.

Mahogany, brass fittings; fibre bellows; sliding frame for focus plate; tin right-angled housing at lens end.

No lens; fibre bellows torn; the patent shutter mechanism is in a mahogany housing (91x67x25) with brass fittings, including cog wheels and a pivoted metal limb; it can slide between two brackets under the tin housing.

2752 TDP296 CARBON ARC RODS

CHAS. H. CHAMPION & CO. LTD. NATIONAL HOUSE, 60-66 WARDOUR ST. LONDON, W.1. ENGLAND SHIP CARBON L 300, D 12-13; [L 153, D 12]. Early 20 C. G.

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"FLAMEX"; "ACLUX"; "POOL CARBON" [smaller] rods.

One box of "SHIP CARBON FLAMEX. MADE IN ENGLAND"; one of "SHIP CARBON ACLUX MADE IN ENGLAND" both with the Chas Champion signature; one box of "POOL CARBON", issued by "G.E.C.' Electric Co. Ltd.", "MORGANITE The Morgan Crucible Co. Ltd.", 'HENRION' Henrion Carbons Ltd., and "'SHIP' Charles H. Champion & Co. Ltd."

2691 TDP235 CHEMICALS - SET

YEATES & SON, DUBLIN.

C 248x106x44; PhsL 50-54, D 10. Mid to late 19 C. G.

Faded red fibre-covered two-tray case for 2x32 phials of chemicals (62 remain); almost all elements.

Case lined with faded purple velvet; contents include: Stibium, Niobium, Terbium, Cadmium, Yttrium, Beryll, Magnesium chlorat.

1282 TDP084 CHLADNI PLATE

Unsigned

303x303 & 280x280; H 160 & 333. Second ½ 19 C. G.

Two; iron tripod foot; one has turned mahogany pillar and white-metal plate; other has oxidised brass plate.

Latter has short tapering iron pillar on top of foot and is secured to modern plywood base; taller pillar ends with brass sleeve and has brass knob on top of plate.

Introduced by Ernst Florenz Chladni (1756-1827) - Turner 1983,135.

1313 TDP199 CHRONOMETER - MARINE

McMASTER & SON, Dublin No. 4660.

FHsD 124; C 181x178x178. 1864-1900 D 1864-1900. D.

Mahogany brass-bound case; hinged lid and glass cover; brass gimbal suspension; silver metal face; three dials.

Main dial I-XII; smaller seconds dial 10-60, and still smaller "WIND DOWN UP" dial 0-56; clamping arm at corner to anchor gimbal; ivory disc (D38) on front of upper part of case; trade label of Francis M. Moore inside lid - see entry 1314 TDP154.

Moore dates, Burnett & Morrison-Low 1989,132,152; appears same as one signed Wm Farquhar, King St, London, Wynter 1975,93.

2846 TDP307 CLOCK - REGULATOR

J. BOOTH & SON,

No measurements available. Purchased 1876. R.

Mahogany glazed case; silvered circular dial 10-60; two inner dials 10-60 and I-XII; circular hole on face.

Presumably the latter hole originally had a dial, especially since the signature ends in a "," and the rest would have been where the hole now is; the pendulum is a brass and glass cylinder containing mercury; the hand is missing from the upper inner dial.

Originally at Dunsink Observatory, this is the "Booth Mean Time" clock which was used as the Master for the slave clocks at the Bank of Ireland, the Post Office (only connected during 1929), the Port and Docks Board Ballast Office, Westmoreland Street, and the Museum Building, Trinity College Dublin (2833 TDE072); a single telegraph wire connected these clocks in series, with earth return, and the slave clocks had permanent magnets as their pendulum bobs.

Wayman 1987a,135 describes the Dunsink time system.

4446 TDP322 CLOCK/BAROGRAPH/THERMOMETER

YEATES & SON DUBLIN

C 1130x375x200. c1885. S.

Mahogany glazed housing contains a clock, a recording barometer and a thermometer; presented to G.F. FitzGerald.

The pendulum clock has a white face with roman hours; a mechanism from the smaller open end of the mercury barometer tube alters the position of a pen recording on a revolving cylindrical chart; the mercury glass thermometer reads 0-120° "FAHRT" and -10-50° "CENTE".

A shield shaped plaque at the bottom of the instrument reads: "Presented/to/George Francis Fitzgerald/Erasmus Smith Professor/of Natural Philosophy/University of Dublin/by the Moderators in/Experimental Science/from 1875-1885/on the occasion of/his marriage/21 Dec 1885"; the instrument came on the English market and was purchased by FitzGerald's "many admirers in the Department" (to quote from the invitation leaflet to celebrate the installation of the instrument in the FitzGerald Library on 19:2:1993).

1269 TDP125 COIL

GAMBRELL BROS

D 140; H 30. Late 19 early 20 C. G.

Two mahogany rings; one has coil wound round nine pairs of holes in glass plate; other has two coils and four holes.

First (signed) has two brass contacts (and cracked glass); other (unsigned) has four bundles of wires through the centre of each hole.

Crawforth 1988,17 gives 1900W for Gambrell Bros.

2669 TDP213 COIL

Yeates & Son Dublin

HsOD 139, ID 73, W 10. Mid 19 C. G.

Slim brass ring, with oxidised brass back, holds white-covered wire; right-angled bracket below.

The signature, on the brass ring, is elaborately engraved, with many flourishes.

2551 TDP210 COIL - DU BOIS REYMOND

KERSHAW DORRINGTON ST. LEEDS

B 705x98x24; CoHsD 53; H 94. Early 20 C. G.

Hinged mahogany base; secondary coil slides in groove; interruptor; stationary primary; boxwood scale 1-50cm.

See also 1229 TDP138.

2555 TDP211 COIL - DU BOIS REYMOND

A. KERSHAW SCIENTIFIC INSTRUMENT MAKER LEEDS

B 705x98x24; CoHsD 53; H 100. Early 20 C. G.

Hinged mahogany base; secondary coil slides in groove; interruptor; stationary primary; boxwood scale 1-50.

See also 1229 TDP138.

1229 TDP138 COIL - DU BOIS REYMOND

JAS. SINCLAIR SCIENTIFIC INSTRUMENT MAKER UNIV. EDINR.

B 685x96x25; CosD 26&44; H 102. Early 20 C. G.

Three; hinged mahogany base; secondary slides in groove; interruptor; stationary primary; scale 1-49cms.

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Boxwood scale; double coil electric interruptor with four contacts and bundle of wires core; secondary has two contacts; another similar instrument unsigned.
Elliott 1895,142 calls the instrument "du Bois Reymond coil", and Parot 1987,24 calls it "Chariot de Ranvier".

2750 TDP294 COIL - INDUCTION, RUHMKORFF

1253 APPS 433 STRAND LONDON PATD. 1881-264

B 444x240x93; CoHsD 130. Patented 1881.

Mahogany base; ebonite coil cover; brass and ivory commutator; ebonite pillars for brass and ivory conductors.

Eight brass contacts on base; ebonite knob to adjust interruptor tension.

Heinrich Daniel Ruhmkorff (1803-1877), a German who settled in Paris, introduced the coil in 1851 and exhibited it at the Paris Exhibition of 1855 - Turner 1983,184.

2712 TDP256 COIL - INDUCTION, RUHMKORFF

APPS 433 STRAND LONDON PATD. 1881. 264. No.1172

B 623x290x95; CoL 360; C 675x365x320. Patented 1881.

Mahogany base; ebonite coil cover; brass and ivory commutator; brass, ivory, and ebonite conductors; brass fittings.

In boxwood case with front present but detached.

1310 TDP071 COIL - INDUCTION, RUHMKORFF

APPS 433 STRAND LONDON NO 1147. PATD. 1881-264

B 440x239x88; H 222; CoHssD 67&125. Patented 1881.

Mahogany base; ebonite coil cover; brass and ivory commutator; ebonite pillars for brass and ivory conductors.

Latter on ball and socket joints on ebonite and brass pillars; commutator handle gone.

2676 TDP220 COIL - INDUCTION, RUHMKORFF

DIXON & HEMPENSTALL OPTICIANS, 12, SUFFOLK ST., DUBLIN.

B 450x201x68. Early 20 C. G.

Mahogany base; ebonite coil cover; brass fittings; wood and brass commutator; contacts on top of coil.

Bunch of wires primary sticks out of centre to interruptor; brass pillar with knurled knob to adjust tension of interruptor spring; brass contacts on tops of ebonite panels (123x123x10) at sides of coil; conductors gone; two brass contacts on base at sides of commutator, which has an ebonite disc to turn it.

2711 TDP255 COIL - INDUCTION, RUHMKORFF

Unsigned

B 510x227x55; H 250; CoD 135. Mid to late 19 C. G.

Mahogany base; ebonite coil ends (145x145); ebonite and brass commutator; short conductors on top ebonite bar.

Brass fittings; circular ebonite knob to turn commutator; brass knob to adjust interruptor spring; two brass contacts on base; some of the edging at the bottom of the base is missing.

1311 TDP070 COIL - INDUCTION, RUHMKORFF

Unsigned

B 422x238x68; H 272; CoD 147. Late 19 C. G.

Mahogany base; ebonite coil cover; brass fittings; ebonite and brass commutator; electrodes on top panel.

Ebonite handle for commutator; ebonite top panel for short brass pillars with clamping screws (one gone) to hold pointed electrodes ending in small brass spheres.

2715 TDP259 COLOUR SPINNER

YEATES & SON DUBLIN

B 230x106x20&10; DiD 77; WdsD 80.

Mid to late 19 C. G.

Mahogany two-tiered base; two disc windows; spinning disc with colours between; pulley wheel & handle gone.

The windows are in the wider part of the instrument; both are broken; the spinning disc has (faded) colours including red, yellow, green, and blue; a pulley spindle with a handle, missing from the thin part, would have spun the disc; the string remains, but has fallen off the spindle in the centre of the disc.

1161 TDP182 COMPASS - MARINE

J. BUCKLEY DUBLIN. PARNELL & SON, HERMITAGE BRIDGE, LONDON

HsD 194, W 93; C 292x290x176 (-Ld). 1832-1859. F.

Oak housing; brass gimbal mount; brass cylinder and glass housing; lid gone; Buckley signature added on.

The Parnell signature at the centre of the compass rose is blacked out; "BUCKLEY DUBLIN" is added to the North point decoration and "J. BUCKLEY DUBLIN. T.C.D." is engraved on the brass edge of the glass cover.

Buckley dates 1832-1859 from Morrison-Low 1989,121; Clifton 1995,210 lists William Parnell & Son at 2 Lower East Smithfield London from 1839-1840.

2730 TDP274 CONDENSER - VARIABLE

THE MARCONI SCIENTIFIC INSTRUMENT CO LTD No 890

Hs 169x169x88; H 143. Early 20 C. G.

Wireless condenser; mahogany housing; ebonite plate on top; revolving ebonite knob and disc with scale 0-90.

Two brass contacts on top; word "SHORT" opposite the 90 mark on the scale.

Identical with one component of the wireless equipment set, 1596 MAY085, which also has an amplifier, a detector, and a tuner.

1204 TDP120 CONDENSER - VARIABLE, AEPINUS

Spencer. DUBLIN.

B 432x200x38; H 460; PsD 307. 1845-1863. F.

Mahogany base with central groove; two slide bases for brass plates with conductors on glass pillars.

Replacement mahogany slide pieces; original turned wood sleeves for insulating pillars; brass sleeves on top of pillars join right-angled brass tubes with plates on one side and spherical conductors at other end; central glass plate gone.

Dates from Morrison-Low 1989,136.

1278 TDP108 CONDUCTOR - CYLINDRICAL

Unsigned

B 460x165x31; H 318; CyL 257, D 51. Mid 19 C. G.

Mahogany base and turned sleeve; glass pillar; on top, flat ended brass cylinder; one foot replaced on base.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1272 TDP110 CONDUCTOR - SPHERICAL

Unsigned

BD 166; H 465; SrD 137. First ½ 19 C. G.

Turned mahogany base; white ebonite pillar; brass sleeve; hollow brass sphere with top cut off.

1271 TDP109 CONDUCTOR - SPHERICAL

Unsigned

BD 102; H 292; SrD 63. First ½ 19 C. G.

Two; turned mahogany base; glass pillar; brass sphere with side cut off; on other side, spherical brass knob.

One pillar is resin coated and is probably original; the other is a plain glass replacement.

2673 TDP217 CRITICAL STATE APPARATUS

YEATES & SON DUBLIN

B 176x178x50; H 548. Mid to late 19 C. G.

Thomas Andrew's apparatus, incomplete; cast iron base; vertical brass tube with inlet; central screw-thread rod.

Glass tubes missing; used for the determination of the pressure-volume-temperature relationships of materials; the brass tube, which has an inlet pipe at its base, is held between brass discs each secured by four brass nuts.

There is another similar base cast with the signature, but no other parts of the apparatus.

For more information, see the entry for Cumine's Critical State apparatus, Ex0305, and also 1029 QBC001.

T. Andrews, Philosophical Transactions 1869,159,575.

1194 TDP185 CUP OF TANTALUS

Unsigned

BD 106; MxD 121; H 198. 19 C. G.

Glass goblet; tube rises through base and bends around; to show intermittent siphon.

End of tube near bottom of goblet; if liquid is poured slowly into goblet, it siphons out when it reaches the bend of the tube, the flow then ceases until this level is reached again.

Illustrated in Deschanel 1891,235.

2701 TDP245 DIFFRACTION APPARATUS

BRIDGE'S DIFFRACTION APPARATUS

RiD 61; H 6. Mid to late 19 C. G.

Oxidised brass ring with cogs on top holds a glass disc with shapes and patterns on a dark background.

The shapes include single circles and patterns of intersecting circles, triangles, squares, a hexagon, ellipses, etc., some with patterns in them.

Bull SIS, No.35, December 1992, p.26-7 illustrates this disc, and also the viewing arrangement, a small brass telescope on a turned stand, signed by Elliott Brothers, brought to a meeting by Peter Delehar: "Turning the screw below the frame [holding the disc at the objective end of the telescope] translated the disc as well as making it rotate, so that each design may be placed successively in front of a pin-hole. By viewing a point light source, diffraction patterns are displayed. John Bridge, a lecturer at University College, London, described his method for making large drawings of fine lines and then producing collodion negatives of them (Philosophical Magazine 10,1855,251-3). Three years later he described a number of patterns arranged in a circle and placed in front of a telescope (Phil. Mag. 16,1858,321-8). In both articles, he acknowledges the earlier work of Sir John Herschel (1792-1871). He concluded his second paper by saying "I may mention that Messrs. Elliott, 30 Strand, will supply the apparatus necessary for exhibiting these phenomena."

Another set, complete with telescope, and a good enlarged illustration of the disc, was offered in Tesseract 42,24,1993.."a distant point source of light, passing through the closely spaced lines on the target, suffers diffraction and interference, producing remarkably beautiful geometrically shaped spectra viewed through the low power telescope".

1164 TDP152 DIP CIRCLE

Henry Barrow & Co., 26 Oxendon St., London

Sp 158; H 236; Hs 185x177x52. 1848-1864. R.

Black brass tribach base; horizontal and vertical circles; two vernier magnifiers; mahogany and glass needle housing.

Horizontal circle scale 10-180-10-180-10°, vertical (silver) 0-90-0-90-0°; spirit level on housing base; clear and frosted glass sides to housing; white metal needle on agate planes. A "Dip circle by Barrow adapted to needles of various lengths" was one of a list of instruments presented to TCD by Rev. Humphrey Lloyd in 1868 (TCD/MUN/V/5/12 p298).

Dates from McConnell 1986,31.

1319 TDP037 DIP CIRCLE

Gambey à Paris

H 421; CrsD 197&262; Hs 335x318x76. 1800-1847. F.

Brass; tribach base; horizontal circle 0-350; vertical circle 0-90-0-90-0° in mahogany and glass housing.

Horizontal circle has vernier and clamping screw; spirit level on base of housing; vertical circle supported on two pillars, two magnifiers on diagonal pivot to read scale; white-metal needle mounted on parallel horizontal bars across housing; spare needle in case with sliding lid.

Dates from Payen 1986,159.

1274 TDP126 DIP CIRCLE

W.B. NICOLSON. GLASGOW

BD 91; H 160; SD 102. Early 20 C. G.

Brass base; eight divisions 0-270°; revolving table on this; black metal bracket for needle; silvered scale 0-90-0-90-0°; needle missing.

1165 TDP151 DIP CIRCLE

Robinson & Barrow, 26, Oxendon Street, LONDON

Sp 221; H 313; Hs 241x223x51. 1845-1847. FL.

Brass; tribach base; horizontal and vertical circles; verniers; two magnifiers; mahogany/glass needle housing.

Spirit level on plate base outside housing; white-metal needle on quartz planes.

Dates from McConnell 1986,30.

4153 TDP319 DISC SPINNER

YEATES & SON DUBLIN.

229x106x20&10; HsD 82. Mid to late 19 C. G.

Mahogany base with a raised portion having glazed holes; between them spins a glass disc with colours.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

The spinning disc has segments of different colours, and it retains its thong, but the driving pulley wheel, which would have been attached to the base, is missing; the glass in the holes on each side of the disc is broken, but the disc itself is intact; revolving the disc would have eliminated the colours.

1217 TDP134 DISC SPINNER

YEATES & SON. DUBLIN.

Sp 151; H 380; AxH 265. Mid to late 19 C. G.

Iron tripod base and support; brass wheel and handle, with thong to wood pulley wheel, turns two brass disc clamps. Latter screw together to secure disc; toothed cardboard disc fitted (with two teeth missing).

1191 TDP133 DISC SPINNER

Unsigned

B 307x197x31; H 570; WhD 237. Second ½ 19 C. G.

Mahogany base, support and wheel; brass fittings; boxwood handle; thong to pulley to spin coloured disc on top of support.

1293 TDP086 DISCHARGE TUBE

Unsigned

BD 81; H 323&325; D 48&50. Second ½ 19 C. G.

Two; black turned wood base; cylinder glass tube containing white phosphorescent sphere or shell.

Pink crystals embedded in sphere.

Also a broken green tube with brass ends and spangled clear glass tube inside (L330 D16), unsigned.

1297 TDP089 DISCHARGE TUBE - CROOKES

Unsigned

B 127x52x9; L 265; H 187. Late 19 early 20 C. G.

"Railway tube"; boxwood base; horizontal glass cylinder; inside, six-paddled wheel runs on parallel bars; disc electrodes from vertical arms at both ends.

"When a discharge passes through the tube the cathode rays strike the upper vanes and the wheel rotates and travels away from the cathode." - Griffin 1910,960.

1296 TDP093 DISCHARGE TUBE - CROOKES

Unsigned

BD 72; L 240; H 210. Late 19 C. G.

Black stepped wood base; glass; stem to horizontal tapering tube; wide end whitened; hinged maltese cross; disc electrode at narrow end; cross electrode in front of white end.

"If the cross is allowed to stand across the cathode stream, a sharp shadow will be formed at the end of the tube. After a while, if the cross is shaken down, the part of the tube which was formerly in shadow will fluoresce more brilliantly than the surrounding parts." - Griffin 1910,959.

1295 TDP092 DISCHARGE TUBE - CROOKES

Unsigned

BD 76; H 250; SrD 91. Second ½ 19 C. G.

Black turned wood base; glass; sphere bulb on curved support; (broken) bracket for angled foil between electrodes, located on top and bottom.

1294 TDP088 DISCHARGE TUBE - CROOKES

Unsigned

BD 83; H 225; SrD 68. Second ½ 19 C. G.

Black turned wood base; glass; stem to spherical bulb; two disc electrodes; paddle wheel with four flower shapes.

Latter broken; bulb has small green sphere on top and contains some white powder.

1320 TDP200 DISCHARGE TUBE - GEISSLER

Unsigned

L 136-275; D 5-34; C 966x326x138 Second ½ 19 C. G.

Collection of 18 assorted glass Geissler tubes; two broken; 11 with glass spirals; case with red cushions.

1146 TDP073 DISCHARGER - UNIVERSAL

Unsigned

B 338x119x27; PvH 228; SrsD 52; TD 97. Mid 19 C. G.

Mahogany base; turned centre pillar to table; two brass sphere and glass conductors on pivots on glass pillars.

Brass ball and socket pivots between insulating pillars and conductors; table has central ivory strip (W24) and can be raised or lowered, held with clamping screw; one of four feet missing.

1258 TDP157 DIVIDING ENGINE

Unsigned

L 400; H 156; SMxD 127. Late 19 C. G.

Iron bridge frame contains threaded rod; carriage runs on this; circular scales on end, one fixed, one moving; incomplete.

1231 TDP162 DRAWING INSTRUMENTS - SET

HOLTZAPFFEL & CO. LONDON. W. ELLIOTT * LONDON * R. NEEDHAM

C 595x65x64; Ss 477x46; CvsL 231-572.

Turn 19/20 C. G.

Lined mahogany case with 12 card scales and 17 boxwood curves; scales by Holtzapffel; curves Elliott/Needham.

Scales labelled e.g. "ORDINARY DRAWING SCALE INCHES and EIGHTHS", "ONE EIGHTH OF AN INCH TO THE FOOT" - "SIX INCHES TO THE FOOT"; curves all labelled: "200 FT.TO.AN.IN" - from "¼ MILE" to "3 MILES".

1304 TDP058 DRUM RECORDER

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY 1893

Sp c275; H c525; DrD c145 [no key for cupboard].

1893. S.

Red painted three-limb foot; brass and oxidised brass; endless screw; two cog wheels and four-gear pulley to turn pillar for drum.

Spiral groove on pillar; with two electrically driven pens on retort (broken or incomplete).

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1298 TDP056 DRUM RECORDER

SCIENTIFIC INST CO LTD CAMBRIDGE CALLENDAR'S PATENT

W 330; H 122; DrD 102. Invented c1897. R.

Brass; clockwork drives horizontal drum; electrically driven recording pens (wires damaged).

Date from Cattermole 1987,202.

2746 TDP290 ELECTRIC MOTOR

Unsigned

B 191x189x82; H 360; HsD 171. Late 19 C. G.

Mahogany base; cast iron circular housing on four feet; large coil with 16 small coils at intervals; armature.

The base is on two more-recent wood blocks; it has two brass contacts and a wood and brass handle to operate a switch mechanism inside the base; the sixteen small coils are wound at right-angles to the main coil; a pulley wheel is attached to the axis of the armature outside the housing.

1163 TDP174 ELECTRICAL MACHINE - CLARKE

IMPROVED PATENT MAGNETO ELECTRIC MACHINE FOR NERVOUS DISEASES PAWSON & BRAILSFORD, LITH, SHEFFIELD

Hs 262x121x116. Post 1878. D.

Mahogany case housing; brass; handle to cogwheel and pulley turns two coils at poles of horse-shoe magnet.

Coils covered in purple velvet; two brass cylinder electrodes (L119,D30); instructions in hinged lid include use of machine for toothache, tic-doloureux and neuralgia.

Medal awards noted up to 1878.

1197 TDP006 ELECTRICAL MACHINE - GRAMME

GRAMME Breguet Breveté S.G.D.G. No. 67

B 330x325x28; H 670; W 366. Second ½ 19 C. G.

Hardwood base; 24 sheet laminated magnet; brass and oxidised brass frame; pulley fitting behind armature.

More usual form has a handle and wheel rather than a pulley system.

Instrument illustrated in Ganot 1890,910.

2724 TDP268 ELECTRO DYNAMOMETER

SIEMENS BROS. & CO. LONDON. 3 2788

B 216x182x59; H 330. Late 19 C. G.

Mahogany base and vertical support for fixed and suspended moving coil; white disc scale on top, 0-390; three brass level screws under base; three brass contacts on top of base.

2670 TDP214 ELECTROMAGNET

YEATES & SON DUBLIN

H 230; CosD 45. Mid to late 19 C. G.

Two parallel off-white wire coils in housings with brass disc ends; four turning shaped iron pieces on top.

The latter, two on top of each coil, are in the shape of inverted commas; brass nuts attach the coil housings to a white metal base piece (75x21x21); incomplete.

2754 TDP298 ELECTROMAGNET

Unsigned

HssH 295, MxD 153. Mid to late 19 C. G.

Two vertical brass-ended coil housings; central iron plates on top; variety of removable iron pole pieces.

2703 TDP247 ELECTROMAGNET

Unsigned

D 133; H 532. Mid to late 19 C. G.

Two iron spools attached vertically to each other, with thick green-covered coils; string around outside.

2842 TDP303 ELECTROMAGNET FOR STRING GALVANOMETER

CAMBRIDGE INSTRUMENT CO. LTD. ENGLAND C67935

H 240; W 470; CosHsD 130, W 91. 1925. N.

Iron frame; two coils in brass spools with red leather covers; screws for mechanism at sides to adjust poles.

The actual adjustment is of small cylinders inset into the poles; microscope at one side.

1291 TDP196 ELECTROMAGNETIC ROTATION APPARATUS

Unsigned

BD 89; MD 28. Mid 19 C. G.

Ampère bucket; turned hardwood base; vertical cylinder magnet; metal bucket and ring hang from top of magnet.

Galvanic battery which rotates around magnet; also called "Ampère's rotating cylindrical battery" in Elliott 1956b,8 - more usually as pair on horse-shoe magnet to show rotation in different directions on poles.

"Ampere bucket" from Turner 1983,opp177.

1249 TDP121 ELECTROMETER - GOLD LEAF

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD. ENGLAND. NO 2497

H 132; Bx 66x64x63. 1895-1907. RN

Brass; box, circular windows at two sides, trap door on other; top double cylinder housing for wire to leaf.

Ivory and ebonite concentric insulating plug on top with brass cover; torn paper coverings behind trap door and on removable ring below.

Registered as Limited Company in 1895, serial no.4734 dated 1:3:1907 (Cattermole 1987,xiv and Bennett PC).

1256 TDP105 ELECTROMETER - GOLD LEAF

Unsigned

H 225; HsD 104; TD 70. Early 19 C. G.

Arched glass cylinder housing; brass sleeve above for rod with disc table on top and gold leaves below.

Broken crystalline material between rod and sleeve; open bottom to glass cylinder.

2739 TDP283 ELECTROMETER - QUADRANT

ELLIOTT BROS LONDON.

Sp 217; BD 183; H 373; VaHsD 120, H 30.

Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass; three level screws; four glass pillars to quadrant housing for aluminium vane suspended from crook.
Glass cylinder (D105,H69), with metal foil outside, sits in the base below the quadrants.

1212 TDP015 ELECTROMETER - QUADRANT, DOLEZALEK

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE ENGLAND

BD 150,150&130; H 316,337&329. Pre 1907 & 1912. N.

Three: 4477/15979/unsigned; brass; cylinder housing; three level screws on base; amber mounts for quadrants.

No 15979 (1912) does not have LTD in signature and has a circular window; others have square windows.

Also a later model C96364 (1927).

1192 TDP100 ELECTROMETER - TORSION, COULOMB

Unsigned

BD 275; HssD 218-205 & 28. Early 19 C. G.

Turned mahogany base; glass cylinder housing, paper scale 0-90-0; brass sleeves for glass fibre housing.

Lower housing slightly tapered; paper scale covers whole of circumference; brass dial on fibre housing, but no scale; wood buttons keep glass plate on top of lower housing in place; turned wood plug to hold internal spherical conductor; detector replaced.

The instrument was introduced in 1785 by Charles Augustin Coulomb (1736-1806) to determine the distribution of electric charge over conductors of different shapes.

Illustration and details in Turner 1983,200.

1243 TDP119 ELECTROPHORUS

Yeates & Son Dublin

D 154; H 312. Mid to late 19 C. G.

Three: brass disc, white ebonite handle: similar (D264,H322): older? (D198,H152): also, cracked base (Dc320).

Only the first is signed; the third has a turned glass handle and a bent wire with a sphere conductor (D16) on a red-coated top side - could be older; cracked base in locked cupboard for which no key could be found.

Illustrated in Elliott 1856a,15 and Griffith 1910,646.

1303 TDP146 ELECTROSTATIC CHAMBER

Unsigned

BD c155; H c415; ChD c95. Mid 19 C. G.

Hardwood turned base and pillar holds glass cylinder chamber with brass top and bottom.

For use with pith balls and electrostatic machines; locked in cupboard.

2742 TDP286 ELECTROSTATIC GENERATOR - CARRÉ

Unsigned - attributed to Yeates & Son

LaCnL 913, D 205. Late 19 C. G.

Parts only, including large brass cylinder conductor, wood pulley wheel and handle, leathers, brass comb, etc.

That the remains are mainly from a Carré machine (although there are parts of other generators also), can be determined by reference to the illustration in Yeates 1877,2, and the similarities are such that it seems likely to have been supplied by Yeates & Son.

Illustrated in Yeates 1877,2; machine introduced in 1868, Van Camp 1988,66&67.

1175 TDP163 ENGINE - HEAT

LOUIS HEINRICI ZWICKAU i.S.

B 195x191; H 463; WhsD 144. Late 19 C. G.

Iron and brass; circular base; supports to disc table; heating cylinder below; on top, two wheels and pistons.

Wheels each have six spokes; piston between them, which lies above the heating cylinder; one wheel has a further brass piston at the side; other has two pulley wheels and a spindle for a missing handle.

Called a hot air engine in Kohl 1911,629.

1324 TDP067 ERECTOR

Yeates & Son, Dublin

Sp 168; H 276; MiHs 110x102x100. Mid to late 19 C. G.

Iron three-limbed base; mahogany box, angled mirror, open front, top lens; lens housing on brass pillar above.

Oxidised brass lens housings; pillar for upper lens housing adjusted by rack and pinion.

This appears to be an incomplete example of S.M. Yeates' improved form of Erector (Yeates 1880,77), "for showing objects upright on the screen"; it is missing a second angled mirror above the upper lens housing.

Debbie Griggs, Rittenhouse 7, 1992, 10-11, shows a similar optical arrangement, a "vertical lantern", exhibited by Henry Morton in New York in 1871, used as a means to project objects (like a galvanometer needle) onto the screen.

1284 TDP044 EXPANSION APPARATUS

YEATES & SON Dublin.

Sp 195; H 344; PrD 15. Mid to late 19 C. G.

Green painted tripod foot; expanding brass pillar; bracket for three brass pivoted limbs; heated rods move limb mirrors.

Ebonite backing board for rods; mirrors no longer present but there are circular brass mounts for them; only two rods remain.

1172 TDP155 EXPANSION APPARATUS - 'S GRAVESANDE

Unsigned

BD 161; H 107; RiD 123; SrD 86. Mid 19 C. G.

'S GRAVESANDE pyrometer; mahogany base; three turned brass pillars to brass ring; copper sphere.

Screw attachment on top for securing (missing) string.

1334 TDP017 EYEPiece - MICROMETER

W. Watson & Sons, Ltd 313 High Holborn London (Leitz)

L 78,88&174. Early 20 C. G.

Three; Watson, Leitz, unsigned; brass; micrometer drumheads; eyepiece moves in grooves in latter.

First has silvered drumhead 0-90; second has brass drumhead 1-5; both of these have cogs in field of view and are in rectangular housings; third has silvered drumhead 0-90 and linear scale 0-80; Watson has lens beyond cogs; others have eyepiece lens systems only; Leitz has silvered tube below cogs.

Anderson 1990,88 lists the firm as a limited company in 1902, Clarke 1989,87 in 1908.

1238 TDP187 FARADAY NEEDLE

YEATES & SON, DUBLIN.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Sp 190; H 312; RsD 59. Mid to late 19 C. CT.

Cast iron tripod base; vertical magnet; wood mercury reservoir on top; wire from brass crook into mercury.

Cylinder magnet rises from green painted base; at the top is a boxwood mercury reservoir with a brass contact; a brass crook with a contact at the bottom rises from the base to above the cup; a wire from this into the mercury will rotate when a current is passed, as shown by Faraday.

Illustrated in Yeates 1877,31.

2693 TDP237 FARADAY NEEDLE

YEATES & SON, DUBLIN.

B 206x153x37; H 295; CuD 79. Mid to late 19 C. G.

White painted mahogany base; vertical magnet with coil to wood mercury cup; brass crook suspends copper wire.

Base has four feet and four brass contacts; the brass crook rises from the base; the wire around the magnet is green-covered; instrument now has a modern electric plug socket on the base.

1154 TDP148 FIRE SYRINGE

Yeates & Son, Dublin

L 244; D 35; HasD 45. Mid to late 19 C. G.

"Pyropneumatic" syringe; brass sleeves; thick glass stationary boxwood handle and one attached to piston.

"For the development of heat by rapid compression of air" - Yeates 1883,8.

2845 TDP306 FRICTION HEATING APPARATUS - CALLENDAR

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD. CALENDARS PATENT

Sp 330; H 605; CyD 153, W 52. Late 19 early 20 C. G.

Cast iron tripod foot and frame; brass calorimeter.

Frame rises to axis of pulley driving wheel and calorimeter; the wheel has six circular holes; a cog wheel on the axis turns a revolution counter; the foot has one level screw; ribbons and weights missing.

2705 TDP249 GALVANOMETER

Weston Electrical Instrument Co. Model 30 1918

B 215x190x44; H 156; ML 123x65x35. 1918. S.

Mahogany base; seven brass contacts on three ebonite plates; horse-shoe magnet; moving coil and spring between poles.

As the coil on a rectangular mount turns a little around an iron block, a flat wire behind the coil moves between two contacts; a brass rod rises from the base in the centre of the magnet and has a screw thread and knurled nut on top; instrument seems incomplete.

1207 TDP005 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS LONDON 239

Sp 205; H 308; HsD 115, W 80. c1878. NR.

Brass; folding tripod legs; cylinder coil housing, glass front; two mirrors; pillar and curved magnet gone.

Mirrors in centre of coil and below; endless screw and cog wheel on top of coil housing to turn pillar mount; two copper contacts at back.

Turner 1983,201 gives 1881 date for No 539.

1206 TDP004 GALVANOMETER - ASTATIC MIRROR

Elliott Bros.. London

Sp 214; H 445; HsD 96, W 71. Third ¼ 19 C. G.

Brass; folding tripod legs; cylinder coil housing, glass front; curved magnet on top pillar; mirror gone.

Endless screw and cog wheel above coil housing to turn pillar holding curved magnet; three level screws; two copper contacts at back.

Similar instruments on sale from about 1880 and still advertised in Elliott 1895,13.

1220 TDP011 GALVANOMETER - ASTATIC, NOBILI

Elliott Bros London.

BD 170; H 311; HssD 147&37, H 72&170.

Second ½ 19 C. G.

Mahogany base, four contacts below; coil on revolving brass disc; housing of wide and narrow glass cylinders.

Coil disc revolved using endless screw and cog wheel, scale 60-0-60°; white paper scale for magnet 0-90-0- 90-0°; double needle; fibre (missing) supported on brass frame, wide at bottom and narrow arch in thinner housing; base of three laminated mahogany sheets.

Type of galvanometer introduced by Leopoldo Nobili (1784-1835) in 1825 - P Brenni, Bull SIS 8,1986,4.

1208 TDP013 GALVANOMETER - ASTATIC, NOBILI

Watkins & Hill Charing Cross LONDON

BD 152; H 250; HsD 99, H 166. 1819-1856. F.

Brass; flattened coil; double magnet; silvered ring scale; glass cylinder housing; reading microscope.

Scale 90-0-90 with three grades of divisions; three level screws; right-angled torsion support; two contacts on front; microscope sits into top of glass housing above scale.

Dates from Clifton 1995,291.

1218 TDP094 GALVANOMETER - ASTATIC, NOBILI

Unsigned

BD 162; H 310. Mid 19 C. G.

Mahogany base, three level screws and coil housing; silvered brass ring scale; brass crook fibre support; glass dome.

Unusual in having wood base and level screws; ring scale 0-180-0° has one diagonal; double needle.

1211 TDP014 GALVANOMETER - ASTATIC, NOBILI

Unsigned

BD 153; H 280; HsD 138, H 190. Mid 19 C. G.

Brass; three level screws; two contacts on ivory plate below base; copper and silvered scale; glass cylinder housing.

Coil also on ivory mounting; scale 90-0-90; two pillars and arch for fibre suspension which protrudes through the glass top; glass cylinder cracked; endless screw and cog-wheel below base to revolve coil.

1223 TDP027 GALVANOMETER - AYRTON MATHER

AYRTON MATHER GALVANOMETER SUPPLIED BY BAIRD & TATLOCK (LONDON) LTD. NO. 606

BD 178; H 196; HsD 131, H 154. Turn 19/20 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass and oxidised brass; three level screws; two contacts; cylinder housing covers entire instrument except base. Detector in metal cylinder with mirror on top; empty bubble level on base; endless screw and cog wheel on bottom to adjust mirror; circular window in housing; fibre broken.

Baird moved to London in 1890, Brian Gee, Bull SIS 27,1990,33.

2675 TDP219 GALVANOMETER - AYRTON MATHER

CAMBRIDGE INSTRUMENT CO. LTD. ENGLAND NO. L-21245

Sp 159&162; MD 96, W 48; H 203; CoHsD 16. c1930. N.

Iron tripod base; two level screws; ring magnet; brass tube housing; mirror on wood bobbin; clamping arm.

Two brass contacts on bar on top of magnet; the brass tube for the fibre support is screwed to a white-metal housing (68x44x35) with a glass disc window (D25).

3070 UDE096 No.L-16801 is dated 18:8:1926.

1221 TDP029 GALVANOMETER - AYRTON MATHER

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE ENGLAND 4906 and 8161

BD 168; H 246; HsD 108. 1907 & 1908. N.

Pair; brass; three level screws; two spirit levels (gone from 4906); coil wound on wood bobbin, mirror on top.

Fibres broken in both cases; each has three contacts on base; 8161 has endless screw and cogwheel to adjust mirror angle.

1222 TDP026 GALVANOMETER - AYRTON MATHER

AYRTON & MATHER R.W. PAUL, HATTON GARDEN, LONDON PATENT

BD 149; H 167; HsD 101. "4276 PATENT 1892"

Brass; three level screws; two contacts; black ring magnet; empty bubble level; coil in white-metal cylinder.

Mirror and fibre missing.

Another has liquid in the bubble level on the brass disc top to the magnet, but is missing its coil insert.

Firm operated 1891-1919, Cattermole 1987,98-104.

2674 TDP218 GALVANOMETER - AYRTON MATHER

H. TINSLEY & CO LONDON. S.E. NO. 9348

Sp 158; BD 166; H 265; HsD 115&19. Early 20 C. G.

Ebonite base; three level screws; three contacts, two of which can be shorted; double brass cylinder housing; mirror on wood coil bobbin; circular window.

1225 TDP052 GALVANOMETER - AYRTON MATHER

H. TINSLEY & CO. LONDON. S.E. NO 1433

BD 152; H 257; HsD 111&19, H 55&116. Early 20 C. G.

Ebonite base; three level screws; two contacts; double brass cylinder housing; coil wound on wood bobbin with mirror; fibre missing; rectangular window.

1219 TDP021 GALVANOMETER - BROCA

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD 6970

BD 172; H 274. 1908. N.

Brass; three level screws, two spirit levels; brass and ebonite coil housing; mirror window below; ball and socket magnet.

Coils labelled 419 W at 20°C and 465 W at 20°C; spirit levels at right-angles to each other on base; which also has two contacts; controlling magnet on ball and socket pivot on base.

The galvanometer is of the "moving vertical magnet type" - two steel wire magnets placed vertically and each magnetised so that the two ends have the same polarity with a pole in the middle; allows use of powerful magnets, with small inertia.

Illustrated in Baird 1924,455.

1169 TDP149 GALVANOMETER - D'ARSONVAL

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LT NO 1275

Sp 168; BD 168; H 230; HsD 114. c1900. N.

Brass; three level screws; disc base; cylinder housing, central circular window; mirror adjust screw on top under hinged disc.

Company founded 1881, serial no 4734 in 1907; Cattermole 1987,xiv, and Bennett PC.

1205 TDP046 GALVANOMETER - D'ARSONVAL

E. DUCRETET PARIS RUE CLAUDE BERNARD, 75

BD 201; H 318. Late 19 early 20 C. A.

Mahogany base; two contacts; five-plate horse-shoe magnet on brass pillars; moving coil round white metal cylinder.

Scale 0-80 and 40-0-40 on silvered arc held by two more brass pillars; fibre missing; damaged mirror above moving coil on fibre mount; groove for missing dome, but protective fibre ring around groove remains.

Anderson 1990,25 lists this address in 1900.

1224 TDP050 GALVANOMETER - D'ARSONVAL

GAMBRELL BROS. & CO. LTD. LONDON PATT. 3300 SERIAL NO 178

BD 152; H 195; HsD 108&48 H 79&67. Early 20 C. G.

Ebonite base; three level screws; four contacts; double brass cylinder housing; coil with mirror around cylinder.

Bubble level; circular window in housing; two contacts shorted; white coil round white-metal cylinder; knob on wider housing: "TO RELEASE DEPRESS & ROTATE".

Gambrell Bros active in 1900, Crawforth 1988,17.

1233 TDP031 GALVANOMETER - D'ARSONVAL

NALDER BROS. & CO. WESTMINSTER NO. 23,182 & 32,011

BD 152; H 278; HsD 94, H 247. 1890-1910. F.

Two; brass; two contacts and three level screws; cylinder housing, circle window; copper coil - metal cylinder.

Mirror (missing in 23182) on top of coil; both move around blue-metal cylinder; fibre broken in both cases; knob on side of base to clamp or release coil.

Another such galvanometer (NO. 23,189) was refurbished and presented to Rev. Professor Michael T. Casey, St Patrick's College, Maynooth on May 19, 1989 - see 1983 MAY304.

In the attic are Nos. 11682, 22357, 23190, 23192, 31999, and 32015, plus two without tops.

The firm issued catalogues from 1890-1910, Anderson 1990,57-8.

2714 TDP258 GALVANOMETER - D'ARSONVAL POINTER

T. MASON. OPTICIAN. DUBLIN.

Hs 177x143x160-90. Late 19 early 20 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Mahogany housing, sloped glazed front; ring magnet; coil on ivory bobbin attached to pointer; white paper scale 6-0-6. Coil suspended by a fibre from a brass knob at the back of the housing; circular spirit level with red spirit on the back top left of the housing; three feet, two levelling; two brass contacts behind instrument. There are five more examples in the collection, which also has six D'Arsonval pointer galvanometers by "GAMBRELL BROS. LONDON", and one by "BAIRD AND TATLOCK (LONDON) LTD.". Morrison-Low 1989,131 lists Thomas Mason II from 1866-1922.

1232 TDP020 GALVANOMETER - DRYSDALE-TINSLEY

H. TINSLEY & CO LONDON S.E. NOS 10872 and 11007

Hs 305x152x150; H 209. Early 20 C. G.

Two Drysdale-Tinsley vibration galvanometers; mahogany base and housing; horse-shoe magnet; mirror.

Coil arrangement and mirror on fibre at poles of magnet; brass knob outside housing leads to screw thread to adjust cross bar on magnet; housing missing for one - in fact housing numbered 11007 fits galvanometer 10872, other unnumbered; circular window in housing; ebonite plate below one with two contacts, but absent in other.

2708 TDP252 GALVANOMETER - DUDELL OSCILLOGRAPH

SCIENTIFIC INSTRUMENT CO. LTD, CAMBRIDGE No 1455

BD 281; H 260; MOD 174; CosOD 88; Hs 126x33x26.

Pre 1907. N.

Mahogany base; three level screws; ring magnet, eight vertical coils around; slide-in housing with thermometer at poles.

Base has 12 brass contacts; the vertical coils are placed at equal intervals around the horizontal ring magnet; the brass and oxidised brass vibrator housing which slides into a groove between the poles is connected to the base by four fuses; the thermometer scale is 0-60°C; there appears to be a suspended glass disc seen through a small hole in the housing, but it is not a mirror.

Cattermole 1987,218 illustrates this instrument - the "Duddell dual system oscillograph galvanometer".

1317 TDP064 GALVANOMETER - TANGENT

HARVEY & PEAK LONDON W.C.

B 351x128; H 220; CoD 191. 1884-1909. F.

Mahogany base, two boxwood scales 0-250mm; single turn and multiple turn coils at ends; magnetometer missing.

Latter would move between the scales at each side of instrument; two arched feet; two brass contacts on one foot for single turn copper coil; two contacts on mahogany housing of multiple turn coil outside the other foot.

Another such instrument is missing its multiple turn coil and housing.

Dates from Downing 1988,57.

2740 TDP284 GALVANOMETER - TANGENT, STEWART

**** *****[can't decipher] & CO ELECTRICIANS BRISTOL

B 456x155x28; H 181; MaHs 142x140x65. Late 19 C. G.

Mahogany base and two supports for movable bar with box-wood scale 500-0-500, and magnetometer; coil missing.

Magnetometer, housed in glazed mahogany box, can move independently of the calibrated bar, and has a white ring with scale 90-0-90°, having equal divisions, and another 90-0-90 with unequal divisions; three brass contacts on ebonite bar on base.

"Stewart" from Griffin 1910,742.

4151 TDP317 GALVANOMETER - UPRIGHT

Yeates & Son Dublin

B 71x68x35; H 88. Mid to late 19 C. G.

Mahogany base; elongated brass spool for green coil; centre magnet with incomplete pointer.

The base has a hollow compartment with a missing door and lock; around the top of the base is a brass circle presumably for a missing dome; behind the coil spool is an ebonite plate, with a curved top; to which may have been attached a scale.

The instrument may be the "Small Vertical Galvanometer" of Yeates 1877,26, possibly for use as "indicators or detectors".

2735 TDP279 GALVANOMETER - UPRIGHT

YEATES & SON [sic] DUBLIN

DiD 154, W 14; W 46. Mid to late 19 C. G.

Mahogany disc; wide brass spool for coil and magnet; boxwood arc scale 90-0-90°; hole for missing stand.

Moving magnet, attached to pointer, revolves inside the elongated spool for green-covered wire; two brass contacts; hole in side of disc for missing stand.

1228 TDP106 GALVANOMETER - UPRIGHT

Unsigned 0.21 Ohm 19.1.

Sp 167; H 275; CoW 78. Second ½ 19 C. G.

Iron tripod base; brass pillar; coil between ebonite plates; moving needle and scale missing; magnet at back.

Thin pillar at back holds adjustable brass bracket for rotating red and blue magnet; note "," decimal points on pairs of brass contacts on upper ebonite plates - suggests continental manufacture.

1227 TDP065 GALVANOMETER - WILBERFORCE

W.G. PYE & CO ENG. CAMBRIDGE NO 9036

Sp 187; B 168x126x21; H 267. Early 20 C. CT.

"Wilberforce's reflecting galvanometer"; mahogany base on brass tribach; hinged mahogany housing for two coils.

Brass contacts and fittings; fibre and mirror missing; horizontal pillar with two moving brackets for compensating magnets at back.

"This instrument is so arranged that it can be used either Ballistically or Aperiodically and its sensitivity can be varied through a wide range".. up to about 500mm per micro-amp at one metre - illustrated in Pye 1914,76.

1341 TDP023 GAS METER

SPIROMETER MANUFACTURED BY CROLL RAIT & CO LONDON

Hs 246x181x174; DiD115. Turn 19/20 C. G.

"Dr Edward Smiths"; tin housing; inlet underneath; white dial, 10-100 cubic inches; four small dials below.

Latter have scales 0-9 and measure "ONE THOUSAND", "TEN THOUSAND", "HUNDRED THOUSAND", and "ONE MILLION".

2692 TDP236 GEM STONE REPLICAS

Unsigned

C 539x258x44. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Forty three glass replicas, in various crystal shapes (plus two domed discs); Topaz, Hanyin, Granat, etc.; case. Mahogany drawer case; also including Spinell, Morion, Amethyst light, Dichroit, Bergcrystal, Pyrop, Zircon; with five examples of Topaz and two of Granat.

2702 TDP246 GEOMETRICAL MODELS

Unsigned

Various e.g. Sq41x41x41; SrsD22. Mid to late 19 C. G.

Collection of boxwood models, including squares, spheres, hemisphere, three and four side pyramids, prisms, etc. Also more complex shapes with triangular sides.

2697 TDP241 GLASS BELL JAR

Unsigned

BD 188; H 450; MxD 315. Mid 19 C. G.

Diameter increases from base to maximum at height c270mm; damaged handle.

Also other jars of various shapes and sizes.

1155 TDP183 GONIOMETER - CRYSTAL

Unsigned

Sp 229; H 265; SD 235; L 478. Mid 19 C. G.

Brass and oxidised brass; tribach foot; six spoke circle scale 10-360°; scales 10-360° on both telescopes.

Fixed tube with crude slit sleeve at one side; knobs acting on racked circle scales to move other telescope and to revolve eyepiece analyser; silver metal scales; vernier to read large circle; raised table (D81) in centre of large circle for sample.

1315 TDP068 GONIOMETER - SEARL

Unsigned - attributed to W.G. Pye & Co.

No measurements available. Early 20 C. CT.

"Searle's simple", mahogany board; upright housed lens at one end; scale 20-0-20; T base board and scale missing.

Metal right-angled bracket on board with circular aperture for scale 20-0-20 towards other end; socket below for revolving with respect to missing T-board with linear scale.

For measuring angles up to about one quarter radian - Illustrated in Pye 1914,122.

1145 TDP184 GRATING - DIFFRACTION

Manuf by D.C. Chapman with L.M. Rutherford's Engine Mar 1880 29520 spaces 17296 per inch [on speculum].

Sp 138; H 101; Hs 90x88x15. March 1880.

Speculum metal; oxidised brass housing; level screws.

Signature engraved on back of speculum metal inside housing; three brass level screws on base.

A card with the grating notes: "In the 1870s, some of the best gratings were those made in the US using the equipment of L.M. Rutherford. This one dates from the end of that period, just prior to the dramatic improvements which were achieved by Rowland."

1321 TDP062 GRAVITY TRACK

Unsigned

1203x102x73; WhsD 125. Late 19 early 20 C. G.

Mahogany open-top box with two brass flywheels on white metal axes.

2720 TDP264 HYDROMETER

Temp 60 Yeates & Son, Opticians, Dublin.

L430; BuD 21; Sfd 7. Mid 19 C. G.

Glass; long egg-shaped mercury reservoir; cylinder bulb; hand-written signature on paper scale 1640-1900.

In case with unsigned hydrometers 2721 TDP265.

1292 TDP197 HYDROMETER

Yeates & Son. Dublin. Beaumè Temp 60

L 186; RsD 15; BuD 21. Mid to late 19 C. G.

Glass; spherical mercury reservoir; pear shaped bulb; scale 0-45.

Another German "Baume's [sic] hydrometer" with pear-shaped mercury reservoir (D15), cylinder bulb (D20); scale 0-24; L 279; "Baume's Hydrometer for heavy liquids. Temp. 60°..F. made in Germany Resistenzglas."

2721 TDP265 HYDROMETER

Hydrometer for Specific Weight, Tempe:=60°F rht.

L 410; Bu&CyD 19; Sfd 7. Mid 19 C. G.

Three (of five); glass; black reservoir and cylinder bulb; paper scales; leather-lined case; space for cylinder.

Hand-written scales 1,000-1,200, 1,200-1,400, and 1,400-1,640; only the 1,200-1400 instrument is undamaged - it has a spherical reservoir; the 1,000-1,200 has its reservoir and cylinder broken; the 1,400-1,640 has an elongated sphere reservoir, and a broken stem; all include "graduated from" on the scales; oak case has room for five hydrometers, a cylinder holder, and a stirring rod.

Case also contains hydrometer 2720 TDP264.

1177 TDP001 HYGROMETER - DANIELL

Unsigned

C 169x133x49; BusD 29&27. c1830. SI/R.

Mahogany fitted case, purple velvet lining; brass pillar with thermometer; black and white bulbs; base missing.

Ivory scale 0-100 above black bulb; clear bulb covered with gauze; mercury thermometer with ivory scale 10-120° F; ivory peg in case for missing disc base; glass bottle with stuck ground stopper for ether (85x25x16).

Appears identical to instrument signed by Newman and dated c1830 (design published 1820) - Turner 1983,242.

2699 TDP243 HYGROMETER - DINES

YEATES & SON DUBLIN

B 362x101x20; H 173; CyH 152, D 65.

Mid to late 19 C. G.

Mahogany base; brass cylinder one end; pipe with stop-cock leads to metal housing with thermometer and outlet.

The housing (82x29x27) is on the end of the horizontal brass pipe; a (broken) thermometer sits into the housing parallel with and above the pipe; a bent out-let pipe leads from the housing on its other end.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2685 TDP229 HYGROMETER - DINES

Unsigned
B 279x79x42; H 158. Late 19 C. G.
Three; mahogany base and housing for tin vessel; horizontal thermometer 20-110°; brass-bound glass plate.
The latter is at the end of the base away from the tin vessel; a curved outlet pipe leads off this end of the base.

1183 TDP002 HYGROMETER - MASON

Thermometer nach Celsius, jeoer Grad in 5 Thiele getheilt, Barom: H: 28" 3""; verf: von J.G. Greiner Jun: in Berlin 1850 im Januar.
BD 78; H 457; ThsD 15. 1850. S.
Hardwood base and pillar; brass brackets; two removable mercury thermometers -20-30° held vertically.
A "Thermo-barometer - by Greinar [*sic*] of Berlin" is listed as one of the instruments presented by Humphrey Lloyd to TCD in 1868 (TCD/MUN/V/5/12 p298).
Brachner 1985,140 lists J.C. Greiner & Sohn whose workshop was taken over by H.L.F. Fuess in 1876.

1179 TDP140 HYGROMETER - MASON

MASON & SON OPTICIANS 11 ESSEX BRIDGE DUBLIN
Hs 254x64. 1865-1875. F.
White-metal housing for two thermometers 0-110°, both bent near reservoir at about 90°; mounted horizontally; dry bulb broken.
Dates from Morrison-Low 1989,130.

1252 TDP142 HYGROMETER - MASON

NEGRETTE & ZAMBRA, SCIENTIFIC INSTRUMENT MAKERS LONDON. 109961 & 109962
HsH 297, W 158; Ss 218x36; C 371x178x70.
Patent 1917. R.
Boxwood case and housing for two mercury thermometers on glass-backed white scales 10-130°, one with muslin wick.
Patent dates from Crawforth 1984,104.

1190 TDP114 HYGROMETER - MASON

SPENCER & SON, DUBLIN.
BD 143; H 407; SsHs 230x38. 1864-1886. F.
Turned oak base; oxidised brass pillar; brackets for white-backed glass mercury thermometers with scales 20-130°.
Thermometers labelled "WET" and "DRY" with former having muslin wrap and wick.
Dates from Morrison-Low 1989,136.

2709 TDP253 INDUCTANCE - VARIABLE

H.W. SULLIVAN LONDON No 281 REACTION INDUCTANCE
Hs 263x183x188. Pre 1922 ["OCT.-9 1922" on base] S.
Mahogany housing; ebonite top; four brass contacts; 12-point switch "A"- "L"; knob to white arc scale 90-0-90.
The switch and scale knobs are of ebonite.
Also No. 275 present, complete, and No.272 without its housing.

1338 TDP075 LAMP - CARBON ARC

O(?). Serrin Bte S.G.D.G. Paris OLS Brevete Etranger Patented in England The 15th of March 1859 No 653
H 767; B 218x123-179x84, H 245. Patented 1859. S.
Brass; rectangular tapering base; vertical carbons.
Automatic adjust mechanism within housing; two vertical mounts for carbons, one with two right-angles so that upper carbon is in line with lower; circular shield on sliding bearing with clamp from taller mount to surround shorter; two contacts at sides of base.

1339 TDP055 LAMP - CARBON ARC

Unsigned ESTABLISHED 1816 TRADE MARK LONDON MADE
B 280x120; H 281. Late 19 C. G.
Metal base for sliding, with handle; brass pillar with rack and pinion to brackets for carbons held at right-angles.
Two ebonite knobs to move carbons apart or both at the same time.

1325 TDP074 LAMP - CARBON ARC

Unsigned
Sp 194; H 488; Hs 104x83x70. Second ½ 19 C. G.
Iron tripod foot; brass rack and pinion adjusted pillar; automatic double coil mechanism for carbons above.
Mechanism in housing with side panel missing; carbons on adjustable pillars above, one straight, one through two right-angles so that upper carbon lies on top of lower.

1152 TDP048 LANTERN - BIUNIAL

NEWTON & CO OPTICIANS 3 FLEET STREET LONDON
B 610x224x17; H 730. Late 19 C. G.
Mahogany base and housing; russian iron cowl; brass lens system on backing plate; four doors; red curtain at back.
Lens system focused by rack and pinion, slide space with clips at back; second housing below without lens or slide space; each door has brass-bound blue disc window; and door has broken hinges; backing plates signed: "NEWTON & CO.
Opticians to her Majesty the Queen and the Government. 3. Fleet Street, London."
Pre 1901, when Queen Victoria died.

2756 TDP300 LANTERN - TRIUNIAL

NEWTON & CO OPTICIANS TO THE QUEEN 3 FLEET ST. LONDON
B 475x472x47; H 757; CyH 465, D 392. c1894. R.
Mahogany base; four brass pillars to oxidised brass cylinder drum with three openings; no optic plates nor cowl.
Three doors with circular spy holes having brass pivoted disc covers; rotating drum to bring each of the three openings into the light path with the others out of the way; three handles at the base of the drum to help turning; plates with optics (now missing) are attached by four knurled knobs to the drum.
0439 RDS002 is a complete instrument, this one is in a distressed state, but was once a fine instrument.
The presence of one of these state-of-the-art lanterns in TCD was noted in the British Journal of Photography, Supplement, April 6, 1894.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1200 TDP041 LANTERN - UNIAL

NEWTON & CO. MAKERS, 3. Fleet Street, London.

B 521x518x90; H 700; HsD 320 H 470. Early 20 C. S.

Tiered mahogany base; oxidised brass cylinder housing; fluted cowl; brass lens mount; carbon arc lamp.

Lens mount with slide clips has signature with words: "Opticians to His Majesty the King, and the Government", which dates it after 1901; variety of fittings including projection microscope 1209 TDP043, rotating prisms 1210 TDP042, circle of nine apertures; adjustable slit; rack and pinion focus lens system; arc lamp, signed by Newton, has two manual controls; one to move both carbons together and one to separate them.

Queen Victoria died in 1901.

1305 TDP033 LENS - BICONVEX

Unsigned

HsD c220 [key for cupboard missing]. Mid 19 C. G.

Mahogany frame; brass semi-circle mount; short brass pillar below for missing stand.

1281 TDP191 LENS - PLANO CONVEX

Unsigned

D 255. 19 C. G.

Two; one mounted vertically on mahogany and oxidised brass stand; one mounted horizontally on metal frame with four legs.

1153 TDP054 LENS - PLANO CONVEX

Unsigned

D 255; HsW 100. Late 19 C. G.

Large lens in white-metal housing; in very good condition.

1188 TDP178 LENS ON STAND

Yeates & Son Dublin

BD 104; H 371; LeHsD 99. Mid to late 19 C. G.

Brass; weighted expanding stand; semi-circular mount; compound magnifying lens, both sides plain; cracked.

1248 TDP061 LENS SYSTEM

JAMIN Ingr Opticien 14 rue Chapon Paris 12^e Bréveté s.g.d.g. 985

L 159 MxD 121. Mid 19 C. G.

Brass; projection lens system; two focusing knobs on sides; lens hood on one end, screw thread on other.

Workshop of Jamin founded 1823 - but no final date given, Payen 1986, 159.

1316 TDP080 LEYDEN JAR

Unsigned

H 320; D 143; ToD 91-98. Mid 19 C. G.

Three; cylinder glass jar; narrower top; foil inside and out; two wooden lids with conductors, only one complete.

Complete conductor has brass sphere on top of bent brass rod which leads to a wire inside ending in a crudely cut brass disc; other conductor is missing its sphere, and one jar is without lid or conductor; height noted is without lids or conductors.

2744 TDP288 LEYDEN JAR BATTERY

Unsigned

Hs 645x643x242; JasH 356, D 181. Mid 19 C. G.

Mahogany divided case for eight (of nine) glass cylinder jars; detached brass rod and sphere conductor system.

Metal foil on both sides of jar bottoms; the conductor system consists of bars across the tops of the jars, with spheres from which rods descend, splitting into three legs within the jars; the tops of the jars are not painted red as are those in 2743 TDP287 and 2745 TDP289; one jar is broken but complete; the open top case has brass handles on two sides.

2745 TDP289 LEYDEN JAR BATTERY

Unsigned

Hs 375x375x259; JasH 312, D 107. Mid to late 19 C. G.

Mahogany divided case for two (of nine) glass cylinder jars; red tops; brass rod and sphere conductors.

Metal foil inside and outside the jars under their red tops; the conductor system is incomplete and detached; it consists of bars for the tops of the jars, with spheres attached to rods descending into the jars and splitting into three bent legs; the open top case has brass handles on two sides.

2743 TDP287 LEYDEN JAR BATTERY

Unsigned

Hs 609x496x270; JasH 305, D 105. Mid to late 19 C. G.

Mahogany divided case for 19 (of 20) glass cylinder jars with red tops, foil below; one three-legged conductor.

All of the conductor system is gone except for one vertical rod leading to a small sphere from which protrude three bent legs to fit into the jar; the jars are foil-covered inside and out below the red-painted tops; the open top case has brass handles on two sides.

1245 TDP115 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned

H 353; D 90-107&77-99; H 136&115. Second ½ 19 C. G.

Glass pail (missing) with two zinc pails; brass spherical conductor (D29) on rod rising from centre pail.

2970 TDP309 LIGHT INTERFERENCE SLIT

Unsigned

No measurements available. Mid 19 C. G.

Brass plate with slide for two white-metal plates forming a slit, one side adjusted by a micrometer 10-100; another white-metal scale at the side 0-9.

Identified by P. Delehar 5/90.

1215 TDP124 LIGHT RECOMBINATION MIRRORS

Unsigned

B 225x74x14; H 181; Mis 101x14. Late 19 C. G.

Wood base and mount for 10 tall thin mirrors (two missing) set in dowels which can rotate using rods at bottom.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1312 TDP179 LODESTONE

The Gift of his Excely. Thomas Lord Wyndham, Baron of Finlas Lord Chancelour and one of the Lord Justices of Ireland, to Trinity College near Dublin

HsL 133, W 87. Lord Chancelour 1726-1739.

Approximately elliptical stone bound in brass.

Also inscribed on the lodestone are the arms of Trinity and (presumably) of Wyndham ("A BON DROIT") on top; holding ring above; poles protrude below with keeper on S-shaped hook.

Accompanying letter from David Webb suggests it was given as a personal gift to Richard Helsham (1683-1737) the first Professor of Natural and Experimental Philosophy; Wyndham lived from 1681-1745.

1267 TDP103 MAGDEBURG HEMISPHERES

Unsigned

L 300&240; D 96&82. Mid 19 C. G.

Brass; two pairs; one side of each has fixed handles; the other stop-cock and removable handle.

2694 TDP238 MAGNET - ROTATING

YEATES & SON, DUBLIN.

Sp 190; H 382; M 268x16. Mid to late 19 C. G.

Green painted iron tripod base; brass crook to top of magnet; wood mercury cups at middle and base of magnet with contacts.

The central mercury cup surrounds the magnet; the contacts connect with the mercury in the cups; one side of the magnet is painted white.

1171 TDP158 MAGNETOMETER - KEW PATTERN

THOMAS JONES 4 RUPERT ST. LONDON

Sp 223; L 622; H 402; CrD 165. 1851-1859. A.

Kew pattern unifilar; tribach base; divided silver circle; mahogany housing for suspended magnet/mirror.

Circle divided 10-360°; instrument revolves on this with vernier and magnifier; laminated magnet; fibre in glass and brass tube housing; disc weight at one side, long frame to hold black-painted metal telescope at other; ivory scale 2-38 (mirror inverted) on top of objective end.

Name from McConnell 1985,49 and 1986,32; dates from Clifton 1995,154.

1288 TDP090 MALLET

Unsigned

L 235; MxD 22; HdL 49, D 24. Second ½ 19 C. G.

Turned mahogany shaft; cylindrical head; for sounding tuning forks.

2687 TDP231 MELDOMETER - JOLY

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE ENGLAND No.13807 [No.7933] LUCAS' PATENT No 13242 1908

Sp 178&181; H 230; TuL 223, D 25. 1910. N.

Brass microscope focuses on sample on platinum strip.

Base on three feet; two pairs of supports for white-metal horizontal bars which hold microscope and allow it to move sideways along them; ivory drum (D52) at side with scale 0-90.

A leaflet with the instrument "Leaflet No.81" notes: "The special feature of the instrument is that it only requires a very small quantity of the substance whose melting point is to be determined, and therefore the substance may be obtained in a high state of purity; or in the case of minerals, fragments can be chipped off museum specimens without destroying their value..."

The instrument depends on the linear expansion of a strip of platinum with temperature. The substance to be investigated is placed in the centre of the platinum strip, the strip being heated by an electric current until the substance melts. The length of the strip at the moment of fusion is a measure of the temperature which it has acquired, and therefore indicates the melting point of the substance."

See also the Meldometer entry 2975 UDE001.

J. Joly, Proceedings of the Royal Irish Academy, 3rd Series II, 1891,38.

1176 TDP141 MICROSCOPE - COMPOUND, BINOCULAR

R & J Beck 31 Cornhill London 5250

Sp 210; H 448; SaD 128; C 494x325x260. c1870. N.

Brass; tripod foot; two tapering pillars; curved limb on pivot; circular graduated stage; Wenham prism.

"Large Best" microscope; disc base for pillars revolves around foot; substage mirror and condenser missing; stage graduated 40-0-180°, knobs to rotate and to move in perpendicular directions; coarse focus by rack and pinion, with knob for fine adjustment on the nose-piece; mahogany glass-fronted case.

Turner 1981,74 gives serial no 5381 dated 1870; firm at 31 Cornhill from 1867-1894, Crawforth 1988,4.

2689 TDP233 MICROSCOPE - COMPOUND, BINOCULAR

C. COLLINS Optician 77, Gt Titchfield Strt LONDON

Sp132&155;H(-E)325;C369x179x165. 1863-1870. R.

Brass; Y-foot; trunnions to pivot; right-angle bracket to objective end; mirror; case with accessories.

The concave mirror is in a semicircular mount which slides on a cylinder below the stage; under the stage is a wheel of five apertures; focus by double knurled knob (not now functioning); boxwood fitted case containing two eyepieces, two objectives in cylinders, one signed: "COLLINS 1in ½in ¼in C. Series LONDON"; accessories include bull's-eye condenser on arm on expanding stand, with detachable disc base; case.

A green Trade Label on the case reads: "CHAS. COLLINS MICROSCOPE MANUFACTURER 77, GT. TITCHFIELD ST. OXFORD ST. W."; Turner 1989,325 gives "77 Great Titchfield Street, Portland Place. London".

Dates from Downing 1988,26.

1151 TDP049 MICROSCOPE - PROJECTING

SOLE MAKERS NEWTON & CO. 3, FLEET ST., NEAR TEMPLE BAR LONDON. WRIGHT & NEWTON'S PATENT

L399; MxD115; VD101,W38; C461x230x157.

Post 1884. D.

Brass and oxidised brass; sample vessel, hinged chamber, apertures, lens system.

Cylinder shaped clip-in sample vessel near sleeve for attaching to lantern; tube with hinged top, rack and pinion housing for lens system inside; wheel of apertures and slide clips at end of tube; separate rack and pinion adjusted objective lens system running on triangular bar below (as does tube lens system); in boxwood case with accessories and green trade label listing diplomas and medals from 1851-1884.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1209 TDP043 MICROSCOPE - PROJECTING

NEWTON'S PATENT Sold by Ross, London

L 195; MxD 78. Late 19 C. G.

Brass and oxidised brass; lens housing with screw thread; four aperture diaphragm; slide holder; microscope system.

Lens system has two clamping nuts in grooves on sides for focus; bracket from it to triangular bar along which it moves by rack and pinion; microscope tube also attached via a bracket to this bar.

1331 TDP201 MICROSCOPE - TRAVELLING

Unsigned

B 180x141x20; H 127; TuMxD 34. Second ½ 19 C. G.

Dark Connemara-type marble base; divided brass linear scale 0-11; screw driven rod and bracket for microscope.

Ebonite handle on brass disc turns divided circle 0-90 and rod with screw thread; this moves the microscope bracket and vernier along scale; microscope of white metal and brass in green-coated bracket has rack and pinion focus; divided plate under objective.

2690 TDP234 MICROSCOPE SLIDES

Various: M. Pillischer, F. Enock, E. Wheeler, E. Bourgogne

75x25; Ty 190x90; C 208x109x85. 1873 etc. S.

Variety; mainly of botanical specimens; including one from the H.M.S. Challenger Antarctic Expedition 1875.

Signatures: "PRIZE MEDAL M. PILLISCHER. OPTICIAN. 88, NEW BOND ST LONDON W. 1851. 1855. 1862. 1873."

"FREDERIC ENOCK. 30 RUSSEL ROAD SEVEN SISTERS ROAD HOLLOWAY N. LONDON" "EW E. WHEELER 48

TOLLINGTON ROAD HOLLOWAY LONDON" "MÉDAILLE DE PROGRES VIENNE 1873 EUGENE BOURGOGNE à Paris."

Most of the slides are in two mahogany cases each of which contains twelve trays for six slides each; one cabinet has mostly commercial slides, the other home-made; the commercial slides include "Antarctic Diatomaceous Dredgings" from the Challenger Exhibition (from E. Wheeler), English Oak, Gold dust, Wood gnat, Egg of bed bug, Human spermatozoa Stained.

1167 TDP144 MIRROR - ANAMORPHIC

Unsigned

HsH 108, D 69; MiD 37. Late 18 early 19 C. G.

Semi-circle cylinder metal mirror in turned mahogany housing; tin case (H123,D80); five distorted pictures.

Chipped housing; brass handle; pictures include pea-cock and bald-headed man; semi-circle cylinder case.

Example illustrated in Turner 1983,297 dated 1830.

1166 TDP145 MIRROR - ANAMORPHIC

Unsigned

H 73; D 73; B 252x250. Late 18 early 19 C. G.

Conical metal mirror on turned wood base; square distorted base picture of bearded man; in tin conical case (D83,H79).

Example illustrated in Turner 1983,297 dated 1830.

1216 TDP129 MIRRORS - ANGLED

Unsigned

BR 223; MiHs 191x122x15. Mid 19 C. G.

Mahogany 90° arc, three brass feet; two revolving mirrors in mahogany housings; brass arc scale 0-90° above.

One foot is a replacement; an electric bulb has been added later to the base arc.

2695 TDP239 MIRROR - CONCAVE

Unsigned

Sp 520; H 884; MiHsD 514. Mid 19 C. G.

Mahogany tripod foot; turned pillar to brass semi-circle pivot for mirror in mahogany housing.

1345 TDP166 MIRROR - CONCAVE

Unsigned

Sp 365; H 655; D 499. Second ½ 19 C. G.

Two; one brass, one oxidised brass; iron tripod foot; tapering brass pillar; pivot.

1195 TDP040 MIRROR - ROTATING CUBIC

Yeates & Son Dublin

BD 145; H 395; MiHs 168x163x160. Mid to late 19 C. G.

Iron fluted base and pillar; handle turns brass disc and another at right-angles to revolve cube of mirrors.

Handle revolves central pillar with mahogany squares top and bottom between which the four mirrors are mounted; two mirrors cracked; lower mahogany square damaged.

1268 TDP127 NEEDLES

Unsigned

L 88-95; Bxs 103x31x12-101x53x12. Second ½ 19 C. G.

Three tin boxes for dip circle needles; small box has space for one needle; others for two; one of five missing; sides of three needles marked "A" and "B".

1157 TDP059 OHMMETER

AYRTON & PERRY'S OHMMETER. PATERSON & COOPER, LONDON.

B 184x183x30; H 162; SHsD 127. 1885-1900. W.

Mahogany base; rectangular section pillar; circular table; brass and glass cylinder housing for silver metal scale 0-300; four brass contacts on base.

Dates from Crawforth 1988,18.

1250 TDP193 OPTICAL CELL

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD. NO4514

85X69X59; WdHsD 41. c1907. N.

Brass box; circular windows at two sides; outlets at bottoms of other two sides, with one on top.

Serial no. 4734 1:3:1907, J. Bennett PC.

2969 TDP308 OPTICAL CELL

L. GOLAZ CONSTR 23 bis Ave du Parc de Montsouris PARIS No 147

No measurements available. Mid 19 C. G.

Brass base and expanding pillar to pivot; on top, fluid cell in rectangular square-section bath.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Input and output pipes, with stop-cocks, for the bath, which would be used to vary the temperature of the fluid in the cell.
Golaz workshop founded in 1830, Payen 1985,176.

1185 TDP009 OPTICAL STAND

Guinands Flintglafs Ainé Chevalier Pere & Fils Opticiens a Paris Presented by Revd. Mr Lloyd A.D. 1832
BD 79; H 177. Pre 1832. S.

Brass weighted stand missing optical element on top.;

Word "Ainé" indistinct, but ends in "e" - the other possible Chevalier is Charles but he succeeded his father in 1841 - Turner 1983,167; earliest date for Ainé is given as 1803, and Guinand's dates as 1827-51 in Payen 1985,175-6.

1241 TDP038 OPTICAL STAND

W. LADD LONDON

BD 111; H 360. 1839-1872. F.

Brass expanding stand with semicircular mount for missing lens on top; two more unsigned for lens and prism.

Also unsigned projection spectroscopy arm with mounted lens and rack and pinion focus.

Ladd stand retains mounting screws at sides of semicircle.

Dates from Crawforth 1988,11.

1333 TDP019 OPTICAL STAND

MASON & SON DUBLIN

BD 94; H 229; MoD 138. 1865-1875. F.

Brass expanding stand with semicircular mount on top; also unsigned parts of projection spectroscopy.

Latter has brass base (D106) and expanding stand; small table on top with one prism on partly cogged disc; second prism and disc, and side arm with lens, missing.

Dates from Morrison-Low 1989,130.

2751 TDP295 ORGAN BELLOWS

Unsigned

L 612; W 355; H 373. Mid to late 19 C. G.

Mahogany table with leather bellows and bridge support for five organ pipes; five press-button stops; two turned mahogany legs (one detached) and one replacement leg to table remain.

1201 TDP091 ORGAN BELLOWS

Unsigned

T 1105x570; H 1050. Second ½ 19 C. G.

Four leg wood table; lower shelf for foot operated bellows; on top housing for eight turned wood pipe mounts.

Top also has one brass pipe; one of the turned mounts is missing as are four of the stops.

2672 TDP216 ORGAN PIPE - BLOCK

SPENCER & SON Optician 13 Aungier St DUBLIN

Hss 1233x91x78 & 1227x92x80; WhD 64 1864-1868. A.

Two; mahogany; one uses a plunger worked by hand, the other plunger uses a brass wheel, sprocket and chain.

Dates from Morrison-Low 1989,136.

1263 TDP097 ORGAN PIPE - BLOCK

Unsigned

L 820-220; Se 80x70-30x25. Second ½ 19 C. G.

Assortment of eight wood pipes; six boxwood, one mahogany; one with glass side; five with stoppers.

1261 TDP099 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN

L 648-339; Se 67x72-47x45. Mid to late 19 C. G.

Boxwood; five pipes each with a single manometric flame capsule; the two largest with slides at top; C3, C3, E3, G3, C4.

1262 TDP095 ORGAN PIPE WITH MANOMETRIC CAPSULES

Unsigned

L 728; Se 77x75. Second ½ 19 C. G.

Boxwood; three manometric flame capsules on one side with branched pipe inlet; one glass side.

2731 TDP275 OSCILLATION TRANSFORMER

H.W. SULLIVAN. LONDON.

Hs 222x142x122; H 190. Early to mid 20 C. G.

Mahogany housing; ebonite top; four brass contacts; central knob holds double brass switch for two of six points.

Two of the contacts are labelled "PRIMARY", and two "SECONDARY"; under the ebonite knob is a brass arm with two limbs split in two, and bent at right-angles to make contact with two of the set of six points at each side; the upper set has "A" to "E" between the points.

1349 TDP047 PENDULUM - TISLEY COMPOUND

TISLEY & SPILLER, 172, Brompton Road. LONDON. TISLEY'S COMPOUND PENDULUM

B 272x275x27; H 418; TaH 163. 1873-1877. F.

Mahogany base and housing; brass pillars on hinges.

Note in Department list reads: "Device coupled pair of pendulums to produce Lisajous figures on paper via linkages and pencil. Device is incomplete, missing stand, bobs, string, and supporting screen for paper."

Dates from Downing 1988,132.

1340 TDP205 PHONIC WHEEL

THE VEEDER M'F'G. CO. HARTFORD CONN. U.S.A.

Sp 163; H 260; DiD 224. Patented 3:10:1899. S.

"Raleigh Synchronous Motor or Phonic Wheel"; two iron tripod feet; cog and motor drive to rotate slotted disc.

Tripod feet at right-angles to position disc vertical or horizontal; brass cog wheel and endless screw mechanism with electric motor drive to rotate disc.

Instrument used to determine absolute pitch of tuning forks.

Name from Pye 1914,34.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1277 TDP111 PHOSPHORESCENT CHEMICALS

AC or CA monogram

C 130x55x18; PhsL 115; D 7. First ½ 19 C. G.

Mahogany case with sliding lid and boxwood bottom holds six flat glass phials containing white powder.

1149 TDP171 PHOSPHORSCOPE - BECQUEREL

Unsigned

Sp 265; H 350; ChD 113. Late 19 C. G.

Iron tripod foot; expanding brass pillar; brass and metal cylinder chamber with revolving vanes inside.

Cog wheels front and back, one with handle; central cog wheel to turn vanes; brass ring around V-shaped window; top of sample holder broken off but present.

1332 TDP198 PHOTOMETER

Unsigned

L 221; 52x27x20(+Hs). Second ½ 19 C. G.

White metal rod (D5) has oxidised brass housing on top for two cloudy glass blocks, three frosted and one shiny sides.

2843 TDP304 PLATE MEASURER

TROUGHTON & SIMMS LONDON

H 460; B 412x385x15; C 530x448x420.

Mid to late 19 C. G.

In the form of a compound microscope; brass and oxidised brass; very elaborate stage for photo plates; case.

Tripod foot; mirror below stage on arm with semi-circular mount; curved limb to tube, which has an eyepiece micrometer; large complex stage with cog mechanisms and handles to move it in mutually perpendicular directions; circle divided on silver 0-350° with two verniers and magnifiers, turned by a tangent screw; foot clamped on base which has a glass mercury thermometer 0-140°; in mahogany case.

1150 TDP181 POLARIMETER

C. REICHERT 2178

Sp 263; H 415; SD 125; L 460. Late 19 C. R.

Black painted metal and brass; tripod foot; pillar; hinged chamber; scale 0-90-0-90-0°, two verniers, lens.

Objective and eyepiece lens systems in brass tubes; scale attached to chamber housing at eyepiece end, reading lens system and rotating mirror for scale.

Anderson 1990,71-2 lists Reichert catalogues from 1880 to 1912.

1307 TDP051 POLARISCOPE - ELBOW

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON.

L 330; MxD 102. Late 19 C. F.

Brass and black-coated metal; objective lens focus by rack and pinion (optics gone); reflecting plate cracked; mounted on modern plywood base.

Firm assumed this name in 1882, Clarke 1989,87.

1346 TDP060 POTENTIOMETER

H. TINSLEY & CO LONDON. S.E. NO 1038TINSLEY'S UNIVERSAL POTENTIOMETER

Hs 470x315x170. Early 20 C. G.

Mahogany case; glass top; three circular switches; ivory linear scale 0-110.

Switches have 20, 11 and 21 segments; sliding scale indicator over scale; press keys for "POTENTIAL" and "STANDARD CELL".

1184 TDP194 PRISM - CONICAL

Unsigned Presented by Revd..Mr. Lloyd, A.D. 1832

BD 105; H 330; HsD 90. Pre 1832. S.

Weighted brass expanding stand; pivot; brass circular housing for green glass prism.

1189 TDP177 PRISM - FRESNEL

Yeates, & Son Dublin.

BD104; H 382; HsD 100. Mid to late 19 C. G.

Weighted brass expanding stand; semi-circular mount; oxidised brass circular housing for bi-prism.

Augustine Jean Fresnel (1788-1827) produced two interference beams of light from a slit source of light using his biprism - two shallow prisms together.

Information from Turner 1983,150.

2704 TDP248 PRISM - HOLLOW

Unsigned

H(+Ld) 108; MxW 62; C 117x97x82. Mid to late 19 C. G.

Glass bottle with neck and stopper; two flat sides; one curved side; in boxwood case without a top.

1187 TDP104 PRISM ON STAND

J. DUBOSCQ A PARIS

BD 111; PvH 293; PrW 31, Sis 30. 1849-1883. F.

Brass; weighted expanding stand; pivot; bracket to housed equilateral prism stressed by two knobs and bar.

Pivot holds bracket with a tube; knob and bar through this allows the prism housing to be turned; top of prism cut off to allow bar to push on it.

Dates from Brenni 1988,3-4.

1193 TDP195 PRISM ON STAND

W. & S. JONES 30 Holborn LONDON

BD 84; H 230; PmL(+Hs) 162; Sis 27-8. 1791-1859. A.

Weighted brass stand to ball and socket joint; horizontal bracket; long prism in revolving triangular sleeves.

Bracket has vertical arms at ends; wing nuts screw prism in sleeves to these.

Dates from Clifton 1995,155.

1186 TDP180 PRISM ON STAND

Yeates & Son Dublin

BD 111; PvH 295; PmHs 56x53x20(Mx).

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Mid to late 19 C. G.

Brass weighted expanding stand; pivot and bracket to two hinged thin prisms in oxidised brass housing. Oxidised brass bracket from pivot ends in tube; knob and bar through this to prisms housing allow it to be turned around; "achromatic" prism pair of two different glasses to give no dispersion when combined; stand identical to one signed by Duboscq (1187 TDP104).

1210 TDP042 PRISM - HOUSED

NEWTON'S PATENT

L 130; D 83; Pm(+Hs)Sis 47,47&65, W 47.

Turn 19/20 C. G.

Three; brass and oxidised brass; lens housing on front; three sided bracket, J groove to allow prism to revolve.

Screw thread on lens housing for lantern present on two; only one has lens present; two brass clamping screws at sides of J groove to secure prism orientation.

1246 TDP118 PRISM - HOUSED

Yeates & Son Dublin

HsD 76; PmW 50, Sis 50,28&28, H 12; SuD 45.

Mid to late 19 C. G.

Biprism mounted on brass ring; retained by two oxidised brass bands (one damaged); sleeve with screw thread; price scratched on HO/-.

1247 TDP122 PRISM - HOUSED

Unsigned

H 70; D 64; PmW 43, Sis 46,46&65. Second ½ 19 C. G.

Oxidised brass housing; ring with screw thread has two short pillars holding mounted reflecting prism.

Pillars topped with two knobs to allow prism to rotate a little and then clamp it; image through ring mounting would be reflected about 90°.

1242 TDP117 PROOF PLANE

Unsigned

H 169; D 44. Mid 19 C. G.

Brass disc on ebonite handle.

To show that charge is on the outside not inside of hollow sphere conductor - illustrated in Deschanel 1891,564.

1328 TDP012 REFLECTING CIRCLE

Troughton & Simms London 277 & 278

D 274. Mid 19 C. G.

Two; incomplete; brass; three vernier limbs; more of No. 277 remains; No. 278 retains only triple vernier arm.

On top of adapted Browning spectroscope (see separate entry 1327 TDP016); brass circle with silver divided scale, but only 140-0-140 numbered (90°=180 numbered divisions); square lattice strengthening frame; scale magnifier on revolving limb; tangent and clamping screws.

2747 TDP291 REFLECTORS - CONCAVE

Unsigned

D 580; Hs 655x655. Late 19 early 20 C. G.

Pair of grey-painted copper reflectors in U-shaped wood housing stands.

1259 TDP034 RELAY

ELLIOTT BROS. LONDON.

BD 127; H 120; HsD 76, H 85. Late 19 early 20 C. G.

Mahogany base; seven brass contacts; cylindrical brass housing with glass top for telegraphic relay system.

Knob at side marked "SPACING" or "MARKING"; labels on contacts D D (with short) S T M U U (with short).

1260 TDP057 RELAY

Unsigned

B 190x190x29; HsD 152, H 76. Late 19 early 20 C. G.

Mahogany base; brass fittings; four contacts "LOCAL", "LOCAL", "LINE", (4th gone); double coil interrupter; brass and glass cylinder cover.

1342 TDP063 RESISTANCE - STANDARD

ELLIOTT BROS. LONDON.

H 206; W 235; C 280x251x95. Late 19 C. CT.

Two; 1 and 100 ohm; double cylinder brass housing; two copper wires bent in two right-angles; one mahogany case.

Illustrated in Elliott 1895,30.

2713 TDP257 RESISTANCE BOX

FRITZ KÖHLER LEIPZIG No931 OHM MANGANIN richtig bei 20

P 270x140x10; H 165. Late 19 early 20 C. G.

Housing gone; ebonite plate; resistance wires on brass cylinders below; 14 (of 18) ebonite and brass keys above.

The turned keys can sit in, or join up, the ring contacts on the plate; two brass terminals at the ends of the U-shaped arrangement of ring contacts

Brachner 1985,143 notes that the workshop of Fritz Köhler was founded in 1897, exhibited Brussels 1910.

1337 TDP208 RESISTANCE BOX

RES FOR BALANCE NO 311 J. WHITE, GLASGOW.

B 375x201x40; Hs 325x208x123. 1892-1900. CO.

Mahogany base and housing has ebonite plate on base with five contacts; for use with electric balance 1336 TDP018.

2753 TDP297 RESISTANCE FRAME

NEWTON & CO 3 FLEET ST LONDON

Fr 443x360. Late 19 C. G.

Cast iron frame with eight coils; ebonite plate at one end; wood and brass handle on this for nine-point switch.

Used with Lantern 1200 TDP041; ebonite plate cracked; coils of different materials - one missing and replaced by two wires; another unsigned damaged resistance frame with 21 coils and handle on top to connect one of two sets of 11 contacts (see 0396 RDS110).

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1160 TDP153 RESONATOR - UNIVERSAL

Attributed to Rudolph Koenig
H 55-282; D 52-212. Late 19 C. CT.
Brass; 13; expanding cylinder type, arched top, ring collar; holes top and bottom; notes e.g. ut3-mi3.
Identical to those in Koenig catalogue; in three, the expanding tube is stuck, and two are missing their outer cylinders.
Illustrated in Koenig 1889,251; firm dates 1858-1901, Payen 1986,160.

1265 TDP083 RESONATOR SOUNDING BOX

RUDOLPH KOENIG A PARIS UT3
H 98; Bx 307x114x66; BwH 30, D 81. 1858-1901. F.
Turned wood bowl on top of boxwood sounding box with one end open; for use with Helmholtz resonator.
Dates from Payen 1986,160; illustrated in Turner 1983, 142.

1299 TDP053 RHEOSTAT - WHEATSTONE

ELLIOTT BROS.. 449 STRAND LONDON
B 339x176x21; CyD 75; H 130. 1864-1886. A.
Mahogany base; platinoid wire (missing) on ebonite screw-thread cylinder; sliding disc contact.
Brass fittings; ivory and brass handle; second contact attached to other end of cylinder by wheel and spring.
Illustrated in Elliott 1895,46; dates from Crawforth 1988,8.

1244 TDP116 ROD - ELECTROSTATIC

Unsigned
L 521; HsD 20, L 321. 19 C. G.
Glass rod with brass cylinder housing covering two thirds of its length.

0292 TDP165 SACCHARIMETER - JELLETT

Spencer & Son, Dublin.
BD 235; H 465; L 734. 1864-1886. F.
Brass; pillar to pivot; bench with nicol analyser, sample system, nicol prism, and objective system.
The instrument consists of a condensing lens system to direct a light source into the instrument, a nicol prism, a container to hold a liquid of rotating power opposite to that being measured, a tube for the sample being analysed, whose position along the axis of the instrument can be varied and read by means of a vernier, a special analysing prism, and an eyepiece lens.
The instrument is set up using a solution of known strength, and a reading is taken by means of the linear scale under the sample tube. Then the unknown is read, from which a simple calculation gives the unknown strength.
For more information, see Mollan 1995,23-25 and Proceedings of the Royal Irish Academy 7,1857-1861,348-350 and 8,1861-1864,279-281.
Dates of Spencer & Son from Morrison-Low 1989,136.

1318 TDP066 SCALE

HOLTZAPFFEL & CO LONDON. MASON, 11 ESSEX BRIDGE DUBLIN
L 474-480; W 43; C 490x56x27. 1845-1883. A.
Nineteen assorted "ENGINE-DIVIDED" card scales in paper-covered cardboard case; hand-signed "J.H. Poole".
Include "ONE QUARTER OF AN INCH TO THE FOOT", "METRE SCALE 45 CENTIMETERS", "40 INCHES TO ONE MILE".
Date from Mason address, Morrison-Low 1989,131.

2680 TDP224 SECOHMMETER

AYRTON & PERRY'S SECOHMMETER NALDER BROS & CO No 4063
B 277x183x27; Hs 168x150x112. c1891. N.
Mahogany base and housing; 2X4 brass contacts on ebonite bars on base; handle turns cog wheels in housing.
Screw brass contacts labelled in pairs: "BRIDGE", "GALVANOMETER" [on one side], and "BATTERY", "BRIDGE" [on other]; the sides of the housing can be removed to reveal a cog-wheel mechanism; the brass arm and ebonite knob, which make the handle, turn the axis of two cog-wheels, and there are three others in the mechanism, which also contains a revolving disc with four brushes.
No.3084 dated 1891 - 3073 UDE099; No.8242 dated 1892 - 3042 UDE068.

1322 TDP022 SELF INDUCTOMETER

Unsigned - attributed to Ayrton & Perry
B 286x285x22; TH 297; ToD 290. c1895. R.
"Ayrton & Perry self inductometer"; mahogany base and frame; fixed and rotating double coils; scale on top.
Two brass contacts on base; rotating coils on mahogany curved ring mount move pointer to silvered ring scale on circular table on top 0-180° and 0-.045.
Glazebrook 1922,Vol.2,420 gives illustration and full description - instrument introduced 1895.

2737 TDP281 SHAFT SPEED INDICATOR

SPEED INDICATOR YOUNG'S PATENT No1613 ELLIOTT BROS LONDON.
HsD 63&70, H 78. Late 19 C. G.
Metal cylinder housing; white face, scales 100-500 and 400-2000, with watch hand; two spinning T-bars at side; face cracked, and missing glass cover.

1196 TDP128 SINGING FLAMES APPARATUS

Made by Yeates & Son Dublin
Sp 194; H 430; PisD 7-3. 1865-1878. SI.
Iron tripod base, gas inlet to two conical brass pipes with stop-cocks; central pillar to top spring bracket to hold glass tubes which fit over the gas pipes.
Similar instrument dated 1865-1878 1476 UGP056.

1173 TDP156 SIREN - CAGNIARD

F. KERBY, 12 Spanns Buildings St.. Pancras. LONDON
BD 88; H 203; HsD 71. 1839-1840. R.
Mahogany base; brass; pillar to cylinder housing; two turned pillars to dial frame, silvered front, two dials.
Scales 500-2500 and 20000-100000; watch-hands for dials missing.
Type of siren invented by Charles Cagniard de la Tour (1777-1859), first described in 1819 - Turner 1983,136.
Clifton 1995,157 lists Frederick Kerby at Platt Terrace, Kings Cross, between 1839 and 1840.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1170 TDP159 SIREN - HELMHOLTZ DOUBLE

Yeates & Son Dublin

B 417x248x43; H 440. Mid to late 19 C. G.

Mahogany base and brackets; brass double cylinder; split air inlet on turned mahogany pillar; silvered scales.

Split inlet to top and bottom of siren; two scale dials (only one hand remains) 5-25 and 10-100; handle on top turns upper part; two feet missing.

The instrument incorporates two horizontal discs rotated by means of air blown through the pipes, each disc having four rows of angled holes with different spacings. Stops allow different sets of holes to sound, the frequency of the resulting note depending upon the number of holes passing the air current per second, which can be calculated from the watch hand counters between the cylinders - see Mollan 1995,54-55.

Koenig 1898, 15 shows a later but basically similar model - this one is probably made by Koenig, and supplied by Yeates.

1335 TDP008 SLIT

Unsigned

L 134; SD 55; P 116x49. Second ½ 19 C. G.

Brass; plate with grooves for slit panels; knob and disc adjusts one panel; another knob revolves other panel.

Slit panels of white-metal on brass; disc has scale 10-100 and peg which moves one of ten pins below silvered disc scale with watch-hand counting revolutions 1-9; other slit panel can revolve only a little.

4152 TDP318 SLITS - FIXED AND SPINNING

Unsigned

262x106x19x9. Mid to late 19 C. G.

Mahogany base with a fixed slit in a brass plate; a raised portion holds a rotating disc with five slits.

The disc is turned, via a thong, by a mahogany pulley disc with a turned ebony handle; the position of the disc can be varied by means of a brass screw clamp in a groove below; holes in the housing are arranged so that the fixed and rotating slits (15x3) are aligned as the disc rotates; when the rotation reaches a certain speed, the eye can see through the system continually although it is blocked most of the time.

This is similar in construction to the disc spinner 4153 TDP319, and may have been made by Yeates & Son.

2716 TDP260 SLIT - SPINNING

Unsigned

B 264x107x20x8; DiD 70. Mid to late 19 C. G.

Mahogany two-tiered base; mahogany pulley wheel and handle turn ebonite disc with slits above fixed slit.

A string connects the pulley wheel to the unseen spindle on the revolving disc; the tension on the string can be adjusted using a brass screw clamp at the back of the pulley; if light is viewed through the slits, the view is not interrupted when a certain speed is built up in the revolving slit disc.

1309 TDP072 SONOMETER

W.G. PYE & CO ENG CAMBRIDGE SUPPLIED BY MASON DUBLIN

L 1210; W 140; H 345. Early 20 C. G.

Mahogany; two arched shaped feet; brass fittings; centre meter rule; two pulleys or tightening knob at ends; two fixed bridges and one sliding bridge.

1308 TDP069 SONOMETER

J. ROBINSON & SONS, 65 GRAFTON ST DUBLIN.

L 1260; H 302; W 125. 1885-1903. F.

Mahogany and boxwood with two shaped arched feet; brass fittings; two fixed and one central weighted strings.

Pulley for central string; original weight pan gone; metre scale at side; two wooden fixed and one sliding brass bridges.

Dates from Morrison-Low 1989,133.

1279 TDP132 SOUND CYLINDERS

YEATES & SON DUBLIN

B 331x127x18; CysL[including Pns] 366-207, D 19.

Mid to late 19 C. G.

Mahogany base with four hollow brass cylinders of varied lengths; pistons with closed bottoms fit into these.

When the pistons are pulled out they produce a note whose pitch depends on the length of the cylinder.

Koenig 1889,12 catalogue entry for equivalent instrument notes: "Four tubes giving the major chord when their pistons are withdrawn in succession."

1266 TDP085 SOUNDING BOWL

Unsigned

Sp 204; H 207; BwH 43, D 130. Second ½ 19 C. G.

Black coated iron tripod base and tapering pillar; on top, gold-coloured metal bowl.

1306 TDP169 SPECTROSCOPE - DIRECT VISION

John Browning 63, Strand. London.

L 433; D 37&22. 1873-1900. A.

Brass; three parts can be unscrewed; slit slides in two parallel grooves, scale knob 1-9 to adjust width; spring on slit broken. Dates from Crawforth 1988,4.

0345 TDP170 SPECTROSCOPE - DIRECT VISION

J.G. Hofmann Paris

L 239; MxD 27; C 255x39x37. Third ¼ 19 C. R.

Brass; three segments; front two covered in brown material; pivot for eyepiece section; draw tube focus; green case.

Screw-through mid section allows slight rotation of eyepiece end; white-metal slit adjusted by small brass knob; red-lined case covered in green cloth, one closing hook missing.

Instrument type added at late stage to 1862 London Exhibition - Bennett 1984a,8.

1147 TDP172 SPECTROSCOPE - DIRECT VISION

Yeates & Son Dublin.

Sp 210; PvH 262; H 327; MxD 45. Third ¼ 19 C. Sl.

Tripod foot; brass; expanding stand to pivot; side collimator; slit system gone; rack and pinion focus.

Prism housing of brass; some fittings of oxidised brass; knob controlled hinge at side to allow objective to move a little from side to side.

Similar instrument (0131 RDS049) bought in 1863.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1156 TDP164 SPECTROSCOPE - PHOTOGRAPHIC

ADAM HILGER LTD. LONDON, ENGLAND NO E34302/30349

Sp 284; H 438; L 607. Early 20 C. G.

Grey metal tripod and pillar; black metal prism chamber; brass collimator; mahogany photographic housing. Ivory scale 0-100, with rack and pinion adjust, on side of plate holder; spare holder; three level screws on foot. Firm incorporated under the name Adam Hilger Ltd in 1904, Cattermole 1987,142.

2841 TDP302 SPECTROSCOPE - PHOTOGRAPHIC, LITTROW

BELLINGHAM & STANLEY LTD LONDON MADE IN ENGLAND

BD 430; L 1200; Hs 884x182x153. Early 20 C. G.

Cast iron base holds long iron frame for mahogany housing; photographic plate holder in circular mount.

The slit is at one side of the circular mahogany mount, and the plate holder in the centre, whose vertical position can be adjusted with a brass handle; it can also be revolved, the angle being noted by two brass discs, the upper divided 90-0-90; the horizontal housing has a hinged door and a trap door over the reflected light path, but the Littrow prism is gone; inside is a linear scale 1-39.

4146 TDP312 SPECTROSCOPE - PROJECTION

Unsigned

BD 105; TH 309; PmH 32; DiD 36. Mid to late 19 C. G.

Weighted brass expanding stand; small table with revolving disc, partly cogged, holding a glass prism.

The prism has curved sides, and its faces are frosted apart from a central circle (D30); clearly there was originally another disc, also partly cogged, for a second prism, and there is a bracket below the table for a missing arm which would have held a condensing lens.

Projection spectroscopes like this were offered in Yeates 1880,11 for projection of ultra violet rays.

1330 TDP176 SPECTROSCOPE - TABLE

John Browning London

Sp 192; TsH 222&255; TeL 325. Late 19 C. G.

Iron three-limb foot; tapering brass pillar; partly divided circle table; prism table on three pillars; no collimator.

On non-original mahogany base (214x214x11) matching that signed by Robinson & Sons (1327 TDP016); three brass supports for foot; moving telescope with vernier and clamping screw; arched clamp above prism table for missing prism; instrument could be completed by adding collimator from 1327 TDP016, which is virtually identical to this.

1327 TDP016 SPECTROSCOPE - TABLE

John Browning, 63 Strand London.

Sp 192; TsH 225&248. 1873-1900. A.

Iron base; brass pillar; adapted for gas studies; ball cock and collimator; parts of reflecting circles added.

Brass reflecting circles by Troughton & Simms (see separate entry 1328 TDP012) on top; under this, on divided circle table, fixed collimator, and moving telescope limb ending in a copper ball-cock with holes; bracket on raised prism table for angled mirrors; on non-matching base (214x211x11) signed "J. ROBINSON & SONS 65 GRAFTON ST DUBLIN."

Dates from Crawforth 1988,4.

4149 TDP315 SPECTROSCOPE - TABLE

W.B. NICOLSON GLASGOW.

BD 181; TH 200; ScH 157. Early to Mid 20 C. G.

Grey cast-iron base; tapering pillar to brass scale 0-350°; prism table; black enamel telescope, collimator.

A small pillar on the scale leads to the prism table, which has a gallows support for the (missing) prism; brackets from above and below the scale hold the enamelled brass telescope and collimator; the former can rotate, and has a vernier to read the scale, plus a clamping screw.

4148 TDP314 SPECTROSCOPE - TABLE

W.G. PYE & Co CAMBRIDGE. ENG.

BD 272; DiSD 85&69. c1926. R.

Heavy brass base on three feet is divided 0-350°; three iron brackets with optical parts slide in groove.

In the centre of the base is a raised solid disc, and a smaller three-legged disc sits with its legs in three radial grooves on the lower disc; the revolving brackets hold a telescope, a tube with a slit and a separate lens, and another tube with a line and window sight and a separate lens system.

There is also a second base.

A spectroscope similar to this is illustrated in Pye 1926,139, and is described as "Searle and Pye's Elementary Spectrometer" which, with suitable attachments, could be used for testing the law of reflection, Snell's law of refraction for liquids, determination of refractive index of liquids by total reflection, determination of angle and refractive index of a prism, and determination of wave lengths by means of a diffraction grating.

2844 TDP305 SPECTROSCOPE - TABLE

Troughton & Simms London

L 1080; H 207; SOD 313. Mid to late 19 C. G.

Cast iron shaped base; brass collimator and telescope fixed at c35°; large ring scale with three verniers.

Revolving prism table with three legs to window verniers on silver scale; rack and pinion eyepiece focus for the telescope; drum to alter separation of the slit; collimator tube is matt green, contrasting with the polished brass of the telescope.

4147 TDP313 SPECTROSCOPE - TABLE

Unsigned

Sp 287; TH 272; W 663; TuD 31&41.

Late 19 early 20 C. G.

Cast-iron tripod foot and slightly tapering pillar to shaped table; brass telescope and two collimators.

The reference collimator is shorter than the main collimator; the telescope rotates about a small angle, and has a clamping screw; a central brass disc (D77) on the table has a gallows support for the glass prism; the slit is protected by a sleeve, and has a small prism mounted beyond it.

1350 TDP202 SPHEROMETER

Rossin, nev, et suc, de Cauchoux à Paris

Sp 95; H 85; D 84. 1836-1868. D.

Metal tripod base, brass fittings, for screw thread pillar; divided brass disc and linear scale on top.

Disc scale 20-400 moves up or down linear scale 0-100 at side; spikes on bottom of base legs and of screw pillar.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

A "Cauchoix spherometer" was one of a list of instruments presented to TCD by Rev. Humphrey Lloyd in 1868 (TCD/MUN/V/5/12 p298).

Rossin succeeded Cauchoix in 1836, Payen 1986,159.

2718 TDP262 STAND

Unsigned

BD 88 H 300; PrD 7; RiD55. Mid 19 C. G.

Brass; turned weighted base; iron pillar; clamped sleeve holds arm to universal joint; pivoted ring on arm.

There is a screw thread on top of the pillar, presumably for a top sphere or similar cap; the iron pillar is bent, but is soft and can be straightened; it has a wire constraint at about one third height to stop the sleeve from going too low.

The stand seems likely to have been used for a bull-dog lens for microscopy; although the ring is not the remains of a lens housing, it could have supported such a housing.

2710 TDP254 STAND - ADJUSTABLE

Unsigned

BD 143; MnH 317. Late 19 early 20 C. G.

Oak; turned base and pillar; brass wing nut holds insert with two-part frame, diamond hole and brass clamping nuts.

There is a screw thread on top of the pillar, when separated a little, make up a circle, but each piece has two side flanges to house the clamping bolts and nuts; the central diamond is lined with four cork pieces, and could hold a variety of items for optical or other studies.

1323 TDP204 STAND - ADJUSTABLE

Unsigned

Sp 123; H 246; W 133; PrD 13. Second ½ 19 C. G.

Metal tripod; brass expanding pillar with wing clamping nut; horizontal brass rod, V-shaped supports at ends.

1257 TDP161 STANDARD LENGTH - IMPERIAL

2½ Feet from Troughtons Brafs Standard Measure Thermr. at 60°

788x60x7; C 838x77x24. Turn 18/19 C. G.

Gold coloured metal; scales of inches and subdivisions; one inclined edge; silver struts and lines on silver at back which mark 2½ feet; mahogany case.

1230 TDP160 STANDARD YARD

Troughton & Simms, London. Standard Yard at 62°.Faht.

L 959; Se 17x16; C 988x50x46. Mid 19 C. G.

Mahogany case; gold-coloured bar; end raised sections; yard between end of bar and inside of raised section.

Unusual in that the yard is not either the length of the bar or the distance between the raised sections (L 42); holes on top and indent in case, possibly for spirit level.

1202 TDP186 STOOL - INSULATED

Unsigned

H 182; To 438x327. 19 C. G.

Mahogany top on four tapering insulating glass legs covered in resin.

2677 TDP221 SWITCH

DIXON & HEMPENSTALL Opticians 12 Suffolk St., DUBLIN

B 139x139x30; AL 106, MxW 18. Early 20 C. G.

Mahogany base; six brass screw contacts; four touch contacts for pivoted brass arm; turned wood knob on arm.

The arm makes contact between a metal arc and one of three of the touch contact discs; when it touches the fourth, the end under the knob is off the contact arc.

2717 TDP261 SWITCH - BATTERY

No 2515 THE NEVILLE PATENT AUTOMATIC BATTERY SWITCH

B 763x230x26; CoD 78. Early 20 C. G.

Marble base; two throw switches; in centre, electromagnet with pivoted arm ending in two contacts in cups.

The end of the pivoted arm away from the cups moves between the poles of the electromagnet, which are in the form of right-angled bars from the brass sides of the coil housing.

1181 TDP112 SWITCH - ELECTROMAGNETIC EXPLODER

Yeates & Son Dublin

B 188x139x40; L 327. Mid to late 19 C. G.

Mahogany base; three horse shoe magnets; coils at poles; pressing bone and brass key with clamp removes keeper.

Coils green-covered and wood mounted; clamp in form of slide - when pulled out, key can be depressed; two contacts on base.

A cruder form of the instrument is labelled "Exploseur" at the Conservatoire des Arts et Métiers, Paris - see 0109 UCP027.

1174 TDP036 TELEGRAPH - MORSE

Yeates & Son Dublin

B 203x149x25; H 223; Hs 198x133x127.

Mid to late 19 C. G.

Mahogany base and housing; six contacts, two keys, and switch on base; silvered front, moving needle and morse code.

Contacts labelled "BELL", "BELL", "L", "L", "C" and "S"; two point switch labelled "L" and "B"; two tapping keys at bottom; silvered brass front with alphabet and morse symbols.

2749 TDP293 TELEPHONE

HUNNINGSCONE TRADE MARK TRANSMITTER

B 390x164x15. Late 19 early 20 C. G.

Shaped mahogany base; hinged housing for microphone enclosing bell mechanism; 11-point switch below.

Bell cup on base above housing; above this again, 13 contacts for wires; hook at side for missing earphone; white discs in ring window on switch arm labelled "REPLY" and "1" to "10"; "BRITISH MANUFACTURE" on housing; "GIVE HALF TURN OCCASIONALLY TO RIGHT OR LEFT" on metal signature plaque.

Illustrated in Griffin 1910,818 as "Intercommunication Telephone", "Hunningscone-Deckert" transmitter with induction coil, double-pole "Ring" receiver, automatic switch hook, ringing key and call bell; mounted on a backboard with improved step-by-step line selector arranged for five lines (or for ten lines).

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

1329 TDP010 TELESCOPE - READING

Horne & Thornthwaite Newgate St. London.
BD 111; PvH 220; H 267; L 210. 1855-1874. A.
Brass; weighted base; pillar to pivot; telescope on top - missing objective lens.
Dates from Downing 1988,62.

2700 TDP244 THERMAL CONDUCTIVITY APPARATUS

Unsigned
CyD 153, H 35; DisD 153, H 6&11. Mid to late 19 C. G.
Two; brass; closed hollow cylinder with two steam pipes; ebonite disc; brass disc with three side screw arms below.
The bottom disc, which has a hole in the side for inserting a thermometer, is suspended using the three side arms; on top is the disc whose conductivity is to be studied; on top again is the brass cylinder, through which is passed steam by means of the input and output pipes.
Illustrated in Griffin 1910,480.

1351 TDP203 THERMO-HYDROMETER

Unsigned Gay Lussacs Alcoholometer, Centesimal-scale Temp.60°.. Fahrenheit
L 412; BuD 19; TuL 440, D 35&42. Second ½ 19 C. G.
Glass; pear-shaped mercury reservoir; cylinder bulb has thermometer 10-100°; scale 0-100; glass sample cylinder has wider top than the rest of the body.
The instrument and cylinder are contained in cardboard case.

1178 TDP139 THERMOMETER - GLASS MERCURY

NEGRETTE & ZAMBRA INSTRUMENT MAKERS TO HER MAJESTY LONDON Patent No 5783
Hs 338x60. Second ½ 19 C. G.
Mahogany housing; yellowed ivory scale 0-170°.
Also a second similar thermometer.
The bulb is bent at angle of 113° to leave it free at the edge of the housing; the instrument is mounted horizontally; the scale is cracked and one fixing bracket is missing.
The second instrument has a white ceramic scale 0-120° and tube numbered 4422; it has the same signature with M.O.40 in larger letters; its bulb is broken and the mercury is gone.
Queen Victoria reigned from 1837-1901.

1182 TDP003 THERMOMETER - LESLIE DIFFERENTIAL

H. NEGRETTE & CO 11 HATTON GARDEN LONDON
BD 92; H 438; BusD 51. 1850. R.
Hardwood base, turned pillar and spherical bracket for horizontal and two vertical glass limbs, bulbs at top.
Stand extends with clamping screw; indicator red alcohol; scales 0-40°.
Earliest date for address is 1850, the year Negretti entered partnership with J.W. Zambra (Read 1985,10).

1254 TDP143 THERMOMETER - SOLAR RADIATION

L. Casella London 119972 & 121522
L 435&450; D 20&56 & 19&59. Late 19 C. G.
Two; blackened mercury bulb; glass protective shaft with sphere at end; scales 90-200° and 100-220°.

1240 TDP096 THERMOPILE

Elliott Bros.. 449, Strand London.
BD 61-100; H 183-268. 1864-1886. A.
Five, only largest signed; brass; two with two contacts on base, others with contacts at sides; two with cones.
Dates from Crawforth 1988,8.

1270 TDP107 THERMOPILE

Griffin, London
BD 99; PvH 192; L 264; CyL 124, D 45.
Late 19 early 20 C. G.
Weighted brass expanding stand; pivot; thermopile with two contacts at sides; black cone; brass cylinder and cap.

1343 TDP025 TICKER TAPE REEL

Unsigned
BD 168; H 425; ReD 199. Second ½ 19 C. G.
Iron base and brass pillar support six-spoke reel with roll of ticker tape.

1314 TDP154 TRADE LABEL

FRANCIS M. MOORE, CHRONOMETER MAKER TO THE LORDS OF THE ADMIRALTY, WATCHMAKER, OPTICIAN & C.
102, HIGH STREET (One Door From Victoria St) BELFAST. AND 23, EDEN QUAY, DUBLIN. BAROMETERS & TELESCOPES. SEXTANTS, QUAD-RANTS, COMPASSES, CHARTS & C. MATHEMATICAL INSTRUMENTS. MARINE CHRONOMETERS RATED BY TRANSITS. Nautical Instruments repaired with the utmost care. BY APPOINTMENT, METEOROLOGICAL AGENT TO THE LORDS OF THE PRIVY COUNCIL FOR TRADE. LONDON CHRONOMETERS OF THE MOST APPROVED MAKERS. A FEW GOOD SECOND-HAND CHRONOMETERS GUARANTEED & READY FOR SEA. [On Chronometer 1313 TDP199].
Burnett & Morrison-Low 1989,152 list the firm in Belfast and Dublin from 1864-99, when it became a Limited Company.

1285 TDP028 TUNING FORK

GRIFFIN LONDON GRIFFIN & TATLOCK W.G. PYE & CO
H 418-84; W 70-13. Late 19 early 20 C. G.
Fifteen varying forks; one by Griffin; four by Griffin & Tatlock; one by W.G. Pye & Co; five "OLD PHILHARMONIC".

1286 TDP081 TUNING FORK

Unsigned
L 383; W 32; HaMxD 31. Second ½ 19 C. G.
White metal fork with pen on top of one prong; brass sleeve to turned mahogany handle.

2682 TDP226 TUNING FORK - ELECTROMAGNETIC

Yeates & Son Dublin
B 775x178x31; FkL 725, W 111. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Mahogany base; large metal fork lies horizontally; electromagnetic coil between ends; two brass contacts.
"Electro-Magnetic Tuning Fork, for illustrating vibratory motion of strings...4 4 0" in Yeates 1877, 53, illustrated with string attached to upper prong of fork, over a pulley on a small stand, to weight pan, the string showing the vibration nodes.

1235 TDP192 TUNING FORK - LISSAJOUS

Unsigned

Sp 188; H 480; FkL 315. Late 19 early 20 C. G.

Iron three limbed foot and pillar; brass fittings; fork held horizontally from top bracket; mirror and counterweight.
Securing nut on brass bracket at top of pillar.

1234 TDP076 TUNING FORK - LISSAJOUS

Unsigned

Sp 195; H 430,480&486. Late 19 C. G.

Three; iron tripod base; turned brass pillar; white metal fork; disc mirror and counterweight on prongs.
Smallest is missing its counterweight; middle sized is attached to modern blockboard base.

1237 TDP077 TUNING FORK ON RESONANCE BOX

GRIFFIN LONDON

H 218&240; Bx 198x112x64&242x113x64.

Turn 19/20 C. G.

Two; boxwood resonance box with one open end; turned wood sleeve for white metal fork; G384 and C256.

1264 TDP078 TUNING FORK ON RESONANCE BOX

RUDOLPH KOENIG A PARIS

UT3 (box) UT3 512VS RK (fork)

H 318; Bx 309x116x64. 1858-1901. F.

Boxwood resonance box (cracked); turned wood sleeve; black-metal fork; now in three pieces.

Dates from Payen 1986,160.

1236 TDP079 TUNING FORK ON RESONANCE BOX

SECRETAN PARIS

H 260; Bx 188x87x50. Post 1855. R.

Mahogany resonance box with open end; turned wood sleeve holds black-metal fork.

The firm was founded in 1855 and survived into the 20th Century, Brenni 1988,1.

1283 TDP082 TUNING FORK & SLIDING FRAME

Made by Yeates & Son Dublin.

B 225x149x30; H 384; Bd 352x124x25.

Mid to late 19 C. G.

Mahogany base and bridge for two upside-down metal forks; each has a pen attached to one prong; sliding frame gone.

The pens would have marked the sliding frame as it slid down the frame; brass catch at about half way to hold board before sliding.

4145 TDP311 TUNING FORK STAND WITH ELECTROMAGNET

THE CAMBRIDGE AND PAUL INSTRUMENT CO LTD LONDON & CAMBRIDGE C50618

[Fork numbered: C.79796 500 V.D.]

B 473x102x21; L 530; H 110. 1919-1924. R.

Black enamel iron base; clamped fork; sliding magnet.

The long base has a central groove for a sliding bracket holding the small coil (D44) of the electro-magnet; a support sleeve at one end allows a tuning fork to be secured with its prongs on either side of the coil; a pin on the lower arm dips into a mercury reservoir in an agate housing; there are electric contacts to the coil and the reservoir; the fork is signed: "CAMBRIDGE INSTRUMENT CO LTD C.79796 500 V.D".

Cambridge & Paul dates from Cattermole 1987,xiv; fork date 1926, J. Bennett P.C.

4144 TDP310 TUNING FORK STAND WITH ELECTROMAGNET

W.G. PYE & CO CAMBRIDGE ENG.

Sp 205 & 225; H 594. Early 20 C. R.

Heavy iron foot; slot for clamping tuning forks; pillar has bracket for electric terminal, and pivoted magnet.

The apparatus can be used vertically or horizontally; there are two tuning forks, labelled 50 and 200 cycles per second; the electric terminal is on an adjustable brass and ebonite bracket and, when the fork vibrates, a spring on its side makes contact with a point connected to the terminal; further along the pillar is another adjustable brass bracket with a pivot holding the coil, which can be placed between the prongs of the fork.

Pye 1914,34 describes this as: "Tuning Fork Stand for holding large forks vertically or horizontally, fitted with improved platinum contact makers and electromagnet for maintaining the vibrations in both positions. The contact maker which we fit enables the forks to be run for long periods without attention. Mercury is entirely dispensed with and the forks vibrate with increased amplitude and at constant rates."

2733 TDP277 VALVE RECTIFIER

H.W. SULLIVAN. LONDON. VALVE RECTIFIER No51 PATTERN 204

Hs280x229x140; H 200. Early to mid 20 C. G.

Mahogany housing; ebonite top; eight brass contacts; two, four-hole valve discs; ebonite knob for arc scale 0-10.

White scale also has "OFF" point; three contacts are labelled "TRANSMITTING VALVE FILAMENTS"; one contact is labelled "A.C. SUPPLY"; and the scale is labelled "RECTIFYING VALVE FILAMENTS".

2734 TDP278 VALVE TESTER(?)

H.W. SULLIVAN. LONDON. No22.

Hs 324x247x122; H 175. Early to mid 20 C. G.

Mahogany housing; ebonite top; 12 brass contacts; four, four-hole valve discs; 13 point switch; dial, scale 0-10.

Switch has an ebonite knob on top of a Y-shaped brass bar with right-angled limbs to connect pairs of points to arc bar; white arc scale also has "OFF" point; two contacts labelled "TUNED CIRCUIT", two "REACTION", two "TELEPHONES", two "50 VOLTS", two "6 VOLTS", and two "EXTRA GRID VOLTS".

2723 TDP267 VAPOUR PRESSURE APPARATUS

I. NEWMAN 122 REGENT STREET LONDON

B 475x152x20; H 477; CusD 63, H 59. 1827-1856. A.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Mahogany base, two vertical frame struts, and five mercury cups; bridge and wires across top; barometer tubes gone.
Dates from Clifton 1995,199.

2668 TDP212 VAPOUR PRESSURE APPARATUS

Made by Yeates & Son Dublin [on ivory plaque]

Sp 277; H 1123; TuD 13; FID 68. Mid to late 19 C. G.

Cast iron tripod foot; mahogany frame; glass tube 0-78cm; sliding glass vial; metal side arm for flask.

The round-bottom flask is attached to a horizontal metal tube with a brass stop-cock; a right-angled turn leads to the calibrated glass tube; at the bottom of this is a sleeve which presumably had a rubber tube to another sleeve at the bottom of the cylindrical glass vial (L115,D27), which is on a sliding frame with a string over a pulley on top of the frame; the other end of the string is secured to a brass bracket.

1344 TDP045 VISCOMETER

W.G. PYE & CO. CAMBRIDGE

BD 138; H 311; W 324; CyD 52; WhD 72.

Early 20 C. CT.

Iron base; white metal pillar; brass cross bar with two wheels; brass cylinder turns in red painted tin vessel.

The latter turns under the influence of weights on string (over the wheels) which is wrapped around a spindle joined to the cylinder; slit window in red vessel.

Instrument designed so that end correction is easily found - illustrated in Pye 1914,40.

2683 TDP227 VOLTMETER

WESTON ELECTRICAL INSTRUMENT CO. NEWARK, N.J., U.S.A.

HsD 242, W 118. Early 20 C. G.

Metal cylinder housing; cast front; white arc scale 0-60 and 0-6 "D.C. VOLTS"; patents quoted from 1888-1901.

"MODEL 57 No 96111"; seven patents from "Nov 5 88" [last number unclear, but next 1889 and next 1890] to "Jul 16 01".

1148 TDP035 VOLTMETER - ELECTROSTATIC

LORD KELVIN'S PATENTS J. WHITE GLASGOW ELECTRO STATIC VOLT METER No 184

Sp 277&110; H 427; Hs 392x237x70. 1892-1900. R.

Japanned tin and glass housing; white-metal vane in two pairs brass quadrants.

Vane has pointer to log scale above 0-40; three brass level screws in ebonite feet; box for weights "28 mgms" and "84 mgms".

Instrument illustrated in White 1898,45.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

2684 TDP228 WATTMETER

WESTINGHOUSE ELEC. & MFG. Co. PITTSBURG PA., U.S.A. SINGLE PHASE WATTMETER PATENTED

HsD 157; W 155. Early 20 C. G.

Metal housing; five dials, each 0-9, 100s-1000000s "WATT HOURS 10 AMPERES 200 VOLTS".

Black paint on cylindrical housing peeling; rectangular window (glass cracked) to show white plate for five dials, each with a watch hand pointer; grey metal plaque on top records patent dates "MAY 1 1888" to "AUG 9 1898", six patents quoted.

2706 TDP250 WAVE DEMONSTRATION APPARATUS

J. NEWMAN 122 REGENT ST LONDON

B 632x201x35&24; Brs 632x37x18. 1827-1856. A.

Base of Wheatstone apparatus; mahogany base; oxidised brass and mahogany bars slide into the base.

The oxidised brass ends of the bars are of different lengths (257&177); one has an indent along the centre of its length; both have small bosses rising with rods on top; the two bars are joined by a tapering limb; latter has a hinged limb (now stuck) ending in a half ring (D21) at right-angles; two similar hinged limbs are at the sides of the base.

For complete instruments see 0351 CWC041, 0258 QBP 053, and 2793 UCP246.

Dates from Clifton 1995,199.

1214 TDP130 WAVE DEMONSTRATION APPARATUS

Made by Yeates & Son Dublin

HsD 184, W 14; WdD 55. Mid to late 19 C. G.

Three; mahogany disc housing, brass fittings, for glass plates with line patterns; dolphin handle.

The handle turns a pulley wheel which is attached to another at the centre; the patterns are viewed through a window in the housing; one is missing its back and is signed YEATES & SON DUBLIN; one has black irregular concentric lines on clear glass, one clear lines on black glass, and one wave form on black glass.

2722 TDP266 WAVE DEMONSTRATION APPARATUS

Unsigned

Fr 691x47; BrsW 125-150; C 869x196x138. Mid 19 C. G.

Brass frame holds 185 brass bars which can be moved to make wave shapes; case contains mahogany templates.

There are seven of the latter in the bottom compartment of the mahogany case, which is lined with green velvet; a tray fits on top of this compartment for the brass demonstration apparatus; the frame has a wave decoration, and the bars have black marks on top, making them look rather like matches; they also have similar marks on their length which, when aligned with the frame, produce a smooth wave form.

2732 TDP276 WAVEMETER

No 132 STANDARD WAVEMETER H.W. SULLIVAN LTD LONDON.

Hs 305x288x250. Early to mid 20 C. G.

Hinged mahogany housing; ebonite top; 10 brass contacts; eight-point switch; disc scale 0-180°; valve base.

Latter disc has four holes for valve; brass arm below ebonite knob of switch connects pairs of points, labelled "A" to "H", to arc bars on the other side; on top also is a coil interruptor and two, two-point throw switches; to read "150 tp 20,000 metres".

1290 TDP098 WHISTLE

Unsigned

L 442; Se 42x36. Second ½ 19 C. G.

Mahogany whistle with cork-tipped insert to vary pitch of note.

2729 TDP273 WOULFE BOTTLE

Unsigned

H 238; CyD 105, H 187. Early to mid 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Glass; cylinder; outlet at base; closed top with central and side openings; at side, paper hand-written scale 0-50 up the side of the cylinder body; bottom opening cracked.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

UNIVERSITY COLLEGE CORK PHYSICS - UCP

Cork

Telephone 021-274034

3302 UCP302 AIR PUMP - DOUBLE BARREL

WATKINS & HILL 5 Charing Cross London

CysH 293, MnD 66; BdW 353. 1822-1856. F.

Mahogany and brass; remnants only of a very fine pump; bridge, ratchets, pistons, cylinders, and handle remain.

A horizontal pipe emerges from the centre of the base holding the two cylinders, and ends in a small disc (D83); rising from this pipe, at its centre, is a vertical pipe with a stop-cock, ending in a sleeve; one of two decorative brass urns, on top of the bridge, remain.

Dates from Clifton 1995,291.

3301 UCP301 AIR PUMP - FLEUSS

GRIFFIN LONDON

B 415x275x58; H 628; WhD 393; PD 176.

Late 19 early 20 C. G.

Cast iron, brass and copper; wheel turns crank connected to beam pivoted from vertical support to move piston.

The piston arm is at the other end of the horizontal beam from the support; the piston goes into a brass cylinder; from this runs a copper pipe to an air pump plate.

Description given in Griffin 1910,322.

3337 UCP337 AIR PUMP - TATE

Unsigned

B 233x236; TH 308; PsD 179&74; W 593; TuD 38.

Late 19 early 20 C. G.

Cast iron base below four curved legs supports horizontal brass syringe pump; stop-cock and pump plates above.

There is a large horizontal pump plate on top of the instrument, with a small vertical plate below this; the pump handle is now missing and the piston shaft stuck; the side key below the stop-cock is also gone.

For details of Tate pumps, see Griffin 1910,3116-8.

0044 UCP006 AMMETER

BECKER HATTON WALL LONDON NO 42602

B 153x149; H 234; CoHsD 50. 1890-1898. A.

Upright; mahogany base and back; four brass contacts; brass coil mount; needle pivots from magnet; 0-10 amps.

Rectangular silvered scale 0.5-2 and 0-10 amps; "To Read 10 Amps CLOSE LINE" - i.e. short two of the contacts; spiral of copper wire around three sides of the coil housing in the form of a bridge with two right-angles.

Dates from Crawforth 1988,4.

2876 UCP292 AMMETER

AMPERES NALDER BROS. & CO. SOAMES & NALDER'S PATENT

HsD 165, W 74. 1890-1910. F.

Glazed brass cylinder housing; white metal face; white arc scale 1-5; mounted on modern wood stand.

The firm issued catalogues from 1890-1910, Anderson 1990,57-8.

2879 UCP295 AMMETER & VOLTMETER

ASTON METER AMPERES Nos 102663/4 ASTON METER VOLTS No 102805

HsD 171, W 83. Early 20 C. G.

Two ammeters and matching voltmeter; cast brass cylinder housing; glazed arc scales 0-40 AMPERES, 0-100 VOLTS.

Ammeter No. 102663 has cracked glass.

0067 UCP013 AMMETER & VOLTMETER

NEWTON & CO. 3, FLEET ST. LONDON Nos 19163 & 19018

H 365; W 222&142; HsDs 165&89.

Late 19 early 20 C. G.

Separate instruments on common mahogany back plate; cylinder brass housings, glass fronts; ammeter larger; scales 0-10 amps, and 0-14 volts.

1944 UCP171 AMPERE APPARATUS

Unsigned, attributed to Yeates & Son

B 355x192x31; H 460; CoD 232. Mid to late 19 C. G.

Mahogany base; two parallel right-angled brass pillars to two mercury cups; single turn copper coil from cups.

Base has two copper strips from brass contacts to meet bases of pillars; latter separated near cups by ebonite strut; very similar to, and same size as, Yeates & Son apparatus 1756 MAY239.

1942 UCP169 ARAGO DISC APPARATUS

Yeates & Son Dublin

B 620x198; MxL 650; WhD 277; DiD 180.

Mid to late 19 C. G.

Mahogany and brass; large wheel and handle turn spindle to rotate copper disc; above this glass disc and needle.

Base on cross bar foot at one end and smaller foot on other; large mahogany wheel turns brass spindle and pillar on other end by means of gut thong; a copper disc with a brass and ebonite centre piece below fits into the pillar with a knurled brass clamping screw; three turned wood pillars support the glass disc above the copper disc; in the centre of this is a needle pivot for a missing magnetic needle.

0113 UCP040 ARTIFICIAL HORIZON

Bennett, Cork.

B 155x80x23; H 107; C 261x143x129. 1810-1867. F.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Iron reservoir; oxidised brass frame with two glass panels at right-angles; vial for mercury missing; in fitted mahogany case. Dates from Burnett & Morrison-Low 1989,144.

0043 UCP049 ASTRONOMICAL MODELS

Unsigned

241x100 & 248x102. Mid to late 19 C. G.

Eight; mahogany frames; five, spindles and disc windows; three, glass plates and frames; to show eclipses of Sun, etc. Models with spindles show The Tides, Comet Haley, Transitive Venus, Eclipses of the Sun, and the Transit of Venus; framed models show Comet of 1680 Comet of 1811, Jupiter Saturn Uranus Neptune, System of Tycho Brahe System of Ptolemy; the models with spindles turn glass discs in brass frames above other glass discs secured in the mahogany frame.

3348 UCP348 ATWOOD MACHINE

PHILIP HARRIS & CO LTD BIRMINGHAM & DUBLIN.

MAKERS.

C 3100x400x259. Early 20 C. G.

Four aluminium wheels with brass fittings on aluminium plate above descending scale 0-245cm; tables and weights.

The central "frictionless" wheel is missing; there are single and double electromagnetic coils, and a table with a central hole, on adjustable sleeves on the scale; there are also two cylinder weights; the instrument is housed in a glazed wood case.

For a full description of a similar instrument see Harris 1908,640.

0005 UCP066 ATWOOD MACHINE

Unsigned

B 240x188x46; H 175. Mid 19 C. G.

Pulley only; mahogany base; brass supports for wheels; only one wheel remains.

Complete instrument illustrated in Deschanel 1891,57.

3851 UCP367 BALANCE - EQUAL ARM

Unsigned

BmL 249; B 327x161x69. Early 19 C. G.

Mahogany drawer base; screw-in pillar; weighted suspension piece; beam with pointer to ivory scale below.

The drawer of the base has an ivory handle; the balance can be dismantled and stored in this drawer; the pillar has a cord which can be attached to a capstan on the base to raise a hook on top of the pillar; over this hook fits a ring, with, below it, a frame to hold the suspension point of the beam, with a downward extension to an undivided ivory scale and a turned knob weight; the beam has simple pivoted hooks on the ends with double figure-of-eight connectors to the triple green suspension cords for the brass pans.

The balance is reputed to have been made by John Boole (1777-1848), father of George Boole (1815-1864).

2807 UCP260 BALANCE - EQUAL ARM

Unsigned 5 KILO

B 133x133; H 563; PvH 513; PasD 222. Late 19 C. G.

Cast iron open trunnion frame; open brass beam; steel knife edges; brass supports and pans; pointer from beam.

The latter leads to a brass boss within the frame near the bottom, observed through two rounded holes in the frame (i.e. sight hole shears).

Also a small white-metal equal arm balance with swan ends used in glass bell jar 2806 UCP259 to show effect of vacuum on weight of objects of different densities.

1429 UCP151 BALANCE - EQUAL ARM

Unsigned

B 208x106x53; H 376. Mid 19 C. G.

Mahogany drawer base; brass pillar and lever raise iron beam; shears and pointer; swan beam ends; incomplete.

Drawer and pans missing; cut-off circular pieces on top of base below where pans would sit.

0745 UCP105 BALANCE - KEATES

KEATES BALANCE WILLIAM SUGG, Gas Engineer, WESTMINSTER

B 304x201; H 292. Late 19 C. G.

Black wood frame holds mahogany bridge; on top, pivot for balance arm (missing); small un-numbered ivory scale below.

At other side of bridge from pivot is a small circular erection with two vertical pins.

Instrument clearly incomplete.

Crawforth 1988,18 gives dates 1844-1885+W.

1456 UCP135 BALANCE - MAGNETIC(?)

R.W. PAUL, HATTON GARDEN, LONDON

B 560x174x24; H 428; DID 152; T 508x67x14.

1891-1919. R.

Mahogany base and table with brass angle adjust; dial divided 0-360° on brass pillar rising from centre.

Table hinged to bracket at one end of base; at other end is a brass frame with a brass micrometer screw 0-19 and side vernier which raises or lowers angle of table; large silvered disc dial on pillar has a hook at the top of its holding bracket and a small pulley wheel at its axis attached in front to the dial needle; a hole through the bottom support would allow a spring from hook and pulley wheel to reach table.

Dates from Cattermole 1987,98-104; somewhat similar balance in Griffin 1910,691, but identity uncertain.

1457 UCP209 BALANCE - PRECISION

F.E. BECKER & CO 34 MAIDEN LANE LONDON W.C.

433x221x30; H 405; BmL 325. 1882-1889. A.

Mahogany base; brass; pillar for solid beam, raised by handle on base; needle from beam to ivory scale; hooks on knife edges to hold pans.

Plus many more-modern Becker chemical balances (9+).

Dates from Crawforth 1988,4.

2870 UCP286 BALANCE - PRECISION

[On beam] OERTLING LONDON [Ivory plaque on base] T. MASON 5, DAME ST. DUBLIN

B 394x188x42; H 340; BmL 240. 1900-1916. A.

Two; mahogany base; brass; pillar for solid beam, raised by handle on base; needle from beam to un-numbered ivory scale.

At the base of the pillar; a small plumb bob hangs from the bracket below the pillar, through a small ring at its bottom.

Mason dates from Morrison-Low 1989,131.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2869 UCP285 BALANCE - PRECISION

WATKINS & HILL 5 CHARING CROSS LONDON

B 690x255x43. 1822-1856. F.

Base only; mahogany; three brass level screws; triangular brass bracket with screw hole for missing pillar.

Could have been the base of an other instrument, but seems characteristic of a balance base.

Dates from Clifton 1995,291.

1964 UCP190 BALANCE - SPECIFIC GRAVITY

Celsius Reimann's D.R. Patent No. 791. [on weight]

BD 57; PvH 184; VH 134, MxD 51. Late 19 early 20 C. G.

Brass expanding stand, pillar, frame for pivoted arm; glass cylinder vessel and thermometer/weight; broken case.

Four U-shaped suspension pieces fit on grooves on balance arm at notches 1-9; the weight thermometer hangs from one end into the liquid in the sample cylinder; the other end of the arm is weighted and has a pointer pin which, in balance, would touch another on the frame; white metal tweezers; weight housed in black card case with cork base; boxwood case.

L. Reimann listed in Brachner 1985,147 from 1839-1896.

1978 UCP205 BAROGRAPH - ANEROID

JAMES J. HICKS, Maker 8, 9 & 10, HATTON GARDEN, LONDON

B 227x372x55; H 202; Hs 300x153x153. 1900-1916. A.

Oak drawer base and frame for glazed housing; seven evacuated capsules; brass fittings; glass ink vial.

White metal pen arm; above signature on instructions in base drawer; actual signature on instrument: "J. HICKS MAKER LONDON"; drawer also contained "THOMAS MASON, OPTICIAN, 5 DAME STREET, DUBLIN." (i.e 1900-1916 - Morrison-Low 1989,131).

For barometer advertisement see trade label 1979 UCP206.

0040 UCP054 BAROGRAPH - ANEROID

RICHARD FRERES CONSTRUCTURES BREVETES A PARIS

281x155x138. 1882-1891. R.

Mahogany case with windows on three sides; brass; with eight evacuated capsules; missing drum found.

Drum also fits Pastorelli & Rapkin thermograph 0038 UCP096 but looks more at home on this instrument.

Dates from Payen 1986,160.

3313 UCP313 BAROMETER - ANEROID

MASON DUBLIN Aneroid Barometer

HsMxD 128, W 57. Late 19 early 20 C. G.

Shaped brass cylinder housing; white ceramic ring scale 26-31", with red and black lettering; glass gone.

White-metal disc and brass mechanism, with the reading hand now gone; the "MASON DUBLIN" signature is rather crudely printed, presumably added later by hand onto a well-printed scale ring.

3303 UCP303 BAROMETER - BANJO

HUNT CORK

H 1019; MxD 308; DID 253. 1844-1884. FG.

Oak veneer; in distressed state; pointed top and bottom; silvered dial 28-31"; spirit level with signed silver metal disc.

Spaces for missing hygrometer, thermometer, mirror; hands and all glazing gone, as is the tube and mercury.

The Hunts were active from 1792-1884 - this may be by Henry Hunt, 1844-1884, Burnett & Morrison-Low 1989, 149.

2831 UCP284 BAROMETER - PORTABLE

Unsigned

C 916, MxD 60; TrL 780; RiD 40. Mid to late 19 C. G.

Folding oxidised brass tripod with suspension ring on top, and leather case only.

The ring on top has an internal gimbal ring to suspend the missing barometer; the three legs are pivoted and the tripod fits into the triangular-section case.

Very similar to the accessories of the Newman portable barometers 2696 TDP240, but the latter are missing the gimbal ring, and this example is thus probably later; "Keep this End up" is hand-written on top of the case lid.

3352 UCP352 BAROMETER - STICK

Unsigned

B 1007x73x18; TuD 8. Mid to late 19 C. G.

For demonstration; oak base; cistern with glass cylinder in centre, and brass adjust screw below.

The tube rises to the top of the base board, where there was a scale plate, now missing; the glass cylinder shows the tapering open bottom of the mercury capillary tube.

3331 UCP331 BASE

WATKINS & HILL 5 CHARING CROSS LONDON

L 473; W 215; T 129x107x99. 1822-1856. F.

Shaped mahogany base on four circular feet holds table with arches below two sides and with shelf at half height.

The top of the table has parallel slides on top of the two vertical sides for a missing part; the base now has a modern wood board (1220x64x8) through the arches under the sides; it has eighteen holes at equal distances on each side of the table.

Original and modern use unknown.

Dates from Clifton 1995,291.

0090 UCP037 BATTERY - DRY PILE, ZAMBONI

YEATES & SON, DUBLIN

BD 199; H 465; HsH 220. Mid to late 19 C. G.

Mahogany base; two piles in glass cylinders between brass sleeves; arched support on top; dome and pendulum missing.

See Yeates 1877,20: "Zamboni's Battery or Dry Pile, composed of alternate discs of tin-foil and paper coated with black oxide of manganese[sic] - 2000 mounted in two columns, with pendulum, on stand with glass globe".

0033 UCP064 BATTERY - EDISON-LELANDE

Unsigned

H 202; D 138. Mid to late 19 C. G.

Cylindrical white ceramic housing with similar top; inside, zinc and copper electrodes.

Illustrated and described in Griffin 1910,705.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2823 UCP276 BATTERY - SMEE(?)

GRIFFIN LONDON

V 129x89x55. Mid to late 19 C. G.

Rectangular glass vessel; ebonite top with two brass contacts to central or to two outside metal electrodes.

One contact is a replacement; type of metal of electrodes uncertain.

This does not seem to correspond to any battery in the Griffin 1910 catalogue, but appears very similar to Smee's battery as illustrated and described in Pike 1856, I, 337 (although that is in a cylinder glass jar), which has a platinised silver central electrode and two plates of well-amalgamated zinc outside it, placed in dilute sulphuric acid.

3363 UCP363 BATTERY CELL CYLINDERS

LONDON POTTERY J. STIFF & SONS LAMBETH 86

OD 169; ID 150; H 207. Late 19 C. G.

Ten ceramic cylinders - presumably used for electric battery cells.

3324 UCP324 BIOT APPARATUS

Unsigned

BD 115; H 350; SrD 105; HID 27; $\frac{1}{2}$ SrsD 113.

Mid to late 19 C. G.

Mahogany base; brass sleeve for glass tube to hollow brass sphere with hole on top; two brass half spheres.

One of the latter has a modern replacement plastic handle; the other is missing its handle altogether; both the pillar of the conductor and the tube are resin-covered.

There is also a spherical brass conductor, with no hole on top, but with a glass insulating pillar between brass sleeves, and missing its base.

2772 UCP225 BOW

Unsigned

L 679; MxW 78. Late 19 early 20 C. G.

Mahogany, ebony, white-metal, and mother-of-pearl, with horse-hair; tightening nut at one end.

2791 UCP244 BRIDGE - WHEATSTONE

Unsigned

B 422x205; Hs 394x180x135; H 212. Late 19 C. G.

Mahogany housing; U-shaped brass bar with 33 holes; brass short to bridge bar with 12 holes; 23 keys.

Holes in the middles or between segments of the bars; the U-shaped bar reads from 1-5000 ohms, and has brass contacts at each end; the bridge bar has contacts at each end and in the middle.

2776 UCP229 BURNER

FLETCHER, RUSSELL & CO LTD WARRINGTON

BD 76, H 122; BD 93, H 120. Late 19 C. G.

Four; brass; all have gauze below burning pipe; two have nine holes under top disc; others have gauze on pipe top.

All have a leaf pattern on the base with the signature around the base; the two with the gauze on top (D42) are substantially larger than the others, which have a turned wood end to the horizontal input pipe at the base, the others have brass input pipes.

2777 UCP230 BURNER

BAIRD & TATLOCK LONDON LTD INSTRUMENT CO LTD CAMBRIDGE F.E. BECKER & CO LONDON

Unsigned.

Various Late 19 early 20 C. G.

Interesting and varied collection of assorted burners.

Two Baird & Tatlock burners (BD68, H240) of cast iron and oxidised brass, with no flame adjustment. Cambridge burner also of cast iron and oxidised brass (BD80, H140) has a fixed sleeve at the pipe bottom with eight holes, and has a crosswork metal top to the burner pipe. Becker burner of cast iron and brass (BD75, H240) has no flame adjuster. One is of iron and brass with a six-hole revolving control; one is on a stand with a bottom chamber, between the inlet and burner pipes, having a (torn) paper cover; one has a boss below the base with a screw to secure it to an arm on a stand; one is a stand with an iron fluted base, having sliding pipes, two with an inlet and closed end, one T-shaped with a closed long end (for manometric flame experiments?); one is a ring burner (OD64) with a stop-cock, having a sleeve and screw to secure it to a stand with a mahogany base; another ring burner (OD59) has a brass stop-cock between the inlet pipe and the burner tube; all the others are of the general shape of Bunsen burners, but without adjusting sleeves.

2780 UCP233 CALORIMETER

Unsigned

ODs 191, 124 & 107. Late 19 C. G.

Copper; outer cylinder water jacket with brass tap at base; two inner cylinders; tops open, bottoms closed.

3346 UCP346 CAMERA - PHOTOMICROGRAPHIC

E. LEITZ Opt. Mech. Werkstätte WETZLAR C. BAKER, 244, HIGH HOLBORN, LONDON

B 349x254x16; H 478; Fr 309x309. Late 19 early 20 C. G.

Cast iron base and pivoted support to camera bellows.

The tapering leather bellows have a mahogany frame above for a frosted glass focus plate, and a small mahogany frame below for the missing lens.

0890 UCP142 CANDLE HOLDER

Unsigned

BD 40; H 100; W 97. Mid 19 C. G.

Oxidised brass(?); disc base; elliptical reservoir; pillar to V-shaped bracket; two circular candle springs.

0740 UCP100 CATHETOMETER

Griffin, London

H 1170; Sp 310; TeL 235, D 29. Turn 19/20 C. G.

Iron tripod base; black metal pillar; brass telescope with spirit level slides up brass pillar.

Foot has two level screws and two spirit levels.

3354 UCP354 CATHETOMETER

Unsigned

Sp 380; H 1500; TuD 50; DiH 290. Late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass; red painted iron tribach base and struts to divided disc; vertical tube 0-1030mm; vernier slide; telescope gone.
The disc can be clamped; so also can the slide, using a screw clamp through a cylinder at one side to the tube; the other side of the slide, for the missing telescope, has a pivoted horizontal adjust spring and screw.

1975 UCP202 CHEMICAL GLASSWARE

Unsigned

H 170, CyD 60; H 105, SrD 77. Mid 19 C. G.

Glass vessels with lids at base; seven arched cylinders and five spheres; containing liquid or solid chemicals.

The cylinder flasks have necks leading to discs at the bottom and into these fit disc and pillar stems; the spheres have necks and ground glass stoppers on which they sit.

2770 UCP223 CHLADNI PLATE

Unsigned

DiD 303; H 208. Late 19 C. G.

Iron tripod foot; turned oxidised brass pillar to oxidised brass disc with black back.

2762 UCP215 CHLADNI PLATE CLAMP

Unsigned

L 183; W(-Scs) 156. Mid to late 19 C. G.

Two; oxidised brass; double G-shape with two wing screws, one to clamp to table, one for Chladni plate.

On the centre arm, above the table screw, is incorporated a disc (D63&58); one of the clamps has been bent and is less sturdy, with a thinner table clamp screw.

2815 UCP268 CHROMOTROPE

Unsigned

Fr 189x106x16; DisD 80; C 100x98x62. Mid 19 C. G.

Two; mahogany frames; brass ring housing for two discs; one turned with a handle; 15 coloured discs; disc case.

The discs are of attractive hand-coloured patterns, and come in seven pairs with another disc missing its pair; a wood case has slots to fit matching pairs; one disc is held stationary while the other revolves above it; one of the handles is made entirely of brass and the other has a turned wood end.

A spinner and discs constitutes a chromotrope, for use with a magic lantern - producing vivid moving colour patterns - name and details from Harly 1988,20.

1465 UCP154 CHRONOGRAPH

Unsigned - attributed to Howard Grubb

B 640x275x119; H 540; CyL 305; D 100. c1890. R.

Cast iron base; to one side clockwork drive and governor; brass cylinder drum; handle and screw to cog wheels.

Latter not now connected to clockwork, but handle can presumably be used to set original position of marker; mahogany frame at one long side has electrical contacts.

Although the diameter here is only 4", this may correspond to the Grubb chronograph registering on a barrel of 8" diameter, supplied with best frictional governor clock to which a simple form of electrical control can be added if desired.

In Grubb 1903,18 - but not in Grubb 1885.

0023 UCP048 CLOCK - REGULATOR

[Howard] GRUBB DUBLIN 4547

D 297; C 1369x437x186. c1880. R.

Brown ebonite face; one large dial, hours and minutes, with no numbers; two smaller dials; in hinged oak case.

Top smaller dial (D95), minutes and seconds, with no numbers; lower (D95) with 24 divisions, numbered 2. 4. 8. 10. 14. 16. 20. 22; boxwood pendulum shaft with brass disc weight and adjust screw; case has two electrical contacts, and circular window for face; lead and brass weight detached.

Second clock face and clockwork with three hands on seconds dial but missing others.

Third with face severely damaged; latter two not numbered.

Grubb 1880 describes set up of Observatory; assumed clock dates from this time.

2774 UCP227 COIL

Yeates & Son Dublin [with flourishes]

D 97; W9. Mid 19 C. G.

Spool with brass front and oxidised brass back for green-covered wire; right-angled bracket for screw contact.

3349 UCP349 COIL

Unsigned

OD 407; ID 283; W 86. Late 19 C. G.

Heavy coil, presumably made of a ribbon spiral (Wc80), bound in black insulating fibre; no electric contacts.

0073 UCP087 COIL - DU BOIS REYMOND

F.E. BECKER & CO. W. & J. George, Ltd. HATTON WALL, LONDON.

L 1118; W 74; CoHsDs 36&81. Late 19 early 20 C. R.

Hinged mahogany base; secondary coil slides in groove; stationary primary; interruptor; boxwood scale 0-94cm.

Double coil electric interruptor with four contacts; bundle of wires core for primary; secondary has two contacts.

A similar instrument in the collection of Musée Henri Piéron, Paris, is described: "Apparatus used for measuring the sensitivity of human skin to an electric charge" and listed as "Chariot de Ranvier" - Parot 1987,24.

Name from Elliott 1895,142; dates from Anderson 1990, 10.

3365 UCP365 COIL - INDUCTION

A.E. Dean. No..333 London

B 840x305x81; CoHsD 260; W 915. Late 19 C. G.

Open mahogany base and supports for yellow-covered coil between wood discs; two contacts on pillars above coil.

There are also two brass electric contacts on one end of the primary coil, which juts out from the centre of the secondary.

3366 UCP366 COIL - INDUCTION

A E Dean No 372 London

B 1013x290x86; CoHsD 280; W 1120. Late 19 C. G.

Open mahogany base and supports for brown-covered coil between wood discs; two contacts on pillars above coil.

There are also two brass electrical contacts on each end of the primary, which juts out from the centre of the secondary.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2821 UCP274 COIL - INDUCTION

Unsigned

L 385; WiD 9. Early 20 C. G.

Spiral of thick copper wire with parallel ends into turned wood handles; metal brackets for spark points.

Now set up with two nails on the brackets on the parallel arms, which are arc-welded together when an induced current is set up in the spiral.

0011 UCP024 COIL - INDUCTION, MEDICAL

E. PALMER Newgate St London

B 176x152; H 330; CoD 90. 1838-1845. A.

Coil has mahogany base, frame, wheel and spindle; brass toothed wheel turns to hit brass tongue interruptor.

The coil, on the base, has a horizontal axis, through which is a movable bunch of wires; the large wheel on the vertical frame drives, via a missing thong, the small wheel which is on the same axis as the toothed brass wheel; the tongued interruptor and the toothed wheel are on turned brass pillars on a table on top of the instrument.

Dates from Clifton 1995,207.

1452 UCP124 COIL - INDUCTION, MEDICAL

Unsigned

B 176x175x50; H 262; CoD 80. Mid 19 C. G.

Mahogany base and table; induction coil below; straight electromagnet between poles of U-shaped magnet on top.

"Self acting Electro-Magnetic Coil Machine for medical purposes, consisting of a hollow wooden cylinder surrounded by a primary or thick wire coil, upon which is wound a secondary or long fine wire coil and a bundle of thin iron wire for placing in or out of the axis of the wood cylinder. The small rotating electro-magnet makes and breaks the battery contact, and the machine is actuated by a small constant battery."

Quote from Elliott 1856b,13.

1968 UCP195 COIL - INDUCTION, RUHMKORFF

APPS 433 STRAND LONDON PATD. 1881-264 1178

B 625x293x92; H 270; CoHsD 173. Patented 1881.

Mahogany base; ebonite-covered coil; brass and ivory commutator; brass, ivory, and ebonite conductors.

The latter are on ebonite pillars with brass ball joints on top; eight brass contacts on base; ebonite knurled knob to adjust tension in the interruptor.

1969 UCP196 COIL - INDUCTION, RUHMKORFF

GRIFFIN GRAM STANDARD LONDON

B 303x196x82; H 332; CoHsD 80. Late 19 early 20 C. G.

Mahogany base; ebonite-covered coil with ebonite end plates (115x97x10); ebonite and brass commutator.

Glass pillars between brass sleeves to ball joints for conductors; one conductor has the original turned ebonite handle, one a clear plastic replacement.

1450 UCP130 COIL - INDUCTION, RUHMKORFF

Ruhmkorff à Paris

B 522x218x61; CoL 318, D 97. 1855-1877. R

Mahogany base; five brass terminals; two more on glass pillars; ivory and brass commutator; glass coil ends.

Black-covered coil and black glass disc ends (one cracked); copper connecting strips.

Coil exhibited at Paris Exhibition 1855, Ruhmkorff died in 1877, Turner 1983,184-5.

0103 UCP035 COIL - INDUCTION, RUHMKORFF

YEATES & SON DUBLIN

B 233x123x39. Mid to late 19 C. G.

Mahogany base (cracked); brass and ebonite commutator with ivory handle; ebonite disc in centre of coil, which is housed between ebonite discs at each end.

3351 UCP351 COIL - INDUCTION, RUHMKORFF

Unsigned

B 560x306x80; H 285; CoHsDsD 178.

Late 19 early 20 C. G.

Mahogany base and supports; ebonite discs at sides of beeswax(?) -covered coil; ebonite and brass commutator; interruptor mechanism replaced.

2805 UCP258 COMMUNICATING VESSELS

Unsigned

BD 105; GoH 164; ToD 66; W 348. Mid 19 C. G.

Glass goblet on disc base has two holes at bottom for two arms, each with two differently shaped glass vessels.

Arms held with (modern) rubber bungs; vessels are curved pipe, egg, cone, and angled straight pipe.

2824 UCP277 COMMUTATOR

SECRETAN A PARIS

B 172x120x32; H 89. Late 19 C. G.

Mahogany base; two pairs of brass springs; handle turns four indented wood discs; one spring of each pair connects.

Brass fittings; as the handle turns, alternate springs connect; two contacts on the base and two on the bridge connecting the springs.

The firm was founded in 1855 and survived into the 20th Century, Brenni 1988,1.

0083 UCP068 COMMUTATOR - RUHMKORFF

SECRETAN A PARIS

B 197x98; H 65. Post 1855. R.

Mahogany base; ebonite and copper drum turned by ebonite knob; brass fittings; two holes on base for missing part.

The firm was founded in 1855 and survived into the 20th Century, Brenni 1988,1.

3329 UCP329 COMMUTATOR - RUHMKORFF

Unsigned

BD 146; H 94. Mid 19 C. G.

Mahogany weighted base; hard-wood and brass drum turned between brass springs by ivory knob; four brass contacts.

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3330 UCP330 COMMUTATOR - RUHMKORFF

Unsigned

BD 153; H 87. Mid to late 19 C. G.

Mahogany base; mahogany and brass drum turned between brass springs by ebonite knob; four brass contacts.

2801 UCP254 COMPASS - MARINE

SINGER'S PATENT [On case] HARVEY & PEAK LONDON

HsD 69; RiD 79; C 103x100x62. 1884-1909. F.

Brass glazed hemisphere in gimbal ring holds black and white compass disc with seven compass points marked; in mahogany, slide-lid, case.

Dates from Downing 1988,57.

1463 UCP152 COMPASS - MARINE

Unsigned

HsD 135; W 50; RiD 161. Mid 19 C. G.

Paper card suspended in brass cylinder with glass top; brass ring at top with two suspension points; case gone.

3310 UCP310 CONDENSER - VARIABLE, AEPINUS

YEATES & SON DUBLIN

B 457x252x33; H 423; DisD 198&245. Mid to late 19 C. G.

Mahogany base and slides for two glass pillars to brass brackets and discs; central replacement plastic disc.

The glass pillars are between brass sleeves, with brass spheres (D33) on top; at right-angles to the spheres are support rods to the centres of the vertical discs; in the middle of the base is a fixed mahogany turned pillar holding an ebony arc support for the central disc.

1943 UCP170 CONDENSER - VARIABLE, AEPINUS

Yeates & Son Dublin

B 508x237x32; H 505; DisD 252&318.

Mid to late 19 C. G.

Mahogany base and slides for glass pillars to brass brackets and discs; with central glass disc.

On top of the resin-coated glass pillars are brass sleeves and spheres (D32); at right-angles to the latter are brass rod supports to centres of brass discs; on top of the brass spheres are rods with smaller spheres (D13) and brass wire crooks (for pith balls); fixed boxwood central pillar from base holds mahogany support for central glass disc; one of four disc feet missing and one detached (stuck on in centre of side).

2788 UCP241 CONDENSER BOX

ELLIOTT BROS LONDON No 164

Hs 268x124x119; B 290x145; H 197. Late 19 C. G.

Mahogany housing, ebonite top; brass grid, 10 holes, five brass keys; "EARTH" & .05,.05,.2,.2,.5 microfarads; other four holes unmarked.

2825 UCP278 CONDUCTOR - SPHERICAL

Unsigned

BD 155; PrD 19; SrD 90. Mid to late 19 C. G.

Weighted mahogany base; turned boxwood boss; glass pillar; heavy brass sphere on top.

3341 UCP341 CRYOPHORUS - WOLLASTON

Unsigned

L 480; SrsD 60&57. Mid to late 19 C. G.

Glass J-tube with spheres at ends (the smaller one on the shorter end has a nipple), containing water.

Ganot 1890,343 notes: "The apparatus is prepared by introducing a small quantity of water, which is then boiled so as to expel all air. It is then hermetically sealed, so that on cooling it contains only water and the vapour of water. The water being introduced into the bulb A [on short end], the other bulb is immersed in a freezing mixture. The vapour in the tube is thus condensed; the water in A rapidly yields more. But this rapid production of vapour requires a large amount of heat, which is abstracted from the water in A, and its temperature is so much reduced that it freezes.

0031 UCP070 DECLINATION/INCLINATION INSTRUMENT

Unsigned

BD 87; H 206; W 255. Mid to late 19 C. G.

Brass; on stand; needle surrounded by arched brass housing with ebonite support; three electrical contacts.

The needle housing can be turned using a limb through a spherical clamp on top of stand.

Illustrated in Griffin 1910,687.

2872 UCP288 DIAL - HORIZONTAL PEDESTAL

W. Conway Cloyne[?] PRESENTED TO CORK UNIVERSITY BY THE MAKERS SON T.W. CONWAY...PASSAGE WEST CORK 1931

318x214. Mid to late 19 C. G.

Slate; bronze gnomon c51.5°; in President's garden.

Hours V-XII-VII; compass radiates from point of contact of gnomon, off-centre to hours circle; highly decorated with Father Time and a young boy, a transit instrument, Father Time with wings and scythe flying over a city, a paper scroll, harp, skull and cross-bones, chalice, crest of two arms with javelin and axe, central belt "MON.DIEU. EST.MA.ROCHE." enclosing stylised letters "EPR"; also with calendar months and days, with corrections and instructions.

1932 UCP159 DIP CIRCLE

T.. Blunt Cornhill London

Sp 304; BD 254; H 408; CrD 324. 1794-1823. R.

Brass and glass; three level screws; silvered vertical circle 0-90-0-90-0°; crossed spirit levels on top.

Circle housed in a slim cylinder with glass on both sides; two diagonal bars on this support the white-metal needle; its axis has a cross with four counter-weight screws; below the circle housing is a right-angled brass bar to the edge of the base disc, which has eight line marks to denote the compass points, and the housing can be revolved to any point around this; glass on front cracked.

Dates from Clifton 1995,33.

2878 UCP294 DIP NEEDLE

Unsigned

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BD 107; H 202; SAcD 155-170. Late 19 C. G.

Brass; vertical trunnion support from base for missing needle; arc scale 80-0 rises from bottom of trunnion.

0039 UCP061 DISC SPINNER

Unsigned

BD 112; H 327. Mid to late 19 C. G.

Brass; iron base; clockwork mechanism with pulley to spinner for two discs on top (only scrap of one present).

2827 UCP280 DISCHARGE FRAME

Unsigned

Fr 349x143x12; W 242; SrsD 16. Early 19 C. G.

Wood frame with turned handle for glass plate with foil strips and lozenges; brass spheres at each end.

The seven parallel sections of the foil pattern are connected through six 180° turns; one side of the frame is missing.

2799 UCP252 DISCHARGE TUBE

Unsigned

L 595; D 41. Mid 19 C. G.

Glass cylinder tube; brass sphere and point electrodes inside; rounded brass top; below, pipe with stop-cock ends with a screw thread to attach to an air pump connection for evacuation.

0060 UCP011 DISCHARGE TUBE - AURORA

Unsigned

B 262x173; H 945; HsH 692, D 100. Mid 19 C. G.

Mahogany base; air pump plate with side tube; tall tapering glass tube with plate and sphere electrodes; brass sphere electrode below; adjustable brass plate above.

0086 UCP072 DISCHARGE TUBE - GEISSLER

WATKINS & HILL 5 CHARING CROSS LONDON

B 420x250x45; H 980; W 344; TuLs 152-306.

1822-1856. F.

Open mahogany frame, two contacts support eight Geissler tubes of various shapes; four of the tubes hold liquids.

The Geissler tubes are held with wires on the frame connected to wires from the contacts, one on bottom left and other on top right; space on the frame for nine tubes, one missing.

Dates from Clifton 1995,291.

2811 UCP264 DISCHARGER - JOINTED

Unsigned

MxL 576; SrsD 29; HaL 256, D 13. Mid 19 C. G.

Glass rod handle to brass sleeve, pivot, and two bent rods ending in spheres.

Second instrument of same description except that the handle is bulbous in shape and is resin-covered (MxL423; SrsD27;HaL162,MxD31).

0027 UCP009 DISCHARGER - UNIVERSAL

Unsigned

B 356x120; PH 151, D 172. Mid to late 19 C. G.

Mahogany base; glass plate on brass pillar in centre; two conductors on glass pillars with universal joints.

2810 UCP263 EARTH INDUCTOR - DELEZENNE CIRCLE

Unsigned

B 582x266x68; H 534; RiOD 294, ID 202.

Late 19 early 20C. G.

Wood base, supports, square frame and coil ring housing; brass fittings; handle and pulley wheel to turn coil.

Mostly, but not all, mahogany; frame (395x377) pivots on the supports; a wood pulley wheel (D127), with a turned wood handle, drives a brass pulley wheel attached to a brass fitting on the revolving coil; at the bottom is a brass commutator with two contacts

Name from Griffin 1910,793.

0101 UCP057 ELECTRIC EGG

Unsigned

B 132x131x24; H 380; GD 81. Mid to late 19 C. G.

Coil on mahogany base; elliptical glass globe with brass sleeves; outlet tube and stop-cock on top.

1454 UCP133 ELECTRIC MOTOR

Unsigned

BD 175; H 155. Mid 19 C. G.

Mahogany base; four brass contacts and trunnions to axis of wheel with six plates passing poles of electromagnet.

Plates on ends of spokes from axis; double magnet on two parallel vertical cores; contact at one end of axis makes or breaks circuit using small six-cog wheel.

3364 UCP364 ELECTRIC MOTOR - MODEL

Unsigned

Sp 520&220; H 738; WhD 335. Late 19 early 20 C. G.

Wood and paper; U-electro-magnet, rope turns; armature and wheel driven by brass handle, between poles below.

The wheel has twelve windows around its edge, and twelve pegs in a circle near the centre, with a brush touching against these extending to near the base; arrows show the direction of the forces.

0751 UCP111 ELECTRIC PERFORATOR

Unsigned

B 223x122x34; H 255; CyH 91,D77. Mid to late 19 C. G.

Mahogany base; two hollow glass pillars, brass sleeves for ebonite bridge; two metal spears; glass cylinder.

The two spears, one from the top and other from the bottom, meet at the centre of the top of the cylinder (glass cracked); four turned feet on base.

Van Camp 1988,46 illustrates two similar instruments and records: "The discharge of a Leyden jar between the pointed conductors will puncture a thin glass plate, placed between those conductors."

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1448 UCP128 ELECTRIC PISTOL

Unsigned

BD 80; H 198; SvD 43. Late 19 C. G.

Black iron base; brass expanding pillar; white metal rod to green-coloured brass sleeve for glass bottle with ground top.

1427 UCP149 ELECTRIC SEE-SAW

Unsigned

B 229x115x30; SrD 15. Mid 19 C. G.

Mahogany base; centre brass pivot on pillar holds wire with spiked ends; two brass conductors on side pillars.

Central pillar is of glass with brass sleeves, as is one of the side pillars which ends in a sphere with a small hook at the bottom; the other is a solid brass pillar also ending in a sphere; pith figures would be placed on the spikes.

Illustrated in Griffith 1910,678.

3300 UCP300 ELECTRICAL MACHINE

A.H. QUIN, Maker, CORK.

Sp 582&390; H(-Wh) 545; CosD 107.

Early to mid 19 C. G.

Mahogany; rounded base on two cross feet; centre support for missing wheel to turn pair of coils; magnets gone.

The missing wheel, at the top of the vertical support, would, via a thong (remaining), have turned a spindle to revolve the pair of horizontal coils across the poles of a set of horizontal U-magnets, now gone, but for which supports remain; beyond the coils is a brass sleeve on the axis of which a brass brush from the base originally played (it is now away from the sleeve); beyond this again the iron axis has two spikes going out sideways, in a turned mahogany mercury reservoir, with a brass electrical contact outside; two other contacts on the base are connected to the brush, and to the centre of the reservoir pillar respectively; on the side of the base away from the coils are two vertical mahogany supports, with a horizontal turned mahogany piece between them and, on top, a bridge piece which is secured by two bolts; since there are two small platforms at each side of each support, and these correspond to two more at the same level on one of the central supports, the system is evidently to secure the missing magnets, which are clamped with the bolts.

A variation of the Clarke magneto-electrical machine, see Ganot 1890,897.

A.H. Quin not previously recorded.

0029 UCP058 ELECTRICAL MACHINE - CLARKE

Unsigned [but identical to one in Yeates catalogue]

L 223; H 147; WhD 106. Mid to late 19 C. CT.

Wheel with handle, via pulley system, revolves double coil on horse shoe magnet poles; one electrode left.

Originally electrodes were missing, but one was found which probably belongs to this instrument.

Illustrated in Yeates 1877,52.

0081 UCP067 ELECTRO DYNAMOMETER

KING, MENDHAM & CO BRISTOL

BD 147; H 543; PrD 36. 1895-1897. W.

Mahogany base; cubic coil housing; two secured coils; one

more moves on torsion fibre from tall brass pillar.

Paper scale, 0-90-0-90-0°, with torsion pointer on top of column; two brass contacts and three oxidised brass level screws on base; circular windows at sides of coil housing divided in two by fibre-covered diameter strut.

Dates from Crawforth 1988,10.

0003 UCP073 ELECTROLYSIS APPARATUS

Unsigned

B 440x200x35; CyD 67, H 132. Late 19 early 20 C. G.

Mahogany base with two sliding panels each holding a cell system; gas outlets from each, stop-cock between.

Cell systems consist of circular brass sleeve with glass cylinder; inside this is another glass cylinder, one cracked; copper cylinder electrode inside this connected through ebonite plate to brass electrical contact; stop-cock held on brass pillar and bracket from base.

0571 UCP150 ELECTROMAGNET

Unsigned

B 376x166x53; H 233; CoD 69. Late 19 early 20 C. G.

Wood base covered in leatheret fibre; heavy iron U on this; both limbs surrounded by red covered wire coil.

Coils housed between wooden discs; one end missing disc and wire uncoiled.

3320 UCP320 ELECTROMAGNETIC APPARATUS

Unsigned

B 232x204x21; H 398; MD 17; PrD 19. Mid 19 C. G.

Mahogany base and two turned pillars to hold two vertical electromagnets with bent horizontal ends.

Six brass electrical screw contacts on base; the pillars, supported by arched iron bars from the base, have knobs on top, which may have held a bridge across them; the magnetic iron bars are surrounded by wire coils covered in red resin, and have their bent ends pointing towards the equivalent end on the other magnet; on the base away from the contacts are two vertical rods (H62) for missing part.

Purpose unknown.

2778 UCP231 ELECTROMAGNETIC ESCAPEMENT

THE B-P PATENT SYSTEM PAT NOS 24620/04 & 919/07

B 165x165. Patents 1904 & 1907.

Cast iron base; brass fittings; two-coil interruptor arm; pivoted system; notched ring; pendulum support.

An engaging peg in the notched ring controls the pendulum arm.

Also an unsigned four-coil electro-magnetic interruptor system.

1451 UCP131 ELECTROMAGNETIC ROTATION APPARATUS

Unsigned

BD 114; H 210; MD 12. Mid 19 C. G.

Mahogany base; U-shaped permanent magnet; circular mercury reservoirs on limbs; suspended parts missing.

Illustrated in Turner 1983,opp177 and Elliott 1856b,8.

0108 UCP029 ELECTRO-MEDICAL APPARATUS

Yeates & Son Dublin. (Armatures "QUNY"; "INTY")

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B201x151x20; H175; C233x221x183. Mid to late 19 C. G.

Mahogany base; four circular magnets on brass frame; handle to turn armatures (2); two hand-held electrodes; mahogany case holds second armature.

3340 UCP340 ELECTROMETER - BRAUN

Unsigned

Sp 211; H 384; CyHsD 200, W 83. Late 19 early 20 C. G.

Iron tripod foot; tapering brass pillar to tin cylinder ring; inside this, pivoted needle for arc scale 0-3000 marked "SC=100V".

One foot of the base has a brass screw electric contact, the other two have brass level screws; the cylinder housing has a glass front and a frosted glass back; a brass and metal rod, starting from a brass sphere on top (D19), goes through an insulated hole in the housing to a brass bar bent in two right-angles with the needle pivoted in the hollow centre; the scale rises from its bottom.

Illustrated in Griffin 1910,670 - "useful for lecture pur-poses in place of a gold leaf electrometer".

0006 UCP043 ELECTROMETER - CUTHBERTSON DISCHARGE

Unsigned

B 290x112x42; H 428. Mid 19 C. G.

Mahogany base; brass spheres on two glass pillars; larger sphere has brass conducting system through it.

Through the larger sphere is a rod ending in a brass sphere (sphere on other end missing); also attached to larger sphere is a movable bent brass rod ending in another brass sphere.

"Cuthbertson's Compound Universal Discharging Electro-meter. With this instrument, the electric forces are said (by the inventor) to be estimated in grain weight." - Elliott 1856a,5.

1445 UCP125 ELECTROMETER - HARRIS UNIT JAR

Unsigned

BD 128; H 519; CyD 38. Mid 19 C. G.

Mahogany base; brass sleeves; glass tube pillar to glass leyden jar; six brass sphere conductor system.

Jar with foil inside and out held horizontally on bracket on top of pillar; brass disc on one end has central sphere from centre and one at right-angles from rim; latter connects with rod to second sphere on support bracket and another beyond end of jar; cork bung in other end of jar holds central sphere on rod and another at right-angles.

"Harris's Unit-Jar Electrometer. This instrument is used to measure the quantity of electricity actually conveyed into a battery or large jar. It consists of a small insulated glass jar, coated inside and outside. The inside is connected with the electrical machine, the outside with the battery. When the unit-jar becomes charged to a certain height, a certain quantity has passed into the battery from its outside; this is marked by a bright spark passing between two balls connected with the inner and outer coating of the unit-jar. The value of the unit may be made greater or less by changing the distance between the exploding balls, for which purpose one of them is movable on a graduated slide." - Elliott 1856a,5.

0112 UCP021 ELECTROMETER - HENLEY

BENNETT PATRICK ST. CORK

H 186; SD 51. 1810-1867. F.

Brass pillar with point at bottom and sphere on top; hardwood-backed ivory semicircular scale plate; straw and pith ball missing.

Name from Ganot 1890,724; directories give Patrick St. address with no number 1810-1812 - Burnett & Morrison-Low 1989,144.

2782 UCP235 ELECTROMETER - QUADRANT, DOLEZALEK

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD CAMBRIDGE ENGLAND No 3505

Sp 154; BD 153; H 330; CyHsD 96, H 126. Pre 1907. N.

Brass; three level screws; amber pillars for quadrants; cylinder housing with square window.

2783 UCP236 ELECTROMETER - QUADRANT, DOLEZALEK

W.G. PYE & CO LTD ENGLAND CAMBRIDGE Supplied by MASON DUBLIN

Sp 160; BD 97; H 312; CyHsD 94, H 133. Early 20 C. G.

Brass; three level screws; glass pillars for black quadrants; cylinder housing with circular window.

0024 UCP074 ELECTROMETER - QUADRANT, KELVIN

Unsigned - attributed to J. White (instructions with instrument by W. LEITCH - printed in Glasgow).

H 360; Sp 303; C 400x400x402x490. 1874-1900. R.

Kelvin standard; hexagonal brass housing; corroded.

Triangular base with three level screws; oxidised brass supports to table with contacts and mirror; housing for quadrants in liquid below; seepage of liquid has caused the corrosion.

The windows in the hexagonal housing are rectangular, which dates the instrument to after 1874 - before this they were arched, Wray 1984, 25.

Name from Griffin 1910,670.

The firm became Kelvin & James White in 1900, Bryden 1972,59.

0087 UCP044 ELECTROMETER - QUADRANT, THOMSON

ELLIOTT BROS. LONDON

BD 190; DoH 475. Second ½ 19 C. G.

Brass; circular base; quadrants on glass pillars; leyden jar on top of centre; chipped glass dome.

Three level screws; white-metal "propeller" vane suspended from top to quadrants.

Illustrated in Ganot 1890,749.

0110 UCP025 ELECTROMETER - TORSION, COULOMB

BENNETT. CORK.

BD 265; H 540. 1810-1867. F.

Turned mahogany base; glass housing; brass fittings; engraved scale around wide housing, 20-360 "degrs".

Fibre present but conductors missing; brass sphere on top to turn bent pointer for torsion scale 6-36 at side.

Dates from Burnett & Morrison-Low 1989,144.

0002 UCP075 ELECTROMETER - WEIGHT

R.W. PAUL, HATTON GARDEN, LONDON.

B 491x199; H 400. 1891-1919. W.

Mahogany base for chemical balance; one side has insulated plate system to measure attractive force.

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The plate system consists of a disc on a tapered glass insulator held close to a circle on top of three brass pillars attached to the base.

The apparatus shows that the attractive force is proportional to the square of the potential difference.

Name from Ganot 1890,750; dates from Cattermole 1987, 98-104.

2784 UCP237 ELECTROMETER PLATES VOLTAGE ADJUSTER

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND No L-27231

Hs 219x217x198. c1930. N.

Mahogany housing, hinged lid; black enamel top with 13 contacts and five revolving adjusting keys.

Contacts: 4V (2), 4V (2), HT (2), EARTH (1), PLATES (2), NEEDLE (2), 2 unmarked; keys: INCREASE POTENTIAL, (2), 4V, ON OFF, LOCK DEPRESS TO EARTH PLATES, LOCK DEPRESS TO EARTH NEEDLE; box in hinged lid (104x111x35) with brass four-contact mechanism and window.

3070 UDE096 No.L-16801 is dated 18:8:26.

3333 UCP333 ELECTROPHORUS

Unsigned

D 144; SrD 16. Mid 19 C. G.

Brass disc plate with wire bent at right-angles to a brass sphere; hole for handle; rest missing.

There is another heavier (and later?) brass disc (D255) with a screw electrical contact at one side, and with a hole for a missing handle - possibly for another different electrophorus apparatus.

1419 UCP148 ELECTROPHORUS

Unsigned

D 295; SpD 19. Mid 19 C. G.

Brass disc with sleeve for insulating handle (gone); small brass sphere on bent wire from side.

Illustrated in Elliott 1856a,15 and Griffith 1910,646.

3307 UCP307 ELECTROSTATIC GENERATOR - CARRÉ

3 E. CARRE 37 24 9 72

B 648x578x54; ISq 410x370. 24:9:1872. S.

Open mahogany base with rusted metal sheet on bottom; one brass electric screw contact at side; rest missing.

The rest of the instrument has not been found, the most obvious feature of which would have been the large brass cylinder conductor at the top of the instrument.

A complete generator with the serial number 3 36 (i.e. the previous one) and the same date is preserved in excellent condition at Birr Castle 2393 BIR069.

Illustrated in Yeates 1877,2; instrument introduced in 1868, Van Camp 1988,63-67.

0116 UCP008 ELECTROSTATIC GENERATOR - CUTHBERTSON

THOS. BENNETT, Cork.

B 760x249x29; H 900; PD 595. 1810-1867. F.

Mahogany base and bridge with brass sphere on top; single glass plate; brass and wood handle.

Brass axis to disc extends outside one support for the detachable handle; wood supports for friction leathers on the top and bottom of the disc.

A complete conductor set, found separately, which probably belongs to this instrument, is of brass, with two combs, arms curved 90° to a central double sphere and cylinder, with a bulbous glass insulating rod extending to one side of the bridge on the instrument.

Dates from Burnett & Morrison-Low 1989,144; Turner 1983,188 shows photo of this type "Cuthbertson's final pattern".

3345 UCP345 ELECTROSTATIC GENERATOR - CUTHBERTSON

YEATES & SON DUBLIN

B 479x217x28; H 453; PD 302. Mid to late 19 C. G.

Mahogany base and two vertical bridged supports for brass axis and handle; rest missing; modern aluminium plate.

The handle has a turned wood end; the original glass plate has been replaced, and the conductor system replaced with a modern wire brush.

3360 UCP360 ELECTROSTATIC GENERATOR - WHEATSTONE

Unsigned

B 400x232x59; H 425; PsD 300. Late 19 early 20 C. G.

Mahogany base; handle turns metal pulleys to counter-rotate ebonite plates; ebonite pillars for conductors.

The conductors are now missing; the segments on the plates are of brass, and brass rods from the plate axis end in brushes against these; the base has four circular feet.

0059 UCP076 ELECTROSTATIC GENERATOR - WIMSHURST

DOLLOND 35, LUDGATE HILL, LONDON.

B 442x204x118; PsD 311. Late 19 C. G.

Open mahogany base; turned black wood legs (two of four); two ebonite plates (broken); one of two leyden jars; handle.

Brass spheres on black wood pillars on each side with sphere-ended brass extensions each side of plates; handle of brass and wood to turn pulley wheel systems.

Wimshurst machine invented in 1883, Van Camp 1988,63.

3358 UCP358 ELECTROSTATIC GENERATOR - WIMSHURST

WBN [monogram - presumed W.B. Nicolson, Glasgow]

B 305x152x23; H 300; PsD 215. Early to mid 20 C. G.

Bakelite(?) base; handle turns two six-spoke pulley wheels to counter-rotate glass plates; brushes to conductors.

Wire brushes on the foil segments around the plates connect to ebonite and brass conductors ending in spheres (D19&9); on the other side of the plates, brushes connect via chains to two cylindrical Leyden jars (D24H131) in brass sleeves on the base.

3359 UCP359 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned

B 650x400x148; PD 510; Jas H210,D102. Late 19 C. G.

Open mahogany base and pulley wheels to counter-rotate plates; brass conductors; Leyden jars; distressed.

The base is supported by four turned mahogany feet; two supports rise to the axis of the plates, of which only a fraction of one remains; insulating glass rods rise from the base to cylinder brass conductors with parallel rod combs on each side of

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the plates; curved wire rods hold brushes against the plates; brass sleeves on the base hold two cylindrical Leyden jars, one with only fragments remaining.

0102 UCP031 ERECTOR

Yeates & Son Dublin

PvH 360; Hs 157x129x127. Mid to late 19 C. G.

Brass and oxidised brass stand; mahogany cubic housing for angled mirror and lens; aperture and pivoted mirror.

Rectangular mirror on top revolves around trunnions.

The instrument is described in Yeates 1880,77 as S.M. Yeates' improved form of Erector "for showing objects upright on the screen".

Debbie Griggs, Rittenhouse 7, 1992, 10-11, shows a similar optical arrangement, a "vertical lantern", exhibited by Henry Morton in New York in 1871, used as a means to project objects (like a galvanometer needle) onto the screen.

2797 UCP250 EXPANSION APPARATUS - BAR BREAKER

GALLENKAMP

B 450-418x95-71x56; H 132. Early to mid 20 C. G.

Cast iron black base; brass burner under rod held by (missing) bar and knurled knob tension adjuster.

One end of the rod has a hole for the bar, which is held by brackets on the base; the other end has a screw thread on which the knob turns, and the latter again is held by brackets on the base.

The bar is broken in the heating/cooling cycle.

2795 UCP248 EXPANSION APPARATUS - FERGUSON

ELLIOTT BROS 30 STRAND LONDON

B 509x179x53; H 462; AcD 313. 1858-1863. A.

Mahogany base; heated brass bar on turned brass pillar and bracket on wood pillar, moves pointer on arc scale.

Four feet on base; the turned wood pillar holds an open wood triangle with a boxwood arc scale 0-10; when the brass expansion bar is heated using a horizontal brass tube burner with 12 holes, its expansion is read on the arc scale via a coupling device.

Called Ferguson pyrometer in Yeates 1883,7&9; dates from Crawforth 1988,8.

2796 UCP249 EXPANSION APPARATUS - 'S GRAVESANDE

YEATES & SON DUBLIN

Sp 125; RiOD 109; BaD 74. Mid to late 19 C. G.

Brass; ring on three legs; crook from ring holds copper ball on chain.

The ball will not fit through the ring when the former is heated.

1977 UCP204 EYE MODEL

Bock-Steger Lips

B 195x187x28; HsD 140; GD 111. Mid to late 19 C. G.

Ceramic base and painted housing, with coloured physiological features, for glass globe with iris and lens.

The top of the housing comes off and the globe, iris, and biconvex lens can be removed.

0754 UCP114 EYEPIECE - DAWES' SOLAR

Unsigned but by Howard Grubb

C 221x169x116; L 205; D 38&32. c1885. R.

Brass and oxidised brass; small front lens; carousel behind with four lenses and six apertures; angled prism.

Glass angled prism at elbow; tube to slide into telescope; circle of four lenses focused by rack and pinion; fitted mahogany case.

"Combined polarising and 'Dawes' solar eyepiece, Avoiding the necessity of using dark glass. Price £8:8:0" in Grubb 1885, 13.

Another example slightly different from this was offered in Tesseract 29,1990,10, \$580.

For an article on this instrument, see F.A. Marriott, Bull SIS, 14,1987,2-3.

1462 UCP140 EYEPIECE - MICROMETER

Unsigned - but by Howard Grubb

L 467; H 265. c1880. G.

Grey iron cylinder base; brass; two endless screw drives at right-angles; linear scales 0-10 with verniers.

Cylinder has six bolt holes; frame on this holds grooves for plates moved by screw drives; screw-in eyepiece hole with no optics, but with ebonite and brass surround and electrical contacts.

This is neither the bi-filar nor the duplex micrometer described in Grubb 1880, 365; but it is illustrated as the breech-piece of the visual finder of the carte du ciel telescopes in Grubb 1899,19 - see refracting telescope 1444 UCP123.

0111 UCP028 EYEPIECE - MICROMETER

[Howard] GRUBB DUBLIN

P 173x57x17; C 278x160x148; TeHsD 72. 1880. R.

Brass; bi-filar; eyepiece socket at front and telescope thread at back; silvered micrometers to adjust wires.

"The Bi-filar Micrometer is of ordinary construction. Two screws each of fifty threads to the inch, carry one or more spider lines each. These wires can be made to traverse the whole breadth of the field, so that measures can be taken in both directions. Whole turns of the screw are read off through the windows in front, and 1/100 parts of a turn on the micrometer heads." - Grubb 1880,365.

1956 UCP191 FARADAY NEEDLE

YEATES & SON [*sic*] DUBLIN

B 218x140x27; H 310; RsD 68. Mid to late 19 C. G.

Mahogany base; vertical bar magnet rises from this, mercury reservoir near top; brass crook up from base.

Latter ends above mercury ring reservoir and would hold missing needle.

The instrument has been "modernised" with two plastic-coated screw contacts, and a two-screw brass sleeve on the end of the crook.

3350 UCP350 FLYWHEEL WITH COG WHEELS

Unsigned

B 300x300; H 857; WhsD 303&153. Late 19 C. G.

Iron base and vertical frame for four-spoke flywheel; this turns two small cog-wheels set above the flywheel.

At the axis of the flywheel is a small cog-wheel, which engages the cogs at the circumferences of the two cog-wheels held at the sides of the frame, each surrounded by a housing; the frame rises to a small table on top (131x99) and both it and the

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base have four screw holes; at the side of the part of the frame above the base is a horizontal bracket for a missing horizontal bar at right-angles to the bracket.

3322 UCP322 FOUNTAIN

Unsigned

BD 70; H 335; SrD 78; TuD 10. Mid 19 C. G.

Glass; disc base for spherical vessel; brass sleeve on top holds capillary tube ending in a brass sleeve.

The tube extends to the bottom of the vessel; on top is the brass sleeve (MxD18) with red resin inside, perhaps for another missing glass vessel?

3321 UCP321 FRESNEL BIPRISM

Unsigned

Sp 138; MnH 256; Pm 44x38. Mid to late 19 C. G.

Brass; tribach base; expanding pillar with screw clamp to mounting for glass prism, one side of which is flat.

One corner of the prism is chipped.

0106 UCP056 FRICTION HEATING APPARATUS - CALLENDAR

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD

H 615; Sp 323; WhD 293. Late 19 early 20 C. G.

Black metal tripod foot and stand; brass calorimeter revolved by large wheel and handle; friction straps.

3338 UCP338 FRICTION HEATING APPARATUS - SEARLE

W.G. PYE. & CO CAMBRIDGE

B 199x139x30; H 260; ConesH 52 & 50, D 21-40 & 21-44.

Early 20 C. G.

Cast iron base; arched frame for pulley wheel; endless screw to cogged counter 0-90; on top, friction cones.

One of the cones is stationary, and the other is revolved; both sit in a brass and cork housing; at the side of the base is a frame for two more pulley wheels; these, with that in the arched frame, are used to rotate the lower cone, by means of an external drive; the large pulley wheel, which would have fitted over two rods in the upper cone, is missing, as is the rod to support the tangential weight holding it.

This instrument is nearly identical to that illustrated in Pye 1914,110, except that here the counter is a brass disc, rather than the enclosed digital type in the illustration; the instrument is described: "Apparatus for determining the Mechanical Equivalent of Heat, as supplied to numerous institutions at home and abroad. This apparatus was designed by Dr. G.F.C. Searle, F.R.S.,...The work is expended in heat caused by the friction between two well-fitting cones, the lower or outer one of which is driven by a motor or hand wheel. The upper cone, in which water is placed to measure the heat generated, is prevented from rotating by means of a weight hanging over a pivoted pulley...this weight being applied tangentially to the disc which is fixed to the top cone. Thus if a weight over the pulley is just balanced and stationary by the revolving of the outer cone, the relative movements of the cones would be the same if the weight had fallen $2\pi NR$ cms.

3335 UCP335 FROSTED GLASS DISC ON STAND

Unsigned

BD 97; MnH 302; DiHsD 103. Mid 19 C. G.

Brass expanding stand with ceramic weight beneath base; disc in oxidised brass ring housing on top.

A clamping knurled knob on the top of the stand allows the inner rod holding the disc to be held at the required height; the ceramic base has a central groove (W28) through it, presumably for a guide on an optical bench, and there is a brass bent spike at the side of the base, presumably to read its position on the bench.

1467 UCP156 GALVANOMETER

KING, MENDHAM & CO. BRISTOL.

B 133x133x23. 1895-1897. W.

Mahogany base; thin circular brass housing; paper scale 0-90-0-90-0°; needle; copper wire around base.

Glass top between scale and top wire; three brass contacts; pencil inscription "36°=3 amperes".

Dates from Crawforth 1988,10.

2830 UCP283 GALVANOMETER

Unsigned

B 257x145x29; Co 147x48x25; CusD 24, H 22.

Early 19 C. G.

Boxwood base with two brass contacts and two mercury cups; holds red-covered flat coil with diamond hole on top.

A hole at the end of the base is presumably for a crook to suspend a needle in the coil; the mercury cups are connected to the contacts and the ends of the coil; two of the four turned feet remain.

0055 UCP052 GALVANOMETER - ASTATIC

ELLIOTT BROS LONDON

B 152x151; H 298; SHsD 125. Second ½ 19 C. G.

Rectangular ebonite base; double cylindrical brass housing, glass-covered; curved permanent magnet on top.

Silvered scale 0-90-0-90-0°; four brass level screws; two brass spirit levels and four brass contacts on ebonite disc on top of base.

Variation on "Horizontal Astatic Galvanometer", illustrated in Elliott 1895,4.

0049 UCP051 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS LONDON NO 177

H 525; SP 199; CoHsD 115, W 79. 1856-1881. FN.

Brass; folding tripod legs; glass-fronted cylinder coil housing; compensating curved magnet on top; coil and contacts can be removed from coil housing.

Turner 1983,201 gives date 1881 for No 539; firm founded in 1856, Crawforth 1988,8.

0022 UCP034 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS LONDON No370

BD 227; H 543; HsH 298, D 178. 1856-1881. FN.

Ebonite base; turned brass pillars to support two double coils; brass and glass cylindrical housing.

Base has bubble level, four terminals, three level screws; double coils on top of one another; curved compensating permanent magnet on rod on top of housing; circular window with oxidised brass frame in glass housing.

Turner 1983,201 gives date 1881 for No 539; firm founded in 1856, Crawforth 1988,8.

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0034 UCP069 GALVANOMETER - ASTATIC MIRROR

Unsigned
BD 171; H 260. Late 19 early 20 C. G.
Mahogany base and frame; glass front and back; two double coils; dumb-bell, one end with mirror, in coils.
Coils set one on top of other; pillar and curved compensating magnet were missing but were found.
Modified Thomson type.

0015 UCP045 GALVANOMETER - ASTATIC, NOBILI

Elliott Bros. 5 Charing Cross & 56 Strand, London.
BD 165; H 285; DoH 366. 1856-1858. A.
Mahogany base; three level screws; copper and silver scale; brass arch; glass dome now present not original.
Dates from Chaldecott 1989, 161.

0748 UCP108 GALVANOMETER - ASTATIC, NOBILI

PHILIP HARRIS & CO. LTD. Instrument Specialists ENGLAND BIRMINGHAM
BD 174; H 295. Early 20 C. G.
Mahogany base; brass bridge; silvered scale; dome.
Ebonite arc under base holds four contacts; base has three level screws; scale 0-90-0-90-0°.

0747 UCP107 GALVANOMETER - ASTATIC, NOBILI

PHILIP HARRIS & CO LIMITED BIRMINGHAM ENGLAND
BD 163; H 295. Early 20 C. G.
Two; mahogany base; three level screws; three contacts; brass bridge; silvered scale 0-90-0-90-0°; glass dome.
Torsion fibre present in one, missing in other; one has silvered scale turning to copper, otherwise identical.

0084 UCP046 GALVANOMETER - ASTATIC, NOBILI

KNIGHT Foster Lane
BD 116; H 274. Early to Mid 19 C. R.
Oxidised brass base; three level screws; white scale; brass arched torsion support; dome missing.
Various Knights are listed at Foster Lane between 1791 and 1875 - Clifton 1995, 160-161.

0037 UCP047 GALVANOMETER - ASTATIC, NOBILI

KNIGHT LONDON
B 178x182; H 350. Early to Mid 19 C. R.
Mahogany base with four level screws and four contacts; copper and silver scale; brass torsion arch; glass dome.

0035 UCP050 GALVANOMETER - BALLISTIC MIRROR

W.G. PYE & CO CAMBRIDGE ENG No 3938
B 202x154; H 345. Early 20 C. CT.
Two double coils; hinged ebonite frame and base; six ebonite and brass keys in resistance frame.
Ball bearing dumb-bell between coils; mirror missing.
Instrument illustrated in Pye 1914, 76.

1952 UCP179 GALVANOMETER - D'ARSONVAL

SCIENTIFIC INSTRUMENT CO, LTD, CAMBRIDGE. No 1713
BSis 198, H 28; H 200; MD 98, H 48. Pre 1907. N.
Triangle mahogany base; black ring magnet; endless screw adjust for missing fibre, coil, and mirror.
Three brass level screws and two brass electrical contacts on base; brass endless screw mechanism on top of mahogany support to adjust fibre tension.

2880 UCP296 GALVANOMETER - D'ARSONVAL

Gambrell Bros Ltd. London. No 5371 MASON DUBLIN
Sp 123; BD 132; H 189; HsD 105; WdD 40.
Early 20 C. G.
Mahogany base; black metal cylinder housing, circle window, brass top; black ring magnet; mirror on coil, which is suspended from a brass support, and rotates around the cylinder.

1970 UCP197 GALVANOMETER - D'ARSONVAL

GAMBRELL BROS. & CO LTD. LONDON PATT. 3300 SERIAL No160.
BD 153; H 197; CysD 47 & 108. Early 20 C. G.
Ebonite base; three level screws; double brass cylinder housing, bubble level on larger cylinder; black ring magnet.
Four brass contacts on base; circular window; mirror detached; knob on top "TO RELEASE DEPRESS AND ROTATE".

3336 UCP336 GALVANOMETER - TANGENT

BAIRD & TATLOCK (London) Ltd Cross Street, Hatton Garden, LONDON, E.C.
Sp 202; BD 197; H 360; CoHsD 215.
Late 19 early 20 C. G.
Mahogany base with ebonite top; brass coil housing.
The base has three brass level feet; on the ebonite disc on top of the base is a brass arc with eight side segments marked 1/999, C3, 1/99, C2, 1/9, C, DIRECT, 750 OHMS, which can be connected with brass and ebonite keys (the seven now present are of three different designs); the disc also has five brass screw contacts (A-E, D&E shorted with a bar), and a taper; from the centre of the base rises a turned pillar to the brass glazed cylinder housed magnetometer, which has a silvered ring scale 90-0-90° and 100-0-100 (log); through the pillar goes the brass ring housing for the coil, which encircles the magnetometer.

3328 UCP328 GALVANOMETER - TANGENT

GRIFFIN SARDINIA STREET LONDON
B 341x128x76; CoD 192; WiD 9. 1899-1905. A.
Mahogany base on two arched feet; boxwood slide and scale 0-250mm on top; at one side, single-turn copper coil.
Two brass screw electric contacts (one missing screw) on foot; no magnetometer.
Dates from Anderson 1990, 34.

2873 UCP289 GALVANOMETER - TANGENT

GRIFFIN LONDON
Sp 238; BD 200; H 262; CoHsOD 196.

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Late 19 early 20 C. G.

Mahogany base and coil housing; three brass level screws; glazed brass cylinder magnetometer in centre of coil; magnetometer scale 0-90-0-90-0°; three brass con-tacts on base.

Similar, though not identical, to that illustrated in Griffin 1910,741 - which has six contacts on its base.

0061 UCP078 GALVANOMETER - TANGENT

R.W. PAUL, MAKER, 44 HATTON GARDEN, LONDON.

B 457x227x20; CoHsD 213; MaHsD 151. 1891-1919. F.

Mahogany base and coil housing (at side, two contacts); brass slide for magnetometer in cylinder brass housing.

Slide has scale 0-22 cms; magnetometer has white scale 90-0-90° and 100-0-100 (non linear), with parallax mirror at bottom.

Dates from Cattermole 1987,98-104.

0082 UCP079 GALVANOMETER - TANGENT

Unsigned

BD 230; H 400; CoD 313. Early 20 C. G.

Mahogany base; cylinder brass magnetometer housing, glass top, on turned pillar; single turn copper coil.

Short fibre housing of brass and glass (broken) for suspended needle (missing); mirror below and silvered scale 90-0-90° and 100-0-100 (non linear); three level screws and two contacts.

0077 UCP080 GALVANOMETER - TANGENT

Unsigned

BD 245; H 400; CoHsD 321; MaHsD 191.

Late 19 early 20 C. G.

Mahogany base and frame; single multiple turn coil; magnetometer in cylinder mahogany housing, glass top.

White scale 0-90-0-90-0°; needle missing; three level screws; two contacts; three point switch.

0091 UCP060 GALVANOMETER - TANGENT, GAUGAIN

Unsigned

BD 223; H 418; CoHsD 336. Early 20 C. G.

Mahogany, brass and ebonite; and large matching coil housings, single and multiple turns; central magnetometer.

Magnetometer scale 0-90-0-90-0° in glass-covered cylindrical housing.

Called "Gaugain" in Griffin 1910,742, and "Helmholtz" in Baird 1924,448.

0065 UCP077 GALVANOMETER - TANGENT, STEWART & GEE

BAIRD & TATLOCK (LONDON) LTD

B 430x178x17; L 723; CoHsD 205. Early 20 C. G.

Mahogany base; two brass contacts; in centre is a single turn copper coil; magnetometer on mahogany slides.

Boxwood scale on slides 6.5-30 cms; black wood housing for coil which has brass contacts at each end; needle missing from magnetometer which is in a square mahogany housing (126x126) with a hinged lid, glass-covered - white scale 90-0-90° and 100-0-100 (non-linear), with parallax mirror on bottom.

"Stewart & Gee" type - from W. & J. George catalogue 1939,344.

1937 UCP164 GALVANOMETER - UPRIGHT

YEATES & SON, DUBLIN.

B 221x140x30; H 248; SW 318. Mid to late 19 C. G.

Mahogany base, four feet; brass coil housing, central magnet, needle to yellowed white arc scale 40-0-40.

Two brass contacts on base; green-covered (faded) wire on elongated brass housing; wood backed arc scale supported by shaped strut rising vertically from base.

0050 UCP081 GALVANOSCOPE - WEINHOLD

GRIFFIN GARRICK ST., LONDON.

B 179x72x19; H 80. 1868-1895. A.

Mahogany base; curved glass tube, reservoir at each end, capillary between - over scale 0-7cm; foot gone; electrical contacts at each end.

Name from Griffin 1910,724; dates from Anderson 1990, 33-4, and Crawford 1988,8.

0746 UCP106 GAS METER

WILLIAM SUGG Gas Engineer WESTMINSTER No 30251

B 298x205x68; H 261; HsD 147. Late 19 C. G.

Tapering mahogany base; black metal cylinder frame; brass clockwork mechanism with bell; white dial.

Pulley wheel on arm of frame would connect with another on the clockwork mechanism; scale cubic feet 1-5 "Hourly rate of Consumption by the Observation of one Minute"; two smaller dials, one giving "MINUTES" 1-10, the other "CUBIC FEET GAS DIVIDED INTO TWELVE" 1-12; brass and glass dial cover; since there is no input nor output gas pipes, measurement must involve the pulley mechanism.

Crawford 1988,18 gives dates 1844-1885+W.

0010 UCP062 GAS REGULATOR(?)

Sehr No 1231

B 241x87x38; H 96. Late 19 C. G.

Mahogany base; electromagnetic interruptor drives small piston regulating gas input and output; two electric contacts at each side.

2806 UCP259 GLASS BELL JARS

Unsigned

BD 245&202; H 339&319. Mid 19 C. G.

Two; one with straight sides; one with curved sides (MxD255), both with arched tops and knobs.

Also a squat jar.

1972 UCP199 GLASS GLOBE

Unsigned

D 155; L 240 & 255. Mid 19 C. G.

Two; brass sleeves on the necks lead to stop-cocks and then a screw thread.

For weighing air - illustrated and purpose given in Curtis 1861,52.

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2877 UCP293 GLASS VESSEL

Unsigned
MxD 160; H 230; LiD 51. Early to mid 19 C. G.
Squashed elliptical bottom; tapering neck to brass sleeve with wider lip.

0062 UCP083 GLOBE - CELESTIAL

MALBY & SON, 37 Parker Street, LONDON.
H 630; D 540; GD 390; Sp 490. c1860. S.
Cracked plaster; brass divided circle; wooden frame with three turned wooden legs; no longer turns properly.
Inscription "MALBY'S CELESTIAL GLOBE, Exhibiting the whole of the STARS Contained in the Catalogues of Piazzi, Bradley, Hevelins, Mayer, la Caille, and Johnson the Double Stars from Sir W. Herschel & Struve reduced to the year 1860. BY JNO(?) ADDISON MANU-FACTURED AND PUBLISHED UNDER THE SUPER-INTENDANCE OF THE SOCIETY FOR THE DIFF-USION OF USEFUL KNOWLEDGE BY MALBY & SON, 37 Parker Street, Little Queen Street, Lincolns Inn Fields: LONDON."
Downing 1988,81 records this address from 1853-77.

0009 UCP053 GONIOMETER - CRYSTAL

SECRETAN PARIS
B 299x197; H 232; CrD 156. Post 1885. R.
Mahogany base; two brass pillars hold divided circle with five spokes; arm revolves vernier on this; incomplete.
Circle divided 0-180-0°; arm is attached to small table in middle, in turn attached to the vernier at right-angles; below table, and moving with it, is a mirror housing (mirror missing); two other holes in base are perhaps for supporting light source, but fittings missing.
The firm was founded in 1855 and survived into the 20th Century, Brenni 1988,1.

1395 UCP143 GRATING - DIFFRACTION

(R. & J.) BECK LTD. LONDON. (rep)lica from Rowland ...Gratings, 14941...the inch.
51x38x3½; C 62x51x18. After 1895. R.
Glass; grating one side; black-covered blue-lined case.
"The surface of the grating must not be touched."
Firm listed as a Limited Company after 1895, Crawforth 1988,4.

1953 UCP180 GRATING - DIFFRACTION

Signature gone, attributed to Thorp
51x38x3; Gt 28x27; C 63x51x18. Late 19 early 20 C. G.
Glass plate with thin transparent grating; black paper-covered case with blue velvet lining and brass clip.
Identical to 0692 UDP020, which is signed: "THORP'S
Transparent Replica Rowland Metal Diffraction Grating of 14,850 lines to the inch."; the paper label with this signature has been torn off, but the paper on the other side mostly remains with: "The surface of the grating must not be touched." as on the UDP copy.

0724 UCP121 GRATING - ECHELON

A. HILGER LONDON
L 155; HsL 197. Late 19 early 20 C. G.
With spectroscope 0088 UCP039; brass and oxidised brass frame; two level screws.

2794 UCP247 HEAD WITH HAIR

Unsigned
H 192; MxD 52; HdH 75. Mid 19 C. G.
Plaster model of Red Indian head with (depleted) hair; on brass rod; for electrostatic experiments.
A charge will make the hair stand on end.

1961 UCP187 HYDROMETER

DICAS LIVERPOOL PATENTEE ID3252 MARRATT & ELLIS LONDON
L 164; C 224x206x65. Late 18, early 19 C. R.
Brass; heart shape bulb; 28 of 36 weights left; ivory scale; ivory-back Marratt & Ellis thermometer; mahogany case.
Signature on boxwood ellipse on top of case, and also on complex scale "DICAS PATENTEE LIVERPOOL" which has central panels on each side screwed on with brass screws - various runs of numbers - e.g. 30-160, 30-80, 30-120 and 190-370 on central panels; thermometer signed: "MARRATT & ELLIS. LONDON.", scale 20-130°; space in case for missing sample vessel.
Turner 1983,287 records that John Dicas patented his excise hydrometer in 1780; Downing 1988,83 records Marrat & Ellis at 63 King William Street, London EC, from 1877-1900+, so the thermometer is not original to the set.

0070 UCP084 HYDROMETER

J. HICKS LONDON.
L 244; D 35; C 263x59x57. Late 19 C. G.
Glass, spherical mercury reservoir; pear-shaped bulb; hand-written scale 850-1000 in shaft; in boxwood case.

2820 UCP273 HYDROMETER

Hydrometer from 0,700-0,850 Temp 60°F. (14-1600, 16-1800)
L 317-360; BuD 17-20; SfD 5-7. Mid to late 19 C. G.
Four; glass; egg-shaped mercury reservoir; cylinder bulb; hand-written paper scales 700-850, 1400-1600, 1600-1800(x2); cardboard cylinder cases.
Plus an assortment of mostly more-modern glass hydrometers.

2819 UCP272 HYDROMETER

Hydrometre für Schwefelsäure n. Beaumé Tp:62°F.
L 295; BuD 18; TuD 11. Mid to late 19 C. G.
Glass; egg-shaped mercury reservoir; stem to small cylinder bulb; paper hand-written scale 0-70; cardboard cylinder case.

2818 UCP271 HYDROMETER - BATTERY TESTING

HICKS' PATENT POCKET BATTERY HYDROMETER
L 119; TuD 10; CL 173, D 22. Late 19 early 20 C. G.
Glass; whitened along one side; inside yellow and (broken) purple beads on stems.

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In black cardboard case with a label: "INSERT THE END OF RUBBER TUBING IN THE ACID, SQUEEZE THE TEAT SUFFICIENTLY TO EXCLUDE THE AIR IN IT; THEN RELEASE THE TEAT, WHEN THE ACID WILL RISE INSIDE THE TUBE. IF THE PURPLE BEAD RISES THE BATTERY IS ALRIGHT, BUT IF THE YELLOW ONE SINKS IT NEEDS EXCHANGING."; the teat is missing.

1963 UCP189 HYDROMETER - NICHOLSON

Unsigned - "G R" or lion on weights

L 235; SrD 74; C 253x100x93. Mid 19 C. G.

Copper sphere; above, brass table (now replaced) for weights; below brass ring and cup; mahogany fitted case.

Circular "500 Grains" brass weight with concave and convex sides; six square brass weights - three marked "G R" and 50, 100 and 500; four more with lions stamped on them, but no weights (about 100, 50, 50, and 20 by comparison); copper sphere of instrument had a brass wire to the concave brass table on top, now a zinc(?) replacement; wire below to brass cup sitting in brass ring; secured by ebonite nut; brass tweezers.

1962 UCP188 HYDROMETER - SIKES

SIKES HYDROMETER LOFTUS 6 BEAUFOY TERRACE, LONDON No 11617

L 175; MxD 40; C203x99x50. 1858-1868. A.

Brass (gilt bronze?); nine weights plus stem cap; ivory back glass mercury thermometer 30-100°; case.

Mahogany case with wood inlay and ivory signature plaque on top; instrument signed: "LOFTUS London P 11617 SIKES P 51"; case has red silk on inside top and blue velvet on inside bottom.

Dates from Downing 1988,78.

3339 UCP339 HYDROSTATIC VALVE APPARATUS

Unsigned

BD 151; H 310; CysD 56&88. Mid 19 C. G.

Cast iron base holds oxidised brass horizontal tube; brass and glass vessels with valves screw into tube.

In the centre is a horizontal brass sleeve with red resin to hold a glass cylinder vessel with a neck (OD36) on top; in the centre of the sleeve is a ball valve; at one end of the tube is another cylinder vessel (H63), this time of oxidised brass, and with a disc valve in the centre; its inside is painted red, and it has a side tube at the bottom; at the other end of the tube is a horizontal brass sleeve, with red resin and the remains of a glass cylinder; the rest of the apparatus is missing.

3309 UCP309 HYGROMETER - DANIELL

Unsigned CENTIGRADE

FR 60,55,50; H 203; BusD 38&43. Mid to late 19 C. G.

Brass folding tripod foot; tapering metal pillar for glass tube with pendant bulbs; two mercury thermometers.

One of the latter, scale 10-0-15°, is on the pillar; the other, scale 1-0-6, is on an ivory scale plate inside the longer of the two limbs, which ends in a blue bulb; the larger bulb on the shorter arm is elliptical in shape, and contains a colourless liquid (ether).

2809 UCP262 HYGROMETER - DANIELL

Unsigned

BD 127; H 278; BusD 34. Late 19 early 20 C. G.

Two; turned boxwood base and pillar for glass pendant bulbs; one on long arm; thermometers in arm and on pillar.

Internal thermometer in long arm has scale 20-120°F and -10-60°C; that on the pillar has scale 20-120°F and 0-50°C; both are mercury/glass; the bulb on the short arm is covered in cotton gauze; there is a brass disc on top of the pillar.

0020 UCP085 HYGROMETER - DANIELL

Unsigned

BD 50; H 152; BusD 29. Mid to late 19 C. G.

Brass stand; glass; one black bulb, one clear, covered in strings, containing colourless liquid; ivory thermometer scale.

Thermometer above black bulb inside hygrometer reads 0-100°.

Like that illustrated in Yeates 1883,14.

0019 UCP086 HYGROMETER - DANIELL

Unsigned

H 185; W 205; BusD 40. Mid to late 19 C. G.

Glass bridge joins two glass bulbs, lower with band of gold foil; thermometer with scale -30-0-60°; goes into centre of lower bulb.

Liquid missing since teat on glass bridge broken.

3355 UCP355 HYGROMETER - DINES

L. CASELLA LONDON MAKER TO THE ADMIRALTY & ORDNANCE

B 390x89x40; H 200; RsHs 153x94x75.

Mid to late 19 C. G.

Mahogany base and vertical housing for tin reservoir; glass mercury thermometer to silver frosting plate.

The thermometer, 10-110°, runs from the bottom of the reservoir to the plate, along the centre of the base; there is a brass "OPEN" "SHUT" tap at the bottom of the reservoir, and a curved brass output tube beyond the plate.

3311 UCP311 HYGROMETER - DINES

Diness Improved Hygrometer L. Casella London No 86395

Hs 281x72x49. Late 19 C. G.

Mahogany housing; hangs vertically; at bottom, metal bound dark glass plate; glass/mercury thermometer.

The latter runs along the length of the housing and has scale 30-100°; inside the top of the housing is a metal reservoir with a cylindrical sleeve inside (for a thermo-meter?); there is a pipe at the side of the housing, and a brass tap.

0105 UCP020 HYGROMETER - MASON

T. BENNETT OPTICIAN CORK

H(+Ha) 331; W 71. 1810-1867. F.

Painted tin backing with hinged roof; ivory scale; two mercury thermometers; wet bulb wick and reservoir missing.

Scale 20-130° on both thermometers.

Dates from Burnett & Morrison-Low 1989,144.

1960 UCP186 HYGROMETER - MASON

J. HICKS LONDON WET 3990 DRY 3991

B 285x103x13; Ss 187x29. Late 19 early 20 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Oak base and mounts for thermometers with white ceramic scales 0-120° and 10-120° (one broken); wick to glass vessel in brass ring.

0017 UCP038 HYGROMETER - REGNAULT

ELLIOTT BROS. 449 STRAND LONDON.

BD 120; H 441. 1864-1886. A.

Black-metal base and pillar with gas inlet; silver thimbles; ivory backed thermometers 20-120°; damaged.

Dates from Crawforth 1988,8.

1958 UCP184 HYGROMETER - SAUSSURE

J. HICKS 8, 9 & 10 HATTON GARDEN LONDON SAUSSURE'S

H 249; W 85; Hs 275x111x52. Late 19 early 20 C. A.

Mahogany housing, glass top; brass frame for (broken) hair; silver metal thermometer and hygrometer scales.

Mercury and glass thermometer 30-120° "FARHT." and 0-50° "CENTE."; 0-100 arc hygrometer scale; black metal pointer from end of hair to this; ring to hang up housing; glass top slides off; "SAUSSURE'S HYGROMETER" engraved on scale.

Firm at this address from 1885-1913+, Downing 1988,59, Anderson 1990,40.

1967 UCP194 HYGROMETER - TWIRLING

CASELLA LONDON MADE IN ENGLAND 38967. 99668

L 220; ThHs 185x50; HaMxD 32. Early 20 C. G.

Boxwood handle to pivot to twirl two glass and mercury thermometers in boxwood frame - one with wick to vial.

Thermometers look older than rest of apparatus, and have the serial numbers hand engraved; scales 20-120°F.

1458 UCP136 ICE MOULD

Unsigned

BD 147; H 78; W 117. Mid to late 19 C. G.

Mahogany base with sides cut off has turned indent; two short pillars hold top block with convex hump.

2798 UCP251 INCLINED PLANE

Unsigned

B 915x228x15+15; AcD 310. Mid 19 C. G.

Mahogany hinged base; brass arc arm 5-90°, with clamp, holds upper part at angle; box with string to pulley.

The string from the box, over the pulley, leads to a pan for weights.

0004 UCP089 INTERRUPTOR

E. DUCRETET PARIS RUE CLAUDE BERNARD, 75

B 370x203x40; H 430. Late 19 early 20 C. A.

Heavy metal base; commutator at side; at other, brass pillar with electromagnet plunger system into mercury.

Anderson 1990,25 lists this address in 1900.

2871 UCP287 INTERRUPTOR

TWICKENHAM ECONOMIC ELECTRIC CO ENGLAND

B 180x127x21; H 60; CuH 18, D 23. Early 20 C. G.

Mahogany base; electromagnetic coil core attracts sprung arm with two rods into two iron mercury cups.

Arm painted red; an upper brass contact was probably attached to a sprung plate to the arm, which is now gone; two other brass contacts on the base - to the coil and to one of the mercury cups.

1460 UCP138 INTERRUPTOR

Unsigned

BD 176; H 148. Mid 19 C. G.

Mahogany base; U-shaped electromagnet; brass frame in two right-angles holds spring; another holds contact.

Spring should have plate at end to contact poles of magnet, but this is gone; tension adjust knobs for both spring and contact; two brass contacts on base and one on each frame.

3356 UCP356 LAMP - CARBON ARC

THE "URBAN" ELECTRIC ARC LAMP MODEL "S" No.922 WARWICK TRADING CO LTD LONDON

MxW 225; MnH 150. Late 19 C. G.

Brass; two ebonite knobs to separate or adjust carbons.

One knob has a pinion to rack-adjust the separation of the carbons; the other gives a fine adjust to one carbon; there are two clamp nuts to adjust the orientation of the lamp with respect to a missing stand.

2881 UCP297 LAMP - CARBON ARC

Unsigned PATENT NO 9225 1910

B 128x101x15; H 168; W 185; TD 67. Patent 1910.

Mahogany base; pillar to iron table; two vertical rods for cap; coil under table; vertical and horizontal rods.

Brass fittings; rack and pinion rod with ebonite knob raises support for one carbon rod through the centre of the table; the second carbon rod sits horizontally in a complex brass bracket at the side; another knob on the base turns the table a small amount on either side; two brass contacts on the base; the patent details are cast on the cap which can rise on the two rods from the table.

0013 UCP007 LAMP - CARBON ARC

Unsigned

BD 145; H 637; TD 95, H 175. Mid 19 C. G.

Brass; automatic feed; four pillars to table; short and long pillars from this to hold carbons.

Circular table above four pillars holds two contacts; short pillar above table is straight; long is bent in two right-angles so that the end is above the short pillar; two-coil electromagnetic and clockwork mechanism between base and table to regulate carbons.

Paolo Brenni calls this the Arc Lamp of Fontaine.

0012 UCP012 LAMP - CARBON ARC, BROCKIE

Attributed to Johnson & Phillips

BH 198; H 335; BoP 144x68. Late 19 C. R.

Focus keeping; inclined carbon rods with internal four-coil mechanism to adjust both; oxidised brass housing.

Latter rises at an angle to the vertical; sides are missing.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Two more of these, signed by Johnston & Phillips, are in other collections - 0432 RDS081 and 3193 QBP138.
Described in Wright 1891,209.

0100 UCP033 LAMP - DOBEREINER

SCHLESINGE PATENT

BD 129; HsD 107; H 217. Mid to late 19 C. G.

Fluted porcelain housing decorated in green and gold; brass top with lamp fittings.

Dobereiner lamps are displayed in the Royal Museum, Scotland, with the information that Johann Wolfgang Döbereiner (1780-1849) of Jena invented the lamp in 1823; hydrogen produced by acid reacting on zinc is ignited when the gas passes over fine platinum.

0066 UCP065 LAMP - LIME LIGHT

WILLIAM LAWSON RECTORY VIEW NEWTON LE WILLOWS LANCASHIRE PATENT 329

B 110x90; H 198. Early 20 C. CT.

Brass; with oxygen inlet and ether reservoir.

A collar supports a shield and a mechanism to raise and lower the spindle in front of the flame - controlled by a remote rod.

Griffin 1910,637 notes: "Will fit any ordinary single lantern without alteration. Neither house gas nor hydrogen is required.

Three or four ounces of ether is a sufficient charge for 2½ hours...The average consumption of oxygen is three feet per hour."

Lime-lights are discussed in Wright 1891,42-73.

0744 UCP104 LAMP - MICROSCOPE

Yeates & Son Dublin (Globe - GISUN FIREPROOF)

BD 99; H 370. Mid to late 19 C. G.

Glass base reservoir; oxidised brass cylinder housing around flame; purple glass at one side, lens at other; side knob to adjust wick; tall glass globe.

0076 UCP010 LAMP - SODIUM

Unsigned

H 410; Sp 140. Late 19 C. G.

Adapted bunsen burner; ring reservoir above flame for sample; cylinder shield around flame; brass tripod.

Another incomplete lamp also present.

1974 UCP201 LANTERN - UNIAL

NEWTON & CO Scientific Instrument Makers to H.M. the King &c 3, Fleet Street, LONDON.

B 940x283x60; H 403; Hs 315x305x215. Early 20 C. R.

Mahogany base; russian iron housing; arc lamp; slit.

Signed brass plate, screwed on with four knurled nuts, holds mahogany and brass lens system mount; at the end of the base is a condensing biconvex lens in an oxidised brass mount with two right-angles which fits into a square hole, and has a sleeve to adjust its position; a moving-prism mount with a cut disc shield (D282) can also fit into a hole in the base; a signed adjustable brass slit with two knobs is fitted.

Queen Victoria died in 1901.

2874 UCP290 LANTERN - UNIAL

Unsigned

L 373; H 370; Hs 230x225x136. Late 19 C. G.

Russian iron; brass lens housing (front lens gone); slide-in oil burner with removable rectangular cowl.

Hinged back; door at side; three brass adjusting knobs for burner; in black-coloured boxwood case with handle.

Similar, but not identical, to that illustrated in Griffin 1910,630.

0071 UCP088 LENS ON STAND

Yeates & Son, Dublin.

BD 105; H 318; LeHsD 72. Mid to late 19 C. G.

Weighted expanding brass stand; semicircular mount for plano-convex lens in oxidised brass housing.

1453 UCP132 LENS HOLDER

BAIRD & TATLOCK LONDON

Sp 121; H 299; RiD 112. Late 19 early 20 C. G.

Iron tripod base; brass extending pillar with clamp screw; oxidised brass ring on top with three push clamps.

Extension piece can be fitted on the pillar either vertically or horizontally; push clamps are velvet-lined.

2816 UCP269 LENSES

Unsigned

D 42; C 171x129x26. Late 19 C. G.

Set of six; three plano-convex, three biconvex; in cardboard partitioned case, black and white outside, pink inside.

1940 UCP167 LESLIE CUBE

Unsigned

103x102x102; H(+Ha) 161. Mid to late 19 C. G.

Brass cube; shiny brass, dull brass, white painted, and black painted sides; bent brass wire handle on top.

In the middle of the handle on top is a disc hole to add heated liquid, with a cork stopper; cube now on non-original iron tripod base and brass pillar stand.

3308 UCP308 LEVEL - SPIRIT

Unsigned

L 314, D 28; FrW 960, H 330; CyL 380, D 39.

Early to mid 19 C. G.

Brass and iron; two legs with Y-ends hold a cross bar to a cylinder; on this is the (broken) spirit level.

The cross bar is bent between the support and each end of the cylinder, and one side has the remains of a leather cover; the spirit level can rise from a pivot at one end, and has a screw clamp at the other; a large and elaborate piece, presumably for some fairly sophisticated use, possibly astronomical?

1965 UCP192 LEVEL - SPIRIT

Unsigned

B 108x18; TuD 13; CL 115, W 22. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Rectangular brass base plate holds brass tube for spirit; window on top with divisions; in black paper-covered tin case with arch cross-section.

2785 UCP238 LEVEL - TELESCOPIC

Unsigned

MnL 230; TuD 29. Mid 19 C. G.

Brass; two knurled screws below tube; spirit level on top of tube; rack and pinion objective focus; line bisects field of view.

1470 UCP158 LEYDEN JAR BATTERY

Unsigned

Hs 325x224x278; JaH 175, D 79. Mid to late 19 C. G.

Boxwood frame with six partitions containing four leyden jars; mahogany tops with spherical brass conductors.

Iron handles on the sides of the frame; a wood cover goes over the frame and jars.

3314 UCP314 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned

VmxD 88-106, H 106; H 245; SrD 24. Mid to late 19 C. G.

Brass; central tapering vessel only; rod rises from centre to sphere with side hole for missing part.

2822 UCP275 LIGHTENING CONDUCTOR - MODEL

Unsigned

B 127x99x11; H 234. Mid 19 C. G.

Mahogany base and house gable; brass rod with hook rises to square indent; above, a rod rises to the chimney.

The square indent (19x19) would have had a wood insert with a diagonal wire; this could be connected so that the rods from the hook to the chimney were connected, or such that they weren't; in the former case, a charge from a Leyden jar connected to the hook and the (missing) sphere at the chimney would pass without disturbance; if connected the other way, the wood insert would be expelled some distance.

Details from Pike 1856,I,309.

1971 UCP198 MAGDEBURG HEMISPHERES

Yeates & Son, DUBLIN

MxD 117; L 320. Mid to late 19 C. G.

Brass; black enamel handles which screw off; stop-cock between one handle and hemisphere.

1466 UCP155 MAGNET

Unsigned

614x26x7; C 727x108x42. Mid 19 C. G.

Pair of permanent magnets; poles labelled "N" and "S"; in boxwood case; space for missing minder.

1447 UCP127 MAGNET - ROTATING

Unsigned

B 164x106x40; H 368; M 252x20x2. Mid 19 C. G.

Mahogany base and turned pillar; turned mercury troughs bottom and centre around bar magnet with arms to mercury.

Yeates 1977,31 shows metal-frame version.

2826 UCP279 MANOMETER

WATKINS & HILL 5 CHARING CROSS

BD 142; H 533; SH 493, W 45. 1822-1856. F.

Mahogany base and support for boxwood scale 50-0-50; two brass hoops for missing tube, which went through base.

Dates from Clifton 1995,291.

0021 UCP063 MANOMETER - FICK SPRING

HAWKSLEY. LONDON.

PL 158x19; D 114; NL 125. Late 19 C. R.

Brass back-plate holds circular spring with mechanism on end to move needle.

Name on paper label on instrument.

Crawforth 1988,17 gives dates 1885 & 1890; Pearsall 1974,265 gives 1894.

0045 UCP003 MASSON APPARATUS

C. GERHARDT BONN.

H 330; Sp 245. Late 19 early 20 C. G.

"Pascal vases"; stand with weighing table; four brass and glass vessels (one vessel badly broken, second slightly) of different shapes.

Apparatus illustrated in Ganot 1890,92; Anderson 1990, 31 lists firm catalogues from 1893-1905.

3298 UCP298 MECHANICAL MODEL - PUMP

WATKINS & HILL CHARING CROSS LONDON

B 1127x245x74; H 1410. 1822-1856. F.

Wood base and vertical support for moving cross-section of two lift and force pumps - village and continuous action.

Essentially moving diagrams, with the pivoted handle raising the piston, and showing the hinged valves; the village-type pump has a curved outlet at the top side; the continuous action (fire engine) shows a rounded bell on top with the outlet pipe descending into it; in the latter case, the handle is detached from the piston extension; both are painted black, white and green, and have pulleys behind for the moving parts.

Harris 1908,676 shows glass continuous action pumps; dates from Clifton 1995,291.

3299 UCP299 MECHANICAL MODEL - PUMP

WATKINS & HILL CHARING CROSS LONDON

B 1133x247x78; H 1640. 1822-1856. F.

Wood cross-section model, as for 3298 UCP298, but showing a ratchet-driven double barrel air pump.

The handle is missing, which would drive the two vertical ratchet racks; the pipe work is shown, with a manometer (1-29), and a bell jar on the pump plate (D357).

Dates from Clifton 1995,291.

3357 UCP357 MECHANICAL MODEL - WATER WHEEL

Unsigned

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

B 360x352x18; H 355; WhD 154; Mid to late 19 C. G.

Wood base; tin water reservoir; iron bridge supports six-spoke wheel driving a millstone via two cog-wheels.

The wheel is above the water level in the reservoir, so it would have been driven by a stream of water from above; the reservoir has an outlet hole; the cog-wheels (D135&120) are at right-angles and turn a (wooden) millstone above a stationary stone on top of the model; the water wheel has inclined vanes to act as water buckets.

There are also two twelve-spoke wheels (D319) with radial vanes, from another model.

3361 UCP361 MELLONI APPARATUS

ELLIOTT BROS. 5 CHARING CROSS & 56 STRAND. LONDON.

B 870x181x41; PrsD 17, H 206. 1856-1858. A.

Mahogany base with central slide for five blocks with brass pillars; clamping screws above for attachments.

Only three attachments remain - a double tin sheet (170x170x24), a single copper sheet (170x160), and a brass table (D100) with a brass(?) arc above showing signs of burning, suggesting it was covering the flame of an oil lamp light source.

Dates from Chaldecott 1989,161.

2828 UCP281 MERCURY DIFFUSING CUP

Unsigned

H 140; MxD 65; DiD 85. Mid to late 19 C. G.

Turned boxwood "eggcup"; under it is a brass disc, and below this a wood stem with sealing wax on its sides.

The sealing wax is cracked and some is lost.

When the disc is placed on a vacuum tube and mercury is added to the egg cup, it emerges in a fountain through the bottom of the stem.

0741 UCP101 MERIDIAN CIRCLE

Unsigned but by Howard Grubb

L 1830; TuD 135; ED 209 (5"). c1884. D.

Brass telescope; central brass cube for pivot with eight handles; four reading microscopes at each side.

Brass-bound glass circles at each side which the microscopes read, one divided, one replaced; circle supported on two wooden tapering pillars; circular wooden surrounds at pivot; trolley mechanism support at top.

Important points noted in Grubb 1880,368 are the more stable mechanical construction and the use of glass as a material for the circles instead of brass; (the remaining divided circle is now back-to-front).

First circle for instrument sent by Howard Grubb on 8 May 1884 (letter extant).

3362 UCP362 METAL GLOBE

Unsigned

Sp 433; H 700; GD 440. Mid 19 C. G.

Decorated iron tripod foot holds globe with curved brass pipe (D34) on top; brass inlet pipe at one side.

The latter, near the top of the globe, has the remains of a rubber tube attached; there is no sign of heating below.

Purpose unknown.

3325 UCP325 METAL SPIRALS

YEATES & SON DUBLIN

Spirals W 30; C 151x41x37. Mid to late 19 C. G.

Boxwood case with hinged lid has six holes, now containing four spirals of different metals, two with threads for suspending the spirals.

2779 UCP232 METRONOME

Unsigned [front gone]

B 114x111; H 232. Mid 19 C. G.

Mahogany pyramid case; brass clockwork to control weighted vibrating rod; boxwood scale 40-203 and 42-200.

Scale labelled: "LARGO LARGHETTO ADAGIO ANDANTE ALLEGRO PRESTO", with a moving weight on the vibrating arm, which has a lead weight at its base.

In rather distressed state with only one of its four feet remaining.

3326 UCP326 MICROSCOPE - COMPOUND

HENRY CROUCH LONDON 4741 [253 under foot]

Sp 144&130; LmH 205. c1885. R.

Brass and oxidised brass; base has two feet to pivot with 180° curve behind; limb and stage pivoted; tube gone.

The limb and stage are fixed at 90° and move together on the base pivot; on top of the limb is a knurled focus knob; a bracket from the limb holds a brass cylinder for the missing tube, which presumably therefore had a slide coarse focus; the rectangular stage has a central hole and two spring clips.

An inexpensive "student" microscope.

Historical Technology 131,1988,105 gives c1868 for No.105; 133,1990,77 c1890 for No.5858.

3852 UCP368 MICROSCOPE - COMPOUND

E. Leitz Wetzlar No 34672 Filiale New-York

MnH 285; C 204x204x355. 1895. D.

Brass U-foot and support to pivot for stage and pillar; bracket to tube; triple nosepiece; mahogany case.

The upper part of the square stage is of oxidised brass, and there is one spring and screw to hold a slide; below the stage is a condenser and pivoted mirror; on top of the pillar is a turned knob for fine focus, and on top of the tube bracket is a double knob rack and pinion coarse focus; the case contains three slide-in blocks for five eyepieces and four objective cylinders, though only three of the latter remain, two by Leitz and the other a 3" signed: "ROSS LONDON 25041"; there is also an eyepiece incorporating a prism; a label in the case: "Mikroskop Nr.34672 Vergrößerungen bei 160 Mm. Tubuslänge" gives details of the optics, and is dated 9/XII/1895; the foot is also signed: "C. BAKER 244. HIGH HOLBORN LONDON".

0025 UCP090 MICROSCOPE - COMPOUND, BINOCULAR

HENRY CROUCH, LONDON. No 3093

B 255x138; Sp 346; H 271. c1880. G.

Brass and oxidised brass; cast trunnion foot to pivot for limb, holding tubes above and stage below; fitted case.

Coarse and fine focusing by rack and pinion; double objective; arm below stage with two nuts to move it in perpendicular directions; plane and concave mirror under stage; fitted mahogany case damaged; fittings - Ross 1/10" eyepiece; Zeiss objective; two Leitz cylinders, one for oil immersion objective.

Historical Technology 131,1988,105 gives c1868 for No. 760; 133,1990,77 c1890 for No.5858.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0018 UCP071 MICROSCOPE - TRAVELLING

BECKER, HATTON WALL, LONDON.

B 255x138; Sp 346; H 271. 1890-1898. A.

Black metal base; brass fittings; microscope pillar moved with knurled knob; scale 0-20cms with vernier.

Microscope moves over silvered plate (251x43); eye-piece missing; pillar attached to brass plate with the vernier which moves along the scale.

Dates from Crawforth 1988,4.

2803 UCP256 MICROSCOPE - TRAVELLING

GRIFFIN LONDON

B 124x100x20; MnH 227; TuD 26. Late 19 early 20 C. G.

"Reading Cathetometer Microscope"; brass; U-foot; pillar to horizontal cylinder limb for vertical tube.

Pillar has double knob rack and pinion; its length is read on a vertical scale 0-90 with vernier; the tube can be removed from the limb and is held by a screw clamp; it can be mounted to read horizontally if the horizontal cylinder limb is removed, when the tube bracket fits directly into the pillar rather than into the limb.

Instrument illustrated in Griffin 1910,76.

0068 UCP091 MIRROR - ANAMORPHIC

Unsigned

BD 104; H 255; ToD 89; CyD 74. Mid 19 C. G.

Wooden cylinder with turned base and top which screws on to secure silver-metal mirror covering half cylinder.

Instrument illustrated in Turner 1983,297.

1947 UCP174 MIRROR - CONCAVE

Unsigned

BD 122; H 315; MiHsD 167. Third ¼ 19 C. G.

Mahogany turned base and pillar; boxwood clamp for white metal pillar to brass circular housing and lid.

Glass mirror in white metal frame in brass housing; silver damaged to reveal printed paper padding behind mirror, which can be seen also through two small holes (D7) behind housing.

1941 UCP168 MIRROR - CONCAVE

Unsigned

BD 123; StH 425; MrD 333. Mid to late 19 C. G.

Two; iron stand and pillar; silvered mirrors on oxidised brass backs; brass clamping nut to pillar.

1935 UCP162 MIRROR - ROTATING CUBIC

Made by Yeates & Son Dublin

BD 146; H 397; MiHs 170x164x157. Mid to late 19 C. G.

Fluted cast iron base and pillar; handle to two brass discs at right-angles to turn mahogany-housed mirrors on top of brass pillar; some of the edges of the mirror housing are missing.

2781 UCP234 MIRRORS - ANGLED

Unsigned

Frs 186x132; H 196. Mid to late 19 C. G.

Mahogany; two frames at 90°; mirrors on outer sides; in between, oxidised brass support and fixed arrow.

Pointed mahogany bracket above frames to hold missing part in front of the mirrors.

Purpose of instrument unclear.

0115 UCP023 OCTANT

J. BUCKLEY. DUBLIN (via T. BENNETT)

R 250; L 300; W 243; CL325, W 309. 1844-1859. FD.

Ebony, ivory and brass; three telescopes; three filters; oak case; fitted case has raised portion on top.

Trade label: "T. BENNETT, Optician, And Manufacturer of every description of MATHEMATICAL & PHILOSOPHICAL INSTRUMENTS 124 Patrick-Street, CORK. QUADRANTS, COMPASSES, TELESCOPES, BAROMETERS, &c. CLEANED & REPAIRED."

The instrument and case could not be found on return visit in 1990.

Bennett at 124 Patrick Street 1844-1867; Buckley dates 1832-1859; Burnett & Morrison-Low 1989,144&121.

1455 UCP134 OERSTED APPARATUS

Unsigned

BD 94; H 236. Mid 19 C. G.

Turned rosewood(?) base and pillar; brass sleeve for magnetic needle; two arms at sides hold mercury cups.

Latter bent in right-angle so that cups are vertical; needle gone.

Apparatus shows deflection of magnetic needle when an electric current is passed around it.

Similar instrument illustrated and described in Elliott 1856b,6.

0743 UCP103 OPTICAL BENCH

Secretan à Paris

B 1206x235x215; H 456; Bn 1212x49x8. Post 1855. R.

Mahogany drawer base; two brass pillars support metal bench divided 0-121cm; clip brackets for elements - mainly in rectangular oxidised brass frames (67x33) which fit into sliding bench brackets.

The firm was founded in 1855 and survived into the 20th Century, Brenni, 1988,1.

1973 UCP200 OPTICAL DISC - HARTL

Unsigned - attributed to Welch, Chicago

DiD 307. Late 19 early 20 C. G.

Incomplete; black metal arc scale disc housing; white scale 0-90-0-90-0°; places marked for missing lenses.

The disc can be rotated about a brass and enamelled handle under the disc.

The missing lenses would have been flat on two sides; the apparatus demonstrates refraction of light; 0695 UDP023 is a complete instrument with lenses and filters.

Name from Baird 1924,327.

1955 UCP182 OPTICAL ELEMENT

Unsigned - Selenite Design

123x51x5½; DisD 45. Mid 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Four; mahogany frames (one varnished); glass discs for "Newton's Rings" "Forget me not" "Fari.ed?" and blank. Varnished example has no legend, or none that can be read now.

1954 UCP181 OPTICAL ELEMENT

Unsigned - Unannealed GLASS

Hs 139x46x18. Mid 19 C. G.

Four; mahogany rectangular frames with tapered bottoms hold glass triangle, circle, ellipse, and eight-point star. Also a "Centipede For ? ?" in similar housing, though wider and thinner (152x58x9).

2764 UCP217 ORGAN - DEMONSTRATION

HARVEY & PEAK LONDON

Hss from 684x69x62 to 303x42x34; TMxH 1083, MxW

741. 1884-1909. F.

Ten boxwood pipes, mahogany lips, open tops; short tapering inlet tubes below; table bellows and keyboard.

Largest two pipes with no notes given; others C D E F G A B C; table bellows and wind chest for eight pipes, with small keyboard, is signed: "HARVEY & PEAK SUCC-ESSORS TO W. LADD & CO BEAK ST LONDON", suggesting early date after the foundation in 1885.

This is a laboratory demonstration apparatus rather than a real organ.

Also some unsigned block pipes.

Dates from Downing 1988,57.

2787 UCP240 ORGAN - DEMONSTRATION

Unsigned

L 763-320; D 35-14; TaH 912, W 613. Mid 19 C. G.

Twenty one cylinder lead pipes, tapering bottoms; mahogany table for bellows, keyboard and wind chest.

The bellows are at the bottom of the table; the keyboard is below the (incomplete) wind chest, and has 15 white and 10 black keys; there are 48 holes for pipes, plus five more for supports for the missing top.

In distressed condition.

2761 UCP214 ORGAN BELLOWS

Made by YEATES & SON, 2, Grafton Street DUBLIN.

Hs 330x69x65-70; SrsD 30. 1840-1864. G.

Fibre-covered wood housing; leather bellows; inlet and outlet pipes; metal dumb-bell on top.

The latter is in the form of a pipe on two supports, with a metal sphere which can slide along the pipe; another brass pipe, with a metal sphere on its end, slides into this.

While this could act as a handle for using the bellows, it seems likely to have had a more sophisticated, though unknown, purpose.

Assumed to be George Yeates & Son, since the address is given; dates from Morrison-Low 1989,139.

3306 UCP306 ORGAN PIPE - REED

YEATES & SON OPTICIANS DUBLIN

Hs 242x59x57. Mid to late 19 C. G.

Two; boxwood housing, mahogany top; glass windows on three sides to show reeds; curved wire stops from top.

One reed is on a brass tube; the other is on a flat brass frame; a glass panel on the latter is cracked, and it is also missing its tapering mahogany input pipe.

2786 UCP239 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN

Hs 610x76x66 to 294x46x43. Mid to late 19 C. G.

Eight; boxwood with mahogany lip; capsule in middle of front; four largest (C3) with slide on top; E5, G3, C4, C4; short tapering pipe below (missing on largest four).

3305 UCP305 ORGAN PIPE WITH MANOMETRIC CAPSULES

YEATES & SON DUBLIN

Hs 699x78x76. Mid to late 19 C. G.

Boxwood; mahogany lip on one side; three mahogany capsules joined by a brass pipe on side two; glass panel on back; short tapering input tube below; open top.

2765 UCP218 ORGAN PIPE WITH MANOMETRIC CAPSULES

Unsigned

Hs 702x75x74. Mid to late 19 C. G.

Boxwood; mahogany lip; oxidised brass pipes with rubber tubes to three manometric capsules; glass back.

The brass pipes are in the form of a T with an inlet on the bottom and three outlets to the capsules on top; the wood pipe has an open top, and a short tapering input tube.

3316 UCP316 OXY-HYDROGEN CAPSTAN VALVE

HUGHES PATENT

BD 68; H 50; MxW 148. Late 19 C. G.

Brass; base disc holds raised ellipse with four pipes; two crossed stop-cock pipes; on top, capstan and cogs.

The four pipes exit from the rounded corners of the elliptical housing; across the tops of these are two parallel pipes, each with a stop-cock in the centre; on top of the housing is a cogged capstan turned by two side rods, and this drives two satellite cog-wheels for the hidden mechanism inside.

Probably William Charles Hughes, 1873-1900, Downing 1988,66.

1461 UCP139 PENDULUM

Unsigned

L 1161; DiD 166. Mid to Late 19 C. G.

Mahogany rod; brass suspension piece on top; brass-covered lead disc at bottom with adjust screw 0-21; rod is not circular or flat but has curved cross-section.

2875 UCP291 PENDULUM - GRIDIRON, MODEL

Unsigned

L 1111; W 148; BbD 182. Mid to late 19 C. G.

Iron central rod; rest of wood; four blue and four yellow parallel rods on frame; yellow biconvex bob.

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2768 UCP221 PHONIC WHEEL

7235/3 [on tripod] LUCAS [on bell]

Sp 165; H 253; DiD 225. Patented 1903[?].

"Raleigh Synchronous Motor or Phonic Wheel"; two iron tripod feet; cog and motor drive to rotate slotted disc.

Tripod feet at right-angles to position disc vertical or horizontal; steel cog wheel turned by two electric coils to drive disc; endless screw mechanism attached to bell.

The instrument is used to determine absolute pitch of tuning forks.

Name from Pye 1914,34; another phonic wheel, 1340 TDP205, was patented on 3:10:1899.

2766 UCP219 PHONOGRAPH

C.F. FIELDING 28A, GRAND PARADE, CORK. 5954 6310

Hs 296x195x141; TuL 272, D 19-105.

Late 19 early 20 C. G.

Rosewood housing; white-metal cylinder and clockwork drive with three-ball governor; japanned tin cone tube.

Ivory signature plaque includes the words "'CANADIAN' NOVELTY STORE"; the instrument is numbered 5954, with a cockerel and phonograph "MARQUE DÉPOSÉE"; the housing is numbered 6310.

There is a broken cylinder "COLUMBIA PHONOGRAPH CO. MAKERS OF THE FAMOUS COLUMBIA RECORDS PATENTED MAY 4th 1886. IF IT IS A COLUMBIA RECORD IT IS GOOD", and a collection of unmarked cylinders; "Baritone Solo The Smuggler J 5832".

1948 UCP175 PHOTOMETER

SIMMANCE-ABADY PATENT FLICKER PHOTOMETER 552 H

Sp 191&55; H 258; Hs 105x89x93. Early 20 C. G.

Oxidised brass and brass; four-wheel base; mahogany housing for clockwork; horizontal eyepiece and prism on top.

Two lenses on tubes at sides to condense light sources to black discs with white crosses; on front of mahogany housing is the message: "Do not touch the white disc" in English, French, and German; the bench along which the wheels could run is missing, with its scale which the suspended needle below the housing would have read

The complete instrument is illustrated and described in Baird & Tatlock 1924,309: "The principle of this is quite a novel one, and replaces the grease spot and similar devices familiar to all experimentalists. By its means light of any colour can be compared with any known standard of light. It is in fact the solution of the 'colour difficulty' which has hitherto pressed so hardly on photometrists, especially with modern forms of lighting, such as arcs, metallic filaments, incandescent mantles, etc. When the lights are unequal a flickering effect is present, but when equality is obtained, all that is seen is an apparently motionless disc. With this photometer the 'personal error' is avoided, even with the greatest contrast between the lights."

1946 UCP173 PHOTOMETER

DR. LETHEBY'S PHOTOMETER DISTANCE BETWEEN LIGHTS 60 INCHES WILLIAM SUGG, GAS ENGINEER, WESTMINTER, S.W.

H 268; Hs 201x162x130. Fourth ¼ 19 C. G.

Mahogany; three wheels; two part housing, white disc between.

Housing has windows at sides for lights to be compared; in front is a viewing framed rectangular hole through which can be seen the sides of the membrane (with the white disc) by means of two angled mirrors at the back of the housing; a sliding trap door at the back of the housing allows the japanned tin mirror and membrane frame to be removed; a thin prism (L60MxW20) is suspended below the housing to near the wheels, which would have run on a missing bench.

Crawforth 1988,18 gives dates 1844-1885+W.

3319 UCP319 PIEZOMETER

Unsigned

BD 105; MnH 807; CyD 69, H 324. Mid to late 19 C. G.

Brass; glass cylinder between sleeves; upper leads to stop-cock for syringe pump or liquid reservoir.

Glass vessel and mercury manometer inside for liquid being compressed - the details are difficult to see due to rust discoloration of the water inside the cylinder, but it looks like a J-tube with bulbs on each end and with mercury in the capillary joining the bulbs.

Similar instrument described in Ganot 1877,76.

3315 UCP315 PITH BALL STAND

Unsigned

BD 63; H 249 & 231. Mid to late 19 C. G.

Two; brass; circular base holds vertical rod ending in a crook with a hook for the (missing) pendant ball.

1936 UCP163 POLARIMETER

FRANZ SCHMIDT & HAENSCH Werkstätten für wissenschaftliche Instrumente BERLIN, S.42

Sp 210; H 385; ScD 1105. 1864-1914. F.

Black tripod, pillar and support; brass optics housing; horizontal housing holds broken sample tube; silvered scale at eyepiece end 0-90-0-90-0°, two arm verniers; brass arm to revolve eyepiece, which has push focus.

Dates from Brachner 1985,149 and Anderson 1990,75.

1934 UCP161 POLARISCOPE

WATKINS & HILL 5 CHARING CROSS LONDON

BD 174; H 378; GIHss 154x80&150x79; ApHsD 83.

1822-1856. F.

Mahogany base; two turned brass pillars and arch hold revolving glass, fixed aperture, and revolving black glass.

Lower glass and centre glass disc aperture in oxidised brass frames; arch turns around horizontal housing of aperture; and black glass in oxidised brass housing (frame on front, solid at back) pivots within arch.

Dates from Clifton 1995,291.

0093 UCP017 POLARISCOPE

Unsigned

BD106; H 308. Mid to late 19 C. G.

Brass; two pairs of prisms in angled cylindrical housings with gap between; light appears linear.

When looking through the instrument, the light appears to travel in a straight line although it has been bent several times by the prisms; these are angled at the Brewster angle, and samples for analysis can be placed in the gap; one pair of prisms can rotate, the other is clamped by a screw which can be loosened.

1933 UCP160 POLARISCOPE - NORREMBERG

YEATES & SON. DUBLIN

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B 180x172x64; H 330; MiD 65; GIHs 131x80.

Mid/late 19C. G.

Mahogany drawer base; brass; base mirror; two supports for revolving black glass, aperture, and nicol prism.

The black glass in oxidised brass housing has a side scale 90-0-90°; slightly more than half way up the supports is the glass disc aperture which revolves horizontally with marks 0, 45 and 90°; into this fits a brass disc with, on top, a revolving arc holding a revolving slide holder; on top of supports is a nicol eye-piece which can revolve around a silvered scale 0-90-0-90-0°; pencil price 72/130/-.

0092 UCP032 POLARISCOPE - SOLEIL

Lerebours et Secretan à Paris

H 374; PvH 227; L 270. 1847-1855. F.

Brass; stand, pivot and optical bench; black glass, lens, revolving clamp with scale, lens, analyser.

The brass stand holds an optical bench above pivot; on this is a rectangular black glass, a condensing lens, a double sample clip revolved by a knob read with a silvered scale and vernier, another lens, adjustable rectangular aperture, and rotatable eye-piece with lens and green tourmaline crystal analyser. "Appareil de Soleil pour étudier les cristaux en lumière polarisée". Dates, Payen 1985,175; date 1843 "Entre" on similar instrument in Paris Conservatoire des Arts et Metiers.

2817 UCP270 POLARISCOPE - TOURMALINE PINCETTES

Unsigned

L 157; HssD 29-31. Late 19 C. G.

Three; sprung wire frames each for two oxidised brass revolving ring housings for tourmaline in cork.

Tourmaline crystal colours green, orange, and yellow.

Another similar pincette is of a slightly different design (L133,HsD25), with orange tourmaline.

2829 UCP282 POWDER CUP

Unsigned

H 63; MxD 63; CusD 11, H 15. Mid to late 19 C. G.

Turned boxwood "eggcup"; in centre, two metal points connected to outside wires ending in turned wood cups.

Appears to correspond to "Powder cup, for igniting gunpowder by electric spark...0 2 0" illustrated in the Yeates catalogue (1877,11), although the design of this example is different, having external mercury cups on the ends of right-angled wires, rather than rings.

0752 UCP112 POWDER HOUSE

Unsigned

B 228x123; H 255. Mid to late 19 C. G.

Mahogany "house" with brass sphere on chimney; black inside; font-like vessel in centre; walls and roof hinged.

A conductor connects the font (on turned pillar) to the outside of the house.

To demonstrate the firing of gunpowder by electricity - illustrated in Pike 1856,I,311.

0064 UCP082 PRESSURE GAUGE

E. BOURDON'S PATENT No 2924

L 585; SHsD 177; BoPD 206; PiD 20. Late 19 C. G.

Cylinder brass housing, glass cover; white scale 0-25; stop-cock, wood handle; brass pipe to screw thread; wider backing plate.

Eugène Bourdon produced his metallic manometer for measuring pressures on steam engines in 1849 and won a Council Medal at the 1851 Great Exhibition in London; he was sued successfully for patent infringement by Lucien Vidie (1805-1866), the inventor of the aneroid barometer; Turner 1983, 236-7.

0075 UCP004 PRISM - ADJUSTABLE

Lerebours et Secretan à Paris

H 307; TpD 180; Sp 192. 1847-1855. R.

Brass and glass with circular brass trap; moving glass plates; on iron tripod foot.

Dates from Payen 1985,175.

0096 UCP015 PRISM - CONICAL

LEREBOURS & SECRETAN A PARIS

H 354; HsD 69; PmD 35. 1847-1855. R.

Held by angled bracket on expanding brass stand; prism in oxidised brass circular housing.

Dates from Payen 1985,175.

1976 UCP203 PRISM - HOLLOW

Unsigned

W 63; D 65; H 122; C 214x104x150. Mid to late 19 C. G.

Set of three hollow glass prisms with two clear plain glass, and one curved frosted glass, sides; in fitted oak case.

Two of the stoppers are bound on by white leather, and all contain liquids.

2802 UCP255 PRISM - NICOL

SECRETAN PARIS

HsD 30&40; L 55. Mid to late 19 C. G.

Brass cylinder, with oxidised brass eye ring, holds prism in cork; at side, arm with knob leads to vernier.

Possibly part of a polariscope.

The firm was founded in 1855 and survived into the 20th Century, Brenni 1988,1.

1945 UCP172 PRISM ON STAND

LEREBOURS & SECRETAN A PARIS

BD 89; MnH 180; PmsHsW 56, H 29. 1847-1855. F.

Brass expanding stand to pivot for right-angle bracket holding two thin prisms on hinged housing.

Dates from Payen 1985,175.

2814 UCP267 PRISM ON STAND

Unsigned

B 108x79; MnH 140; Pm 75x56x56x56. Late 19 C. G.

Brass plate bottom to expanding pillar with push inset; oxidised brass hinged plate for 84° apex prism.

Height of pillar fixed with clamping wing-nut; the prism can be adjusted by raising its base plate by means of another wing-

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nut below the side opposite the hinge.

Presumably this was used with a larger apparatus, perhaps a lantern or optical bench?

1938 UCP165 PRISM HOUSING

John Browning, London.

BD 155; H 465; CyHs D180 H197. Fourth ¼ 19 C. G.

Brass base and pillar to oxidised brass cylinder housing with two pairs of sliding doors.

Upper parts of housing can be removed to show velvet-covered table on which prisms would rest.

1950 UCP177 PULLEY FRAME

Unsigned

B 676x164x54; H 680. Mid 19 C. G.

Mahogany; base has four feet and holds two turned pillars to bridge; boxwood scales 1-23"; oxidised brass pulleys.

Strings across horizontally at each inch; single (3), double (2), and triple (2) pulley systems, with brass cylinder weights.

0107 UCP026 RELAY

YEATES & SON, DUBLIN

175X158X137. c1877. CT.

Mahogany base; brass frame with thick glass; brass instrument with two white-covered coils.

As in Yeates 1877,42&44 - "Relay, best make, large size, very superior".

0852 UCP144 RESISTANCE

Unsigned

B 218x141x35; H 182. Early 20 C. G.

Black boxwood base; asbestos sheet; cross-shaped section porcelain frame for helical resistance wire.

Red diamond pattern wire protection in arch over frame; two brass base contacts; "50 ohms 2½ amps" in pencil on base.

3332 UCP332 RESISTANCE - STANDARD(?)

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD ENGLAND. No2134

Sp 87; H 224; CosD 102&114. Pre 1907. R.

Four ebonite feet hold two horizontal ebonite crosses for two metal spiral coils; vertical rods to contacts.

The brass screw contacts are above an ebonite rod between the vertical rods; the coils are of metal ribbon and are connected by a vertical strip.

Dates from J. Bennett PC.

0753 UCP113 RESISTANCE - STANDARD

ELLIOTT BRO. LONDON. NO. 499 B.T. OHM AT 13.2C. P.S.

C 248x228x120; RiD 102; WiD 8. Late 19 C. G.

White metal ring and two pillars; ebonite insulation to two copper wires in two right-angles; mahogany case; glass vessel missing.

2790 UCP243 RESISTANCE BOX

F.E. BECKER & CO LONDON No 3783 W.G. PYE & CO LTD CAMBRIDGE ENGLAND Nos 11638 & 15079

Various sizes. Late 19 to mid 20 C. G.

Variety including one by Becker and two by Pye, as above; all with mahogany housings, brass fittings, and keys.

Pye No 11,638 has "CONSTANTAN COILS"; Pye No 15,079 has "MANGANIN COILS OHMS AT 17° CENT".

Some older boxes are unsigned.

2789 UCP242 RESISTANCE BOX

GAMBRELL BROS LTD LONDON No14306 Patt2007 MASON DUBLIN

B 272x88; Hs 263x79x75; H 146. Early 20 C. G.

Two by Gambrell Bros Ltd; three by Gambrell Bros & Co Ltd; one by W.G. Pye & Co; all different and supplied by Mason.

All with mahogany housings, ebonite tops, and brass or ebonite and brass keys: No 14306 Class C Patt 2007 has 14 (of 17)

brass cap keys and reads 1-5000 ohms and infinity. Class C Patt 2009 No 15 has eight (of nine) brass cap keys and reads

.010-.5 ohms and infinity. PATT 2052 No 50 (GAMBRELL BROS & CO LTD) has six (of 12) keys and reads 1-500 ohms.

PATT 2053 No 14332 has eight brass keys and reads 1-50 ohms and infinity. Fifth has four bakelite and brass keys and

reads .1-.5 ohm "TOTAL 1 OHM" and will date well into 20 Century. Sixth (W.G. PYE & CO ENGLAND CAMBRIDGE) has

11 (of 13) brass and ebonite keys and reads 1-500 ohms and infinity.

2769 UCP222 RESONATOR - HELMHOLTZ

K [monogram of Rudolph Koenig]

D 127-33; H 148-48. 1858-1901. F.

Nine; brass spheres with disc holes at one side and conical ear inserts at other; from UT3 to SOL3

Others MI, MI5, RE, SOL1, UT2, & UT5.

Monogram is usually RK, but here only the K appears; Dates from Payen 1986,160.

0490 UCP147 RHEOSTAT

ELLIOTT BROS. 449 STRAND LONDON

B 253x126x16; H 70 (incomplete). 1864-1886. A.

Mahogany base; brass bracket (other gone); copper contact on brass disc slides along bar; cylinder gone.

Brass contacts to one bracket and to one side of bar support.

Appears identical to that illustrated in Elliott 1895,46 - "Rheostat - Wheatstone's form, platinoid wire, of any required resistance, wound on ebonite cylinder in screw thread, with rolling contact sliding along a rod, and divided end with index."

Dates from Crawforth 1988,8.

1140 UCP145 RHEOSTAT

Unsigned

B 80x78x24; MnH 67. Late 19 C. G.

Mahogany base; graphite disc insert; brass bridge with screw clamp to vary disc pressure; two brass contacts; one contact to brass bridge, other to back of disc.

1105 UCP146 RHEOSTAT

Unsigned

B 261x178x27. Late 19 early 20 C. G.

Oak base; iron frame in form of cylinder with lengths cut out; eight asbestos pads on remainder for wire (gone).

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Brass track to one side on springs allows ebonite frame attached to brass cog wheel to run along wire; two brass contacts on base.

1949 UCP176 SCREW PRESS

WATKINS & HILL 5 CHARING CROSS LONDON
B 315x154x47; FrH 435. 1822-1856. F.

Mahogany; base holds rectangular frame; screw goes through top, and is attached to moving plate at base.

Two turned horizontal handles at right-angles to the screw, at its bottom, are used to turn it to press whatever is between the base and plate; base has four feet.

Dates from Clifton 1995,291 .

3327 UCP327 SHUNT - UNIVERSAL

NALDER BROS. & CO WESTMINSTER No 19,137 AYRTON & MATHER UNIVERSAL SHUNT

BD 132; H 106; CyD 100. 1890-1910. F.

Brass cylinder housing; ebonite top; nine contacts.

A central ebonite knob has three brushes to make the contacts, which are labelled 0 1/1000 1/300 1/100 1/30 1/10 1/3 1 INF; there are also three brass screw electrical contacts on the ebonite disc top.

The firm issued catalogues from 1890-1910, Anderson 1990,57-8.

2773 UCP226 SINGING FLAMES APPARATUS

Made by Yeates & Son Dublin

Sp 195; H 294. Mid to late 19 C. G.

Iron tripod foot has gas inlet under it; horizontal brass block; two stop-cocks and two vertical brass pipes.

One of the pipes is tapered (H200,OD6-2.5), the other is a straight tube with a rounded top (H205,OD7); the glass tubes, which would have gone over the pipes, are missing.

3312 UCP312 SIREN - CAGNIARD

YEATES & SON DUBLIN

H 192; CyD 74, H 25. Mid to late 19 C. G.

Brass; input pipe to cylinder; on top, 25 hole turning disc; rod to endless screw mechanism for scales 0-90 and 0-20, which are read by watch hands on a silvered scale plate.

2775 UCP228 SIREN - CAGNIARD

Unsigned

BD 71; CyD 57. Mid to late 19 C. G.

Turned mahogany base boss; brass cylinder chamber; 20 hole turning disc; endless screw mechanism to scales.

Input tube under the cylinder sits in the base boss; the scales, 10-100 and 1000-5000, are on a silvered plate on top, read by two watch-hands.

2759 UCP212 SIREN - HELMHOLTZ DOUBLE

Yeates & Son Dublin.

B 400x249x31; H 420; CysD 86. Mid to late 19 C. G.

Mahogany base, turned pillar and two supports for double brass cylinder; top and bottom pipes joined to Y-piece.

Base on four feet; two brass and oxidised brass cylinders each with four stops, "8 10 12 18" below and "8 12 15 16" above, have oxidised brass pipes below or above, turned in a right-angle, and attached by rubber tubes to the oxidised brass Y-piece on top of the turned pillar; between the cylinders is a silvered scale plate (134x45) with two scales 10-100 and 5-25, one watch-hand remains; behind the scale is a glass panel showing a cog wheel and endless screw mechanism; on top of the cylinder frame is a brass disc (D51) divided but not numbered, with a brass handle and pointer.

2758 UCP211 SONOMETER

BENNETT. CORK.

Hs 610x154x103; H 158. Mid 19 C. G.

Mahogany sounding box; on top, boxwood rack with notes marked DEFGABCDEFGABC; one fixed, one sliding bridge; two pulley wheels.

The sounding box has curved holes in two sides, both of which are cracked; one pulley wheel is on the top at one end, and the other is at the side of the sounding box; a string would have been tensioned with weights over the pulleys.

Burnett & Morrison-Low 1989,144-5 give dates 1810-1867 for Thomas Bennett.

3342 UCP342 SONOMETER - HUBBARD MONOCHORD

BAIRD & TATLOCK (LONDON) LTD. A3582

L(-Ha) 785; MxW 102. Early 20 C. G.

Mahogany base suspended vertically; brass fittings; two screw clamps on top, a bridge, and two clamps below.

At the side is a brass slide for the missing sliding bridge.

Baird 1924,395 notes: "The advantages are that, for lecture purposes, it can easily be seen by the whole class. The back of the instrument serves as a sounding board, so that its strings can be compared with a standard tuning fork. For experimental purposes: The length of the vibrating wire can be easily adjusted by means of the movable bridge. The stretching force acts directly, all friction being avoided, and by tightening the bottom screw, the stretching force can be maintained while the weight is removed. The springs being merely clamped by the top screws can be easily removed or replaced by others of different diameters." - supplied with two steel wires and set of five one kilo weights.

3343 UCP343 SOUND INTERFERENCE TUBE - KUNDT

Unsigned

MnL 609; MnW 173; W 365; TuD 16; SvsD 26.

Mid to late 19 C. G.

Brass tube with parallel side and 180° ends; trombone--type slider; two side sleeves for missing side tubes.

Baird 1924,394 illustrates the apparatus, with glass side tubes of three feet and eighteen inches - these appear to be Kundt dust tubes, the longer one with a syringe.

2757 UCP210 SOUNDING BOWL

Unsigned

BD 232; BwD 181; H 331. Mid to late 19 C. G.

Turned mahogany base and pillar to brass sleeve; on top, hemispherical glass bowl.

3317 UCP317 SPECIFIC HEAT APPARATUS - REGNAULT

YEATES & SON DUBLIN

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B 205x155x30; H 285; CyD 70, H 116.

Mid to late 19 C. G.

Mahogany base; black vertical wood support for metal lagged cylinder water jacket; calorimeter gone.

Two mahogany bars on base to guide missing container for calorimeter; the cylinder has mahogany rings top and bottom; at its bottom is a pivoted arm to release the object being heated into the calorimeter.

2812 UCP265 SPECTROSCOPE - DIRECT VISION

A. Hilger [on instrument] J.A. HILGER -192- TOTTENHAM COURT ROAD LONDON. W. [on case]

MnL 237; TusD 22&25; C 265x55x45. 1876-1880. A.

Brass; ring to revolve slit; screw thread below this.

The thinner eyepiece tube has a slit on its end, which can be turned around (but seemingly not adjusted in separation) by a knurled ring; an outer housing surrounds this with two circular holes for access to the ring; then there is a flange and a screw thread, and a wider tube with a push-focus lens at the end; in a red leather-covered case with royal purple velvet and silk lining; it is not clear what it screws into.

Not illustrated in Hilger 1906 and 1930; dates for address from Crawforth 1988,10.

1951 UCP178 SPECTROSCOPE - DIRECT VISION

[On case] A. HILGER 204 STANHOPE STREET LONDON. N.W. [On instrument] A. Hilger, London.

L 134; TusD 22&15½; C 157x67x35. 1885-1901. A.

Brass and oxidised brass; draw tube focus; slit adjusted by knurled ring; prism to parallel tube on top; cover cap on end of small top tube.

Black leather-covered case with blue silk inside top lid and blue velvet inside bottom.

Dates from Crawforth 1988,10.

0097 UCP014 SPECTROSCOPE - DIRECT VISION

J.G. Hofmann Rue de Buci 3, Paris

L 214; H 286. Third ¼ 19 C. R.

Brass, three segments; front two covered in brown material; pivot for eyepiece section; slit gone; stand and clamp; crew through mid section allows slight rotation of eyepiece end.

Instrument type added at late stage to 1862 London Exhibition - Bennett 1984a,8.

2813 UCP266 SPECTROSCOPE - DIRECT VISION

WINKEL GÖTTINGEN Nr.6832 T. MASON 5, DAME STREET DUBLIN.

MnL 80; TuD 18; C 94x36x30. 1900-1916. A.

White-metal; push focus eyepiece; ring on other end to adjust slit; red leather-covered case, blue lining.

Mason dates from Morrison-Low 1989,131; Rudolf Winkel workshop founded 1857, c30 staff 1900, Brachner 1956, 152.

0099 UCP016 SPECTROSCOPE - PROJECTION

SECRETAN A PARIS

H 163; Sp 135. Post 1855. R.

Brass; tripod foot, three level screws; prism in frame in centre; revolving side arm with plano-convex lens.

Similar instrument illustrated in Turner 1983,147, where it is called "Achromatic lens and prism".

The firm was founded in 1855 and survived into the 20th Century, Brenni 1988,1.

0095 UCP019 SPECTROSCOPE - PROJECTION

Unsigned (S.M. Yeates' Projection Spectroscope)

BD 144; TH 293; T 191x100. c1880. CT.

Mahogany table for two hollow prisms; side arm and lens; same instrument as 0128 RDS090 signed Yeates & Son.

Collimating lens on right-hand side of table; grooves for prisms; latter present, but one cracked; green painted fluted base; brass pillar.

Illustrated in Yeates 1880,10-11.

0094 UCP018 SPECTROSCOPE - PROJECTION

Made by Yeates & Son Dublin.

BD 132; TH 302; P 154x78. Mid to late 19 C. G.

Brass; stand to circular table for one prism; side arm with thermocouple on plate; another with lens.

Lens adjusted by rack and pinion; revolving arm with thermocouple behind ebonite plate; cost written on bottom 5/5/0; prism missing.

2760 UCP213 SPECTROSCOPE - TABLE

John Browning London

B 216x214x11; Sp 195; TH 223; CIL 345.

Fourth ¼ 19 C. G.

Mahogany base; brass and oxidised brass; tripod base; pillar to divided table 0-110; moving telescope gone.

Brass pillar is tapering; the collimator is fixed by a bracket to the table, has a push focus at the slit end, a small knob to adjust the (stuck) slit, and a small pivoted prism over the slit; the main prism sits on an oxidised brass three-legged table with crook and clamp above; the telescope bracket with a screw-thread remains, but the telescope is gone; the position of the telescope is read with a vernier on the scale.

0117 UCP001 SPECTROSCOPE - TABLE

[Howard] GRUBB. DUBLIN

B 455x140; H 388. 1880. R.

Iron base and pillar; brass and oxidised brass; five prisms, one reversing; telescope and collimator parallel.

Knob attached to two chains allows prism train to adjust automatically for minimum deviation; spectrum viewed through right-angled eyepiece; reflecting prism at end allows prisms to be used twice for greater dispersion; can be mounted for astronomical work and was purchased for Observatory, but now on stand for bench work.

Instrument described in Grubb 1880,364-5.

0088 UCP039 SPECTROSCOPE - TABLE

A. HILGER LONDON (on echelon grating)

L 995; W 176; TH 155&182. Late 19 early 20 C. G.

Base of two long hinged pieces of wood; one holds the collimator and echelon table, the other a telescope.

Larger wooden piece has three legs with level screws, smaller side has one; slit with small reference prism; eyepiece missing; echelon grating in brass and oxidised brass frame with two level screws - see separate entry 0724 UCP121.

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3334 UCP334 SPECTROSCOPE - TABLE

Unsigned

Sp 195; TaH 183, D 161; PmTD 74; TusD 26.

Late 19 C. G.

Iron tripod foot; tapering brass pillar to brass table divided around edge 0-350°; vernier on telescope.

Slightly raised brass prism table; collimator fixed to table, with hand operated slide slit; telescope focus by rack and pinion.

1980 UCP207 SPECTROSCOPE - TABLE

Unsigned

Sp 226; TH 228; TeL 263, D 43&38; CIL 252, D 32.

Late 19 C. G.

Cast iron tripod base and heavy tapering pillar to table and supports for brass telescope, collimator, reference.

Drum micrometer with silvered scale to adjust slit; bracket on table to hold missing prism; knurled knobs for clamping or adjusting telescope and table.

0089 UCP036 SPECTROSCOPE - TABLE

Unsigned

BD 370; TH 258; TD 224; SD 193. Late 19 C. G.

Mahogany base with three brass pillars to support table; large scale under table; telescope missing.

Brass and oxidised brass; short collimator L130; scale 0-360°.

A photograph of this instrument, with light source including valves, found loose in 1939 Becker catalogue, is also without a telescope, though the mount for this remains.

3318 UCP318 STAND WITH SCREW CLAMP

YEATES & SON [*sic*] DUBLIN

Sp 344 & 273; MnH 663. Mid to late 19 C. G.

Oak; T-shaped foot holds vertical pillar (48x31) ending in a frame (W65) with a vertical wood screw.

Possibly for studying vibrations in a clamped rod?

0755 UCP115 STANDARD METRE

L. Oertling London

L 1052; W 50; C 1078x71x68; RdD 13.

Late 19 early 20 C. G.

Brass; divided into decimetres; first and last divisions in millimetres; metre rod with ivory rollers; case.

Rule has two square section pillars at the 0 and metre mark between which the rod fits; case of mahogany.

0758 UCP118 STANDARD VOLUMES - IMPERIAL

L. OERTLING LONDON

BD 47-194; H 62-185. Late 19 early 20 C. G.

Seven brass cylinders; largest with brass and ebony handles; gallon, ½, quart, pint, ½, gill, ½.

Largest signed.

0759 UCP119 STANDARD VOLUMES - IMPERIAL

Unsigned

B 173x177; H 190. Mid 19 C. G.

Glass; approximately cubic; hand calibrated (with serifs); ½ pint; pint; quart; ½ gallon (full one gallon); open top.

0757 UCP117 STANDARD VOLUMES - METRIC

L. OERTLING LONDON

H 40-175; BD 29-104. Late 19 early 20 C. G.

Seven brass cylinders with wider bases and lips; 1; 0.5; 0.2; 0.1; 0.05; 0.02; 0.01 litres; largest signed.

0760 UCP120 STANDARD WEIGHTS - METRIC

L. Oertling. London

H 7-74; D 5-51; Hs [198x105x99]x279.

Late 19 early 20 C. G.

Brass cylinder weights; 13 from 1-1000 grams; turned tops; in mahogany tray with brass sides and handles.

Mahogany and brass frame on top of tray; double sided brass fork to pick up weights from 1000 to 20 grams.

0756 UCP116 STANDARD YARD

L. Oertling London

L 964; W 50; C 993x75x67; RdD 13.

Late 19 early 20 C. G.

Brass; divided 0-36"; first and last inch divided into 1/100ths; 2nd 12ths; 3rd 16ths; also yard rod; case.

Rod has two turned ivory rollers and fits between two square-section pillars at the 0 and 36" marks; case of mahogany.

"Yard rod and bed" noted in 1909 Oertling catalogue in UCG Physics.

1469 UCP157 STEREO VIEWER

Watkins & Hill, Charing Cross, London

BrL 127; W 93; PmSis 25x22x26x35. 1822-1856. F.

Mahogany bar holds brass bridge with moving brackets to hold two prisms in brass housings.

Presumably there was once an outer casing, what remains being only the optical system.

Dates from Clifton 1995,291.

0056 UCP092 STEREO VIEWER - BREWSTER

DS (Duboscq-Soleil monogram) DÉPOSÉ

Ft 182x96; H 162. Mid 19 C. G.

Mahogany frame, blackened inside; trap door with ivory handle; two brass eyepieces.

DS monogram interpreted in Morrison-Low 1984,98 - instrument invented by David Brewster 1781-1868.

1468 UCP141 SWITCH

Unsigned

BD 76; H 29. Mid to late 19 C. G.

Mahogany base; four brass contacts; two parallel brass bars have knob to move them between four points in two pairs.

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Another switch has an ebonite base (102x63x13) and white metal bars with T-shaped ends which have an ebonite knob to move them between three points such that the central one is touched by one or other of the bars; it also has four contacts on the base; a later version.

0109 UCP027 SWITCH - ELECTROMAGNETIC EXPLODER

Yeates & Son Dublin

B 190x138x39; L 290. c1877. CT.

Laminated horse shoe magnet; coils at poles; brass and wood key with clamp; mahogany base and cover.

Identified as "Exploseur" at Conservatoire des Arts et Métiers, Paris; probably "Improved Magnetic Exploder, by which the fuses can be fired by simple percussion of a handle; no coil, battery, or revolving apparatus required" of Yeates 1877,35.

1446 UCP126 SWITCH - SERVO-CONTROL

Unsigned - but by Howard Grubb

B 224x197x12; H 103; CosHsD 30. c1888. R.

Ebonite base; brass fittings; three pairs green coils to clamp arm or move right or left to cylinder contacts.

Brass cylinder with two contacts above in ebonite housing at end of base away from coils; nine brass contacts on base; part of servo-control for telescope drive; a "detector" of three brass discs has three "wipers" which contact raised parts of the discs; these feed the relevant pair of coils; central coil results in no effect on the pendulum, others accelerate or retard it.

See H. Grubb, Monthly Notices of the Royal Astronomical Society, 43,352-6,1888.

0114 UCP022 SYMPIESOMETER

BENNETT OPTICIAN CORK IMPROVED SYMPIESOMETER

250x62x24. 1810-1867. F.

Boxwood, ivory and glass housing; barometer tube gone, but mercury thermometer, scale 20-110°, present.

Sliding scale 28-31 over stationary scale 40-100°F; small circular scale 27-31 below.

Dates from Burnett & Morrison-Low 1989,144.

0030 UCP005 TELEGRAPH - ALPHABETICAL

KNIGHT. FOSTER LANE.

B 204x99; H 324; D 305. Mid 19 C. G.

Mahogany base; black alphabet on white circular back-ground; second instrument without pointer.

Various Knights at Foster Lane are listed in Clifton 1995,160-161 between 1791 and 1861.

0098 UCP055 TELEGRAPH - ALPHABETICAL

YEATES & SON. DUBLIN

B 220x140x28; H 190; Sbk 160x137. Mid to late 19 C. G.

Mahogany base; rectangular white back; black letters and numbers; electromagnetic and clockwork mechanism; letters A-Z; numbers 0-25.

0052 UCP094 TELEGRAPH - ALPHABETICAL

Unsigned

B 218x131x15; H 230. Mid to late 19 C. G.

Two; mahogany base and arched frame; brass disc face with letters A-Z and spikes; two electrical contacts.

0104 UCP030 TELEGRAPH - MORSE

Yeates & Son Dublin Breguet No41720

B 368x150x48; H 360; ReD 142. Mid to late 19 C. G.

Mahogany base; brass instrument; clockwork drive; paper reel on top; relay incorporated at side.

Pencil note on base: "without relay with key EO/-/."

0078 UCP093 TELEGRAPH - MORSE

Unsigned

B 232x171x21; H 230. Mid to late 19 C. G.

Mahogany frame; green vertical pointed alphabet and morse chart; brass bell behind chart housing.

Coil behind needle; contacts labelled "C" and "Z" on one side and "L" and "L" on other; two mahogany contact bars; codes for "understand" and "not understand".

0749 UCP109 TELESCOPE - READING

Unsigned - attributed to Elliott Brothers

BD 178; H 200; TeL 350. c1895. CT.

Heavy metal base; three level screws; short pillar; trunnions for oxidised brass telescope; brackets for scale.

Eye-piece focus by rack and pinion; vertical angle adjusted by knurled brass knob under back half of telescope; knurled knob, spring and clamp on base to adjust horizontal angle; mounted the wrong way around, brackets to hold galvanometer scale should be at the objective side of the telescope.

Identical base signed "ELLIOTT BROTHERS LONDON.", illustrated in Elliott 1895,27.

0042 UCP095 TELESCOPE - READING

SMITH & BECK LONDON No 1029

B 279x113x9; H 117; C 302x141x127. c1855. R.

Mahogany base and case (damaged); brass and oxidised brass instrument on pivot; cylinder above for fine tuning.

Serial no 1045 given date 1855 in Brown 1986,54; firm dates 1847-1857, Turner 1989,171.

1444 UCP123 TELESCOPE - REFRACTING

[Howard] GRUBB DUBLIN 1878

LesD 330&280; L c3720. 1878. S.

Blue base, equatorial pillar, and two separate tubes; brass finder; straight cross-head support; drive.

The 1878 refers to the original eight-inch refractor which had been exhibited, and won a gold-medal at, the 1878 Paris Exhibition - it is illustrated in most of Grubb's catalogues as his "standard equatorial"; the thirteen-inch refractor was added later - reported as under construction in 1888 - and the new arrangement was used in the "Carte du Ciel" project, the eight-inch being used as guider.

See Glass 1990,7&10; Burnett 1989,98&115; Grubb 1880,348-9; Engineering 28,277,1879; 46,573,1888,

1464 UCP153 TELESCOPE - REFRACTING

Unsigned - attributed to Howard Grubb

L 835; TuD 68. c1880. G.

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Brass on iron equatorial mount; cardboard disc circles; declination 10-18 80-10 (x2); hours I-XXVI.
Broken glass cover on hours circle; rack and pinion eyepiece focus; objective optics gone; telescope and mount were detached, but seem to belong.
The result closely resembles "The Student's Equatorial" shown in the Grubb 1885,4 and 1903,3 catalogues "in which all unnecessary finish and elaboration is dispensed with, and the most rigid economy practised in all stages of preparation".

0742 UCP102 TELESCOPE - REFRACTING

Unsigned but by Howard Grubb
L 1800; TuD 113; H 1565; MiHs 240x107. c1880. R.
"Siderostatic"; brass tube; revolving mirror (out of brass frame); clockwork drive; four trolley wheels below.
Blue painted metal and mahogany frame; divided circle on top VI-0-XVIII with 20 and 40 between each roman numeral mark; objective and mirror at bottom used outside the Observatory, with the eyepiece at top inside; gives the good definition of working in open air with utmost comfort of observer; price in 1885 £105.
Described in Grubb 1880a,361-364; see also Grubb 1885, 11 and Grubb 1903a,6.

0750 UCP110 THEODOLITE - SIMPLE

JOHN DAVIS & SON. DERBY. LTD. 1059 (LEVEL 4)
H 250; CrD 166; Tel 364; C399x275x203.
Turn 19/20 C. G.
Brass and oxidised brass; approximately hemispherical base; silvered circle scale; vernier; two spirit levels.
Base has three level screws; the silvered circular scale is under a circular oxidised brass housing with vernier under the telescope; large and small spirit levels on top of telescope at right-angles to each other; rack and pinion focus of objective; screw at side of housing for fine horizontal angle adjust; mahogany case with leather strap; John Davis trade card under case lid.

2800 UCP253 THERMAL CONDUCTIVITY APPTS - INGENHOUSZ

Unsigned
Sp 198&160; Ta 207x80x76; H 373.
Late 19 early 20 C. G.
Enamelled tin tank on four legs; on top, six sleeves with corks for bars of different metals; brass cap (D20) which screws into the top of the tank.

0739 UCP099 THERMOGRAPH

J. HICKS MAKER LONDON
Sp 345x196; HsH 174, L 296, W 149. Late 19 C. G.
Mahogany housing with glass on top and three sides; grill on fourth side; brass fittings; curved grey metal element attached via right-angled turned-metal piece to pen mechanism.

0038 UCP096 THERMOGRAPH

Pastorelli & Rapkin 46 Hatton Garden LONDON
280x180x130. 1873-1900. A.
Iron and brass; hinged housing with grill and window; wave-shaped detector; ink vial.
The cylinder was missing but one was found which fits this and Richard barograph 0040 UCP054 but which looks more at home on the latter.
Dates from Downing 1988,98.

3344 UCP344 THERMOMETER - DEMONSTRATION SET

Unsigned
Sp 279&150; H 793; BusD 38-31 ;TusD 7.
Mid to late 19 C. G.
Vertical mahogany frame with tin heating vessel below for ether, alcohol, oil, and mercury glass thermometers.
The oil filled thermometer is now missing; none of the tubes has scales; the mercury bulb is largest, the ether smallest; on the two foot supports there are lugs below the heating vessel (234x77x68), which were presumably for an oil heater for the water in the vessel.

0072 UCP097 THERMOMETER - GLASS SPIRIT

Dr. Peters u. Rost Berlin No. 1009
L 382; D 13; CL 446, D 26. Late 19 early 20 C. G.
Glass; yellow alcohol indicator liquid; white scale -30-0-100°C; in black paper-covered cardboard case.

0026 UCP002 THERMOMETER - KINNERSLEY

HARVEY & PEAK LONDON
BD 112; H 315. 1884-1909. F.
Mahogany base; brass, oxidised brass and glass; two spherical electrodes, one adjustable; glass housing with side arm in oxidised brass sleeve.
Name from Griffin 1910,679; dates from Downing 1988, 57.

3323 UCP323 THERMOMETER - LESLIE DIFFERENTIAL

YEATES & SON DUBLIN
B 243x121x16; H 330; SrD 50. Mid to late 19 C. G.
Mahogany base and two vertical supports for glass U-tube topped by two spheres (one broken); arms joined by tube.
The latter crosses horizontally at the upper end of the U-tube, and has a stop-cock frame (missing the cock) in the centre; there are paper scales on each support (one torn) with hand-written numbers from 0-30.

1959 UCP185 THERMOMETER - MAXIMUM

J. HICKS 8, 9 & 10 HATTON GARDEN LONDON 126570 MAXM
B 273x48x13; SHs 259x35. Late 19 early 20 C. A.
Oak base with two brass suspension rings; white ceramic scale 10-130°; horizontal glass and mercury thermometer.
Firm at this address from 1885-1913+, Downing 1988,59, Anderson 1990,40.

0069 UCP098 THERMOMETER - MINIMUM

J.J. HICKS. 8, 9 & 10. Hatton Garden LONDON No1265704
HsL 272, W 48; C 290x74x40. Late 19 early 20 C. A.
Hardwood back; white ceramic scale 10-100°; alcohol thermometer with minimum mark catch; two brass rings; cardboard case.

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J. Burnett calls this a "Rutherford minimum thermometer".
Firm at this address from 1885-1913+, Downing 1988,59, Anderson 1990,40.

3347 UCP347 THERMOMETER - SOLAR RADIATION

Unsigned
Bd 153; H 252; HsL 380, D 55&21. Mid to late 19 C. G.
Iron base; brass pillar to bracket for horizontal glass housing with sphere end for mercury thermometer.
The thermometer has a blackened bulb in the centre of the sphere, and has scale 60-400° "F"; there are two wire electrical contacts fused into the glass housing.

1966 UCP193 THERMOMETER - WEIGHT

Unsigned
H 90; W 63; VD 13; TuD 6. Late 19 C. G.
Glass cylinder; capillary tube above, bent in two right-angles, end pointed and open; contains mercury.

0028 UCP059 THERMOPILE

ELLIOTT BROS LONDON NO 342
BD 99; H 250; CnsD 33-59. Mid to late 19 C. G.
Brass on expanding stand; two detachable cones; also two detachable caps.

2804 UCP257 THERMOPILE

MASON DUBLIN
BD 93; MnH 240; HsD 41, W 25. Early to mid 20 C. G.
Weighted brass expanding stand, with ring clamp, holds brass and ebonite ring element housing; cone/cap gone.

1449 UCP129 THERMOPILE

Melloni [handwritten on base]
BD 68; H 178. Second ¼ 19 C. G.
Turned rosewood(?) base and pillar; oxidised brass pivot; pile in top mahogany block; two brass contacts.
Appears to be a very early model, perhaps by Macedonio Melloni himself (1798-1854); Turner 1983,122 records that the thermopile was invented by Leopoldo Nobili (1784-1835) and improved by Melloni.

00254 UCP122 TRADE LABEL

T. BENNETT, Optician, And Manufacturer of every description of MATHEMATICAL & PHILOSOPHICAL INSTRUMENTS
124 Patrick-Street, CORK. QUAD-RANTS, COMPASSES, TELESCOPES, BARO-METERS, &c, CLEANED & REPAIRED.
On case of Buckley octant UCP023 0115; Bennett was at 124 Patrick Street from 1844-1867 - Burnett and Morrison-Low 1989,144.

1979 UCP206 TRADE LABEL

HIGHLY FINISHED BAROMETERS, In Carved and Polished Wood Cases, 10/6, 12/6, 15/-, SUITABLE FOR PRESENTS.
THOMAS MASON, OPTICIAN, 5 DAME STREET, DUBLIN. ESTD.
1780). RELIABLE INSTRUMENTS Brass Case Aneroid, good works, 5" diam. porcelain dial £1 1s. Do. do. in Japanned Iron Case 15/- Do. do. Polished Oak 15/- Farmers' Barometer Aneroid, 8" porcelain dial, thermometer, large good works, length about 36", in light or dark oak, as illustration 35/- NO CHARGE FOR PACKING. Write for Illustrated Catalogue.
With Hicks aneroid barograph 1798 UCP205.
Thomas Mason at this address from 1900-1914, Morrison-Low 1989,131 and Mason 1980,12.

2771 UCP224 TUNING FORK

J & J GOODARD NEW PHILHARMONIC
FksL 144-118; C 161x95x30. Late 19 early 20 C. G.
Eleven (of 13) blue metal forks in red leather-covered case with red velvet and silk lining; one non-matching fork.
Notes C C# D D# E F F# G G# A# B; the similar but non-matching fork is labelled "A439 B & H LTD".

2763 UCP216 TUNING FORK - LISSAJOUS

YEATES & SON, 2, Grafton Street, DUBLIN. [on case]
C 522x170x85; Fk+MoL 496; MiHsD 34; DiD 35. 1840-1864. G.
Wood case contains four white-metal forks "SOL1" "SOL1" "UT2" "UT1 128"; mirrors and brass discs on prong ends.
Each fork is on a wood mount such that the combinations have the same length, although the forks have different lengths.
Assumed to be George Yeates & Son since address given; dates from Morrison-Low 1989,139.

1459 UCP137 TUNING FORK ON RESONANCE BOX

YEATES & SON OPTICIANS DUBLIN C 612
Bx 300x117x61; H 343. Mid to late 19 C. G.
Boxwood and mahogany veneer box with turned wood boss and (non original) tuning fork.
The box is open at one small side; the white-metal tuning fork is signed: "BAIRD & TATLOCK LONDON LTD C.256" and is clearly a replacement in the brass neck above the boss.
Four other sounding boxes are of box-wood and mahogany, all signed as above; dimensions - 298x112x62 (C3), 248x90x56 (E3); 199x87x50 (G3), and 150x75x45 (C1); pencilled on the base of the latter: "John J Hennessy III Science 1935-36 18 MARCH 36".

1939 UCP166 TUNING FORK & SLIDING FRAME

YEATES & SON [sic] DUBLIN
B 231x95x23; H 317. Mid to late 19 C. G.
Mahogany base and bridge for two (missing) forks; groove at back for sliding board; see 1283 TDP082.
The forks would be held upside down and each would have a pen attached to one prong; this would mark the sliding board when it was released by means of a catch at the back of the frame.

3353 UCP353 VAPOUR PRESSURE APPARATUS

Unsigned
SuL 1275, W 38, D 4; TusL 1054, D 12.
Late 19 early 20 C. G.
White-metal strip support has T-bar on top and iron mercury cylinder below for two divided barometer tubes.
The tubes clip onto the support and have scales 0-100mm; they are protected by a damaged glass cylinder tube (D57).

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1981 UCP208 VOLTMETER - ELECTROSTATIC

LORD KELVIN'S PATENTS ELECTRO-STATIC VOLT METER NO.164 J. WHITE. GLASGOW.

B 330x254x25; Hs 390x235x87. 1892-1900. R.

Mahogany base; brass quadrants; grey metal vane.

Latter is distorted figure-of-eight shape, has a counter-weight screw at the bottom, and a pointer to the white scale 0-60 above; three brass level screws on base.

Instrument illustrated in White 1898,45.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

2793 UCP246 WAVE DEMONSTRATION APPARATUS

Watkins & Hill Charing Cross London C. Wheatstone Invr.

B 630x201x23; Hs 332x106x76; C 660x248x221.

1805-1856. F.

Mahogany base; oxidised brass housing, slits three sides for wire and white glass bead rods; mahogany wave forms.

Sixteen wave forms; four fit on the apparatus and, when it is moved along the base, the moving patterns are demonstrated corresponding to the wave forms; in black boxwood case.

Dates from Turner 1989,226 and Chaldecott 1989,161.

0008 UCP041 WHIRLING TABLE ATTACHMENT

Unsigned

B 510x75; SrsD 51 & 26. Mid 19 C. G.

To show effects of centrifugal force on dumb bell; mahogany base; brass wire for brass and wood spheres.

Scale 2.1.0.1.2. below dumb bell on base; brass screw thread below to attach to missing whirling table.

0007 UCP042 WHIRLING TABLE ATTACHMENT

Unsigned

B 510x75; H 157. Mid 19 C. G.

To show effects of centrifugal force on weighted discs system; mahogany base; brass frame for weights.

One disc moves up and down circular brass frame; the other, attached with a string to the first, moves along two parallel wires above a scale 2.3.4-8; discs have sprockets to add missing weights; brass screw thread below to attach to missing whirling table.

3304 UCP304 WIND CHEST

YEATES & SON DUBLIN

Ch 664x154x75; PiBD 45. Mid to late 19 C. G.

Boxwood chamber (missing bottom); eight mahogany bosses for pipes on top; eight stops at side for slides inside; at one end of the chamber is a brass sleeve for the air input.

2767 UCP220 WIND CHEST

Yeates & Son Dublin

Sp 257&162; Hs 205x102x63. Mid to late 19 C. G.

Cast iron base; mahogany housing; two turned bosses for organ pipes with two stops; brass inlet and outlet pipes.

The base is painted black with gold decoration; one of the knobs from the push-in stops is missing; an oxidised brass bracket at the back holds a large and a small oxidised brass pipe behind the housing, and two brass outlets, with stop-cocks, on top of the housing.

1957 UCP183 WIRE - VIBRATING

Unsigned - Marsh's Oscillating Wire [under base]

B 233x112x38; H 259. Mid 19 C. G.

Mahogany base; brass crook rises over mercury trough in

base; wire from crook into this; horse shoe magnet.

Two egg-cup mercury contacts on base; red and white metal horse-shoe magnet around mercury trough; a modern contact has been added into the trough; and the needle suspension has a modern adjustable height addition; base has four turned mahogany feet.

When current is passed, there is no movement without the magnet but, when it is in place, the wire is thrown out of the mercury; it falls back, and is again expelled.

Illustrated and described in Pike 1856,II,21.

2808 UCP261 X-RAY TUBE

Schall & Son, London, W. Date 24/11/1913

SpD 135; L 380. 1913. S.

Glass; sphere with four limbs; two have disc electrodes, one angled at centre; one has point electrode; side vessel.

The point electrode is joined by an external spring to the angled disc electrode boss; the side vessel is at right-angles to the limb, and has disc and point electrodes; on boxwood stand; also on the label stuck to the instrument are the words: "Eq. Spark 3 inches".

2792 UCP245 XYLOPHONE

Unsigned

B 473x50x45-88. Mid to late 19 C. G.

Wood base, inside painted blue, outside covered with white and red paper; 10 metal note bars (of 15) remain.

In distressed condition.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

UNIVERSITY COLLEGE DUBLIN ENGINEERING - UDE

Belfield

Dublin 4

Telephone (01) 706-7777

3044 UDE070 AMMETER

EDMUNDSONS LTD ELECTRICAL ENGINEERS AMPERES RD. No. 184776

BD 200; HsD 167, H 60. Design 1891. RD

Glazed brass cylinder housing for white scale 0-40 on silver-metal face.

The Edmundsons signature is on an ivory plaque attached to the face, and may hide another maker's name; the instrument is mounted on a crude and damaged wood base with vertical support, and two brass screw contacts on it have wires to two brass bars below the housing.

3067 UDE093 AMMETER

HARTMANN & BRAUN FRANKFURT a/M.

BD 109; H 228; CoD 54; ScTuD 32.

Late 19 early 20 C. G.

Mahogany base, two contacts; vertical coil on wood bobbin; on top, cut-away vertical brass tube, 0-5 AMP.

Brass contacts on base attached to the ends of the coil wire; a celluloid cover is in front of the paper cylinder scale; the pointer presumably falls from the top zero reading when a spring-suspended metal bar is pulled down into the coil, as in the mechanism of the Hartmann & Braun ammeter 3050 UDE076 and voltmeter 3011 UDE037.

3050 UDE076 AMMETER

HARTMANN & BRAUN FRANKFURT A/M No 78034 D.R.G.M.

B 280x180x24; H 324 Early 20 C. G.

Wood base and vertical support to white scale 0-2 and 0-10; vertical brass coil, green wire; sprung needle pivot.

On the back of the scale are printed: "SPULE=0,9 OHM" and "NEBENSCHLUSS-0,225 OHM"; a bar pulled into the centre of the coil works against a spring above, and turns a horizontal bar to deflect the vertical needle; on the base are four brass contacts, two shorted with a copper strip "10.A."; behind the wood support is a double strand of thick wire wound in a rectangle; there is a damaged cardboard case.

3049 UDE075 AMMETER

JOHNSON & PHILLIPS, LTD. LONDON. 10006, 10009, 10010, 10011 & 10019

B 299x246x34; H 332; CyHsD 206, W 104.

Early 20 C. G.

Five; wood base and support for ebonite back with hot wire and glazed brass cylinder scale housing.

The base has two brass level screws, and two copper and brass screw contacts; the white scales vary from 0-30 (10009&10), to 0-40 (10006&9), to 0-100 (10011); some have a leaflet on the back giving: "INSTRUCTIONS FOR FIXING HOT WIRE INSTRUMENTS".

3046 UDE072 AMMETER

JOHNSON & PHILLIPS Ltd., LONDON. O. BEREND & CO., LTD LONDON, E.C.

Hs 215x202x144. Early 20 C. G.

No.633; oak housing with metal grills at back and sides; scales 0-15 and 0-1.5; five contacts on top, two shorted.

Heavy brass screw terminal in the middle of the grill at the back of the left hand side of the housing; the scale is protected by a glass cover, but the oak flap which was over this is gone; on top is a brass handle and the five ebonite-covered contacts, labelled 1.5, 1.5, 0 (shorted to) 15, 1.5; legend on the scale reads: "CALIBRATED IN VERTICAL POSITION"; added metal plaque for "O. BEREND & CO".

3045 UDE071 AMMETER

AMPERES JOHNSON & PHILLIPS LTD. LONDON. 950, 10037, 10039

Hs 206x200x144. Late 19 early 20 C. G.

Three; mahogany hinged housing with metal grills back and sides; scales 0-5(950), 0-20(10039), 0-25(10037).

Heavy brass screw terminal in the middle of the grill at the back of the left hand side of the housing; the scale is protected by a glass cover, and by the hinged panel on the housing when it is closed; on top is a brass and turned wood handle; on the scale is the legend: "CALIBRATED IN VERTICAL POSITION".

3042 UDE068 AMMETER

AMPERES NALDER BROS. & CO. SOAMES & NALDER'S PATENT

HsD 162, H 64; L 210. 20:4:1892. D.

Shaped mahogany back; glazed brass cylinder housing; white arc scale 0-40 on silver-metal face.

Two brass contacts on arms below housing.

On the back is a label: "Ammeter No.8242. Resistance - Ohms. This instrument should be set up so that the Needle points to 0 when no current is passing. The Positive lead being connected to the left-hand Terminal or Connector, when looking at the face of the Instrument. 20/4/1892."

3043 UDE069 AMMETER

AYRTON PERRY'S DIRECT READING SPRING AMMETER THE WESTMINSTER ENGINEERING CO. LTD.. LONDON, N.W. No.E67.

BD 133; H 116; SHsD 101. Early 20 C. G.

Mahogany base; pillar; brass glazed cylinder housing holds scale 4-22 "AMPERES", which is on a white card with an arc parallax mirror.

On the base are two brass screw contacts; between base and scale housing is an oxidised brass pillar (D46), with a ring of small holes around the top and bottom; part of the base is gone, and the remainder is cracked.

3048 UDE074 AMMETER

Unsigned [reminiscent of work of Yeates & Son]

B 197x117x32; Hs 142x88x50; H 84. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Two; mahogany base holds horizontal U-magnet and coil; needle pivots from small plate in middle of coil. In one case the brass coil bobbin is wound with green covered wire, and this has a card scale 10-0-10 "AMPERES"; the other is wound with finer white-covered wire and has no scale on its card; both are covered with a removable glazed mahogany lid.

3047 UDE073 AMMETER

Unsigned No 62232

BRiD 272; HsD 243, H 79; B 299x245x34. Early 20 C. G.

Brass base ring and cylinder glazed housing; silvered face with scale 0-20; brass disc above needle pivot.

On wood base with two brass level screws holding vertical wood support.

3033 UDE059 AMMETER - MAGNETO STATIC

SIR W. THOMSON'S PATENT MAGNETO STATIC AMPERE METER No.12 J. WHITE GLASGOW.

Sp 202; HsMxD 188; H 185. 1866-1892. R.

Tribach oxidised brass base; brass cylinder housing.

Mounted on a cracked black wood base; the housing has a red and a blue ring magnet around it; the top is a glazed silver scale 0-90, with a circular bubble level on the face; a knob at the side releases a ring which supports the needle when not being used; at the bottom of the housing are two copper shunts; a hand-written label on top reads: "Constant = .197 amps per div 6/11/13 C Bright".

Thomson was knighted in 1866, and raised to the peerage in 1892, Smith 1989,130,799.

3010 UDE036 AMMETER - MAGNETO STATIC

SIR W. THOMSON'S PATENT MAGNETO STATIC MILLIAMPERE METRE N.11 J. WHITE GLASGOW

Sp 198; HsMxD 192; H 155. 1866-1892. R.

Tribach oxidised brass base; brass cylinder housing.

Mounted on a wood base which also holds a vertical coil in a copper cylinder cover (H129D134) which has four tapping brass contacts on an ebonite arc labelled 1.46, 400, and 500; a hand-written card on the base notes ".209 Volts per div for 1.46", with .98 for 400 and 1.99 for 500; the housing has a red and a blue ring magnet around it; the top is a glazed silver scale 0-90, with a circular bubble level on the face.

Thomson was knighted in 1866, and raised to the peerage in 1892, Smith 1989,130,799.

3130 UDE155 BALANCE - ELECTRIC

ELLIOTT BROS 449 STRAND LONDON

B 398x340x27; Hs 315x261x258; PsD 104.

1864-1886. A.

Mahogany base and glazed housing; brass; two horizontal insulated plates; pivoted needle with suspended disc.

The latter D32 is attached near the point of the needle, which reads an un-numbered vertical ivory scale; the disc can fit through a hole on the upper plate, and will be attracted to the complete lower plate when there is a charge between the plates; the scale pivot and the upper plate are held by five glass pillars; a divided glazed pillar holds the lower plate which can be raised or lowered; all the pillars rise from a shaped brass base plate; on the other side of the needle pivot from the scale is a hook for a scale pan, and beyond this a brass adjusting screw; the housing, which had mahogany bound glass on all sides, is badly damaged and is in several pieces, with some of the glass broken, though it is all there and could be repaired. Dates from Crawforth 1988,8.

3008 UDE034 BALANCE - ELECTRIC

LORD KELVIN'S PATENTS ELECTRIC BALANCE J. WHITE, GLASGOW. No 307

B 457x173x72; LdHs 462x176x122. 1892-1900. R.

Black base on three brass level screws; two sets of mounted coils; scales in front 4-50 (log) and 0-66.

Brass-bound glazed lid cover; the 0-66 scale is divided on aluminium and is held at the centre; the ends are attached to metal rings between the upper and lower blue-covered vertical coils; there is a circular bubble level on top of the base; and a releasing knob, a lever with an ebonite handle, and an ebonite and brass connector for shunts under the base.

Similar to "Standard centi-amp balance" in White 1898,4.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

3131 UDE156 BALANCE - ELECTRIC

YEATES & SON DUBLIN

B 306x152x37; Hs 255x126x101. Mid to late 19 C. G.

Mahogany base; four brass level screws; glazed mahogany housing for pivot, constraint, and disc; incomplete.

The pivot is on an ebonite pillar, but is attached by a wire to a brass screw contact outside the housing; the constraint is an ivory U on an ebonite pillar; the brass disc (D65) is also on an ebonite pillar, this time in a brass sleeve on the base; the balance arm and upper disc are missing; there is an un-numbered ivory scale attached to the housing above the disc; only one (of two) sliding glass panels on the housing remains.

3152 UDE177 BEAM ENGINE

VICTOR COATES & CO. LTD. ENGINEERS LAGAN FOUNDRY, BELFAST.

BmL 5400; WhD 6700. 1800-1908. D.

Red painted iron; single cylinder; double-acting piston; nine-spoke flywheel; now driven by electricity.

A document from the Engineering School notes: "About the year 1800, Dublin Corporation encountered difficulties in obtaining an increased water supply from the Grand Canal Company at acceptable terms. A steam beam engine was ordered from Boulton & Watts Foundry, Birmingham, at a cost of £1,560.5s.3d. It was intended to develop a pumping station near Island Bridge to supply the north side of the city. By 1806, the Corporation had agreed suitable terms with the Grand Canal Company and the steam engine was sold to John Jameson & Co, for £800. The engine drove as necessary four sets of millstones, the rakes of two mash tons, several pumps, elevators and screens. In 1884, Victor Coates of Belfast made a series of modifications, producing a more powerful engine [probably replacing most of the original engine], and in 1908 a heavier flywheel was installed. The original Boulton & Watt engine was a single-cylinder, double-acting piston engine of 20 hp (15kW). The Coates engine is also a single-cylinder, double-acting piston engine. The vertical steam engine transmits the power to a lineshaft through the vertical piston rod, oscillating cast iron beam, connecting rod and crank. The engine is condensing and is governed by a centrifugal governor. The engine developed 175 indicated hp (130 kW) at a rotational speed of from 28 to 32 rev/ min. The 22ft.(6.7m) diameter flywheel and the 17 ft. 9in (5.4m) long beam were approximately the same size as those of the Boulton-Watt engine. The engine was last run as a steam engine in 1934 when separate electric motors were installed to drive the various components in the distillery. University College Dublin is indebted to Irish Distillers Group and to the Commissioners of the Office of Public Works, who acquired the Bow St. property, for their donation of the engine to the College, and to the Electricity Supply Board for dismantling, overhaul and installation of the engine in 1988/89 at the School of Engineering, University College Dublin."

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3090 UDE116 BRIDGE - SLIDE WIRE

Robt. W. Paul, London, N. SLIDE WIRE BRIDGE

Hs 168x88x83; WhD 80. 1891-1919. F.

Mahogany, iron, brass and ebonite housing for metal insulated cylinder wound with wire; slide and contacts.

A four-spoke brass wheel at the side is numbered 0-18 around its circumference, and it turns the cylinder; an ebonite U-bar on top has seven brass screw contacts, a press button, and a hole with a key; a grey metal slide with an ebonite knob on top runs along the arms of the U-bar, its position noted by spots, labelled at intervals 0, 200, 400, 600, 800.

Dates from Cattermole 1987,98-104.

3077 UDE103 BRIDGE - WHEATSTONE

RIGHT AT 16.5°C. No 2045 ELLIOTT BROS LONDON TRUE OHMS

Hs 503x258x185. Late 19 C. G.

Three dial coil form; mahogany housing; ebonite top; brass U-bar; three brass dials "TENS UNITS TENTHS".

The U-bar has nine segments and eight holes for the ebonite and brass keys; it also has five brass screw contacts; the holes along the long side are calibrated 100 10 1 1 10 100 "TRUE OHMS" - i.e. three pairs of proportional coils; the dials each have ten tapering and one circular segments with ten holes each for keys; eight matching, and one non-matching, keys are present; housing has two green-covered holes at sides.

Elliott 1895,41 illustrates instrument No 2225, which presumably is of similar date; for instrument see p40.

3059 UDE085 BRIDGE - WHEATSTONE

NALDER BROS. & CO. LONDON No.4160

Hs 241x114x78. c1891. R.

Mahogany housing; ebonite top; brass U-bar, 14 segments and 13 holes; brass bar, seven segments, six holes.

Nineteen ebonite and brass keys (two do not match); there are three pairs of proportional coils labelled 10, 100, 1000; the other holes are numbered 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, 400, 1000; there are five brass screw contacts, two on the ends of the U arms, and three on the proportional bar (one missing part of its screw).

No.3084 dated 5:6:1891 - 3073 UDE099; No.8242 dated 20:4:1892 - 3042 UDE068.

3051 UDE077 BRIDGE - WHEATSTONE

H. TINSLEY & CO. LONDON. S.E. No 2199, 2200, 2201, 2202

Hs 248x176x169. Early 20 C. G.

Four; "Post Office Form"; oak hinged case, ebonite top with four brass rods, 23 keys, and two tapping switches.

Six brass screw contacts, one each for the tappers, two with right-angled screws also at the ends of the bar system, and two (shorted with a copper strip) on the ends of the top two bars; bar one is marked 10, 100,1000(x2), bar two 1, 2, 3, 4, 10, bar three 20, 30, 40, 100, 200, 300, and bar four INF 400, 1000, 2000, 3000, 4000; keys are brass and ebonite; inscribed on ebonite top: "MANGANIN. STANDARD OHMS AT 15.5° CENTIGRADE"; tapping springs are labelled: "BATT." and "GALV."; at the bottom of the "BATT." contact is "ZINC" and on the neighbouring double contact "COPPER AND EARTH"; at the other end of the system is "GALV AND LINE"; the handle on 2199 is detached, and the case is missing from 2201.

3864 UDE181 CIRCUMFERENTOR

Troughton & Simms, LONDON.

L 304; H 300; DIHsD 139. Late 19 C. G.

Oxidised brass; staff sleeve to ball joint; glazed compass; arms with two spirit levels to hinged sights.

The staff sleeve has a clamping screw; the compass has silvered scales - lower 10-80°(x4) and upper 10-360°, with a vernier, attached to the housing, revolving beyond the upper scale; the spirit levels are at right-angles to each other, one on each arm; the sights are double line and window; the compass has a divided lid "Diff. of Hypo. & Base" with angled divisions 30-0-30 and 40-0-40; a plug, with a ring end below the housing, fits through a hole in the housing and scale to clamp the latter when not in use.

3135 UDE160 COIL

Unsigned

OD 210,200&200; ID 100,145&145. Late 19 C. G.

Three; horizontal coil of many turns with outside binding; ebonite ring around, with 36, 40 and 40 contacts.

Each has an oak base with a central raised handle; the coils are held in place with ebonite and oxidised brass, or ebonite, supports; the screw brass contacts are tapped to different lengths of coil.

3037 UDE063 CONDENSER - STANDARD

ELLIOTT BROS. LONDON. No677 ½ MICROFARAD

BD 173; H 143; HsH 73. Late 19 early 20 C. G.

Brass cylinder housing; ebonite top; on this, two brass contacts on two bars, which can be shorted with a key of ebonite and brass.

3040 UDE066 CONDENSER - STANDARD

GRIFFIN LONDON No 6574(1.5 M.F.D.), 6575(.25), 6576 (.25), 6577(.5), 7459(.5), 7923(.5).

Hs 198x170x68 [one] - rest 198x170x44. Early 20 C. G.

Six; mahogany housing; two brass contacts at one side; contacts mounted on ebonite block.

3041 UDE067 CONDENSER - STANDARD

SHUNTED CONDENSER 2.5 MFD. 2800 OHMS FOR IRWIN OSCILLOGRAPH.

Robt. W. Paul, London, N.

Hs 272x153x68. 1891-1919. F.

Two; mahogany housing; metal grills on the front and back; two top contacts of ebonite-covered brass.

Dates from Cattermole 1987,98-104.

3039 UDE065 CONDENSER - STANDARD

1 INT. MICROFARAD (MICA) H. TINSLEY & CO LONDON. S.E.

Hs 173x145x104. Early 20 C. G.

Mahogany housing with ebonite top; two brass screw contacts on this.

3038 UDE064 CONDENSER - VARIABLE

MARCONI'S WIRELESS TELEGRAPH CO LTD .01 CAPACITY PATENT No 15909/06 No 178353 & 179906

B 120x120x13; H 85; HsMxD 109. Patent 1906. S.

Two; ebonite base and top; brass cylinder; scale 0-9.

The ebonite disc top turns the divided ebonite top of the housing; a brass contact is attached to a marker which reads the scale - this includes a "SHORT" position; a similar contact and marker are also on the non-divided side.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

A third instrument is missing its top.
The Company took this name in 1900 - Encyclopaedia Britannica 1968.

3036 UDE062 CONDENSER BOX

ELLIOTT BROS No 17 LONDON .1 MICROFARAD
Hs 288x143x143; C 316x217x175. Late 19 early 20 C. G.
Mahogany housing; ebonite top; two long and five short brass bars on it; six brass keys join bars; two contacts; case.
The brass contacts on top have a screw on the top and at the side; one long bar is labelled "EARTH", the other ".001 .002 .002 .005 .09"; the hinged boxwood case has an iron handle.
Similar to that illustrated in Elliott 1895,72.

3068 UDE094 COUNTER

SCHAEFFER & BUDENBERG BUCKAU MAGDEBURG No 10051
Spencer & Son Dublin
Hs 213x73x35. 1864-1886. F.
Glazed brass housing; five elliptical number windows.
Housing has sides painted green; at its back are two brass plates each with two screw holes for securing the instrument to a base; a hinged brass flap on top covers a hole in the frame - presumably for the bar which revolves to change the numbers?; reading now 16303.
Spencer & Son dates from Morrison-Low 1989,136.

3863 UDE180 DIVIDERS/PAIR OF COMPASSES

Unsigned R.266
L 295. Mid to late 19 C. G.
Brass with folding ends and steel points; part of one arm slides out, and can be replaced with a pencil holder.
The join is above the hinge, so that both the point and replacement pencil holder are hinged; the latter has a clamping screw.

3139 UDE164 ELECTRIC MOTOR

AC or CA monogram Nos 164387 and 164553
B 216x147x24, H 150; B 213x147x24, H 150.
Early 20 C. G.
Two; cast iron base and supports for commutator and armature in iron poles from two coils on the base.
The commutator is a brass cylinder with 12 strips; the armature has complex windings on a cylinder spool; the larger of the two instruments has two brass contact cylinders with brushes on the end away from the commutator, but this is missing in the other, whose axis ends in a brass disc with four fingers; the smaller No.164387 is marked "KOMS 12 V 100 A 2,2 TOURS 3200"; larger "KOMS - V 110 A 0,5 TOURS 2900".

3003 UDE029 ELECTRIC MOTOR

YEATES & SON DUBLIN
H 223; L 293; W 143. Mid to late 19 C. G.
Cast iron frame for two vertical elongated coils; laminated wire-wound armature with (broken) commutator.
At the other end of armature, which is at the bottom of the coils, is a brass pulley wheel; there are two brass contacts with springs to discs for the armature wires; two other contacts attach to brushes on the commutator.

3138 UDE163 ELECTRIC MOTOR

Electro Moteur BTE. S.G.B.G. FRANCE & ETRANGER
Sp 250&75; H 235. Late 19 C. G.
Cast iron frame for two elongated coils above and below; in centre, a pulley wheel, coil armature and commutator.
The coil on the armature is very similar in size and shape to the stationary coils above and below; it is held between two white-metal plates; outside the frame, at one side, on the axis, is the brass pulley wheel (D65); on the other side is a split cylinder copper commutator with wire gauze brushes on brass adjustable supports; above this is a double switch connecting two of five points.

3137 UDE162 ELECTRIC MOTOR

Unsigned 226
B 204x146x22; H 178. Late 19 C. G.
Mahogany base holds white-metal frame for two elongated coils; the coil armature on top has brass fittings.
The armature is between two brass discs and is held by two white-metal strips; at one side of the frame, on the armature axis, is a pulley wheel and, at the other, a split cylinder brass commutator with a copper brush.

3136 UDE161 ELECTRIC MOTOR

Unsigned
Sp 358&182; H 312. Late 19 C. G.
Two cast iron supports have upper and lower thick wire coils; in the centre is an armature between poles.
The armature is a ring coil with many tapping points to a copper strip cylinder commutator; adjustable brass brushes make contact with the armature; outside the frame, on the coil axis, is wooden spool (D85); there are two brass screw contacts on the iron pole unit, above the upper coil.

3061 UDE087 ELECTRICAL MACHINE

SANDERSON BROTHERS
B 580x295x28; H 510; WhD 280. Mid to late 19 C. G.
Mahogany base and driving wheel; six horizontal U-magnets; pulley wheel revolves two brass-bound coils at poles.
The driving wheel is mounted on a turned mahogany pillar and has an ebony handle; there are two grooves on the circumference for thongs to the small pulley wheel below (MxD38), which also has two grooves; a brass horizontal bar from this revolves the red-covered wire coils supported by a brass bracket from the base; at the end are two copper spring brushes to a split cylinder commutator; thongs missing.
This seems to be a variation of "Clarke's magneto-electrical machine", which has vertical U-magnets, and the coils revolving at the sides of the poles, rather than at the ends (see Brian Gee, Bull SIS 25,1990,23).
A more-recent, but very similar machine is called "Stoeher's" magneto-electric machine in Leybold 1930,347 - this has the coils revolving at the ends of horizontal magnets, but has two separate brushes, rather than the split-cylinder commutator here.

3062 UDE088 ELECTRICAL MACHINE

Unsigned
B 395x193x34; MxH 504; WhD 287.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Late 19 early 20 C. G.

Oak base for 16 spaced vertical U-magnets; handle with cog-gears drives wheel, then armature to commutator.

The turned wood and iron handle ends in a cog-wheel with inclined cogs which connect with a stationary cog-wheel and a revolving one attached to the six-spoke driving wheel; a thong from this turns a pulley wheel below, thereby revolving the hidden armature at the poles of the magnets; at the other end is a split iron commutator with brass fittings, and two spring brushes to brass contacts.

3025 UDE051 ELECTRO DYNAMOMETER

SIEMENS BROS. & Co LTD LONDON No 6439

B 205x178x51; H 344; ScD 102. Late 19 C. G.

Mahogany base and vertical support for two fixed multi-turn and an inner single-turn coil; white scale 0-390.

An ebonite knob on top has a pointer to read the white ivory scale, and is attached via a spring to the moving coil; the base has four brass contacts, a brass "CLAMP", and a brass frame of two pairs of segments labelled 1, 2, 3, 4 - 1 & 2 and 3 & 4, each being shorted with a copper bar; under the base are three modern 2K ohm resistors and a 60mA fuse.

3024 UDE050 ELECTRO DYNAMOMETER

SIEMENS BROS & CO LTD LONDON 5940

B 204x178x48; H 320; ScD 102. Late 19 C. G.

Mahogany base and vertical support for fixed multi-turn and moving single-turn coil; white circle scale 0-390.

An ebonite knob on top has a pointer reading the enamelled metal scale, and is attached through a spring to the moving coil, which encircles the inner multi-turn coil; the base has three brass contacts.

3035 UDE061 ELECTROMAGNETIC APPARATUS

YEATES & SON DUBLIN

B 164x99x29; H 135. Mid to late 19 C. G.

Mahogany base; brass; at one side a contact to a turned pillar; on the other, a second contact to a crook.

There is a screw on top of the pillar; at the end of the crook is a screw clamp which can hold something in a vertical position; at present this holds a copper wire; it is assumed that, when a battery is connected across the contacts, something held in the crook is attracted to the pillar or something attached to it?

A label on base reads: "PHYS. LAB. R. COLL OF SC."

3129 UDE154 EXPANSION APPARATUS(?)

Hicks Patent 4C.C. [on vial]

B 487x109x86; H 340. Late 19 C. G.

Oak drawer base; pivoted mercury glass thermometer with thimble reservoir; water bath on pillars above.

The thermometer reservoir holds about 4cc; from the side of the thimble, the scale shaft emerges horizontally with scale 3-39° "CENTE"; this is pivoted at about the 8° mark, and the far end is constrained by metal bridge, with the point close to an ivory scale with only the centre point numbered "0"; the signed vial fits into the water bath, which has a side tap, and presumably 4cc of hot liquid can be added to the thermometer reservoir; when this is hot, then presumably the weight of the mercury in the capillary of the thermometer would cause the shaft to move down the scale, and to rise as the liquid cooled; the 4cc vial has a sleeve to fit into the centre of the water bath, which has a turned pillar with two rings above, presumably for a thermometer to measure the temperature of the contents of the vial (whose bottom is now broken off) before it is inserted into the thimble; the drawer in the base is lined with red velvet and contains the thermometer; it also holds a little scale pan, but there is no obvious place for this on the apparatus, so its purpose is unknown.

A label on the drawer base, which has two level screws, records the results of several investigators, e.g. "Mr Ramage 1.451", "Mr Drury & Mr Rouse 1.309", "Mr Blair 1.284 11/12/02"; it is not very clear what is being measured.

3121 UDE146 FLUXMETER

GRASSOT FLUXMETER THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO., LTD., CAMBRIDGE, ENGLAND No C2042

L 195; H 185; W 215; CyH 58, D 70. 1920. N.

Black metal fan-shaped housing; paper scale 60-0-60.

Two level screws; arc scale with parallax mirror - cover glass broken; circular bubble level on top of housing; knob on top of cylinder above housing "To Clamp Press & Turn"; two silver-metal screw contacts at the sides of the base.

3065 UDE091 FURNACE - CARBON ARC

DUCRETET & LEJEUNE PARIS 5046 26

B 210x152x101; H 270. Introduced 1893. R.

Slate base (cracked) on four iron legs for brass-bound furnace entered by two terminals for adjusting carbons.

The furnace itself is made of white ceramic material, and one side has asbestos sheets; both sides can be removed and are secured with four-screw brass frames; there are four ebonite knurled knobs on the ends of carbon supports, with another to clamp the supports in position; each of the supports also has a brass screw contact.

Called an "Electric Cupel Crucible Furnace" in Baird & Tatlock 1914,568, which gives references Transactions of the Academy of Sciences, No.12, 20:3:1893,29:5:1893.

Anderson 1990,26 gives 1893 firm date.

3126 UDE151 GALVANOMETER

EDELMANN MÜNCHEN HJ.0.185 W O.7Ω [On case No 423]

Sp 80; ScD 69; H 43; CD 102, H 51. Early 20 C. G.

Oxidised brass disc with three legs for level screws; coil housing in centre; on top, ivory scale 30-0-30; case.

The needle is mounted at the apex of a U-magnet which sits on a pivot in a copper cylinder extending down into the central coil; there are two silver-metal screw contacts, and an adjusting knob, on the coil housing; the instrument is in a black and white card case, with a damaged lid; inside the latter is the hand written legend: "No.423 H.J. 0,185 Wo,7Ω Dr W Edelmänn".

Brachner 1985,138 lists the workshop of Max Thomas Edelmänn, München in 1869, who exhibited until 1882.

3128 UDE153 GALVANOMETER

Unsigned

HsD 132, W 41. Late 19 C. G.

Mahogany semi-circle glazed housing; white paper scale 90-0-90°, arc parallax mirror; needle suspension gone.

Two brass contacts on the sides of the housing are connected by wires to a coil at its centre; a horizontal brass support remains for the missing needle suspension.

3127 UDE152 GALVANOMETER

Unsigned

CyHsD 100; H 47. Late 19 early 20 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Glazed brass cylinder housing with four contacts to central coil with needle to silver-metal scale 40-0-40. The four brass screw contacts are on ebonite mounts on the sides of the housing, and have wires into the coil windings; the needle rotates from the centre of the coil bobbin to read the scale, which has an arc parallax mirror; on top of the housing is a glass disc window (D28); on the side of the housing is a slide to clamp the needle. Instrument similar to one of the "Detector Galvanometers" in Elliott 1985,1&2.

3125 UDE150 GALVANOMETER

Unsigned

BD 183; H 192; CoHsD 50, H 53. Early 20 C. G.

Two; wood base; three brass level screws; brass crook; sliding coil; paper arc scale 90-0-90°; two contacts.

The coil is wound on an arched metal ring on a slide in the centre of the base under the scale platform, so that it can be moved close to or away from the (missing) suspended needle mechanism; there is a groove on top of the base, suggesting the original presence of a glass dome, now gone.

3098 UDE124 GALVANOMETER - ASTATIC

ELLIOTT BROS. 449 STRAND LONDON No135

BD 226; H 245; CoHsD 83, W 53. 1864-1886. A.

Mahogany base and turned pillar to oxidised brass and ebonite coil housing with small window in centre.

There is a screw thread above the coil housing, presumably for a missing adjustable magnet; on the base are four brass screw contacts on an ebonite bar, and four more without the bar; the base sits on four turned feet; there is at present no place for a mirror, but there is a brass sleeve running into the centre of the coil for a missing part.

Similar to the "speaking galvanometer" in Elliott 1895,10&11, which is described: "On turned mahogany stand, with four terminals mounted on ebonite, three sections to the coil, of 1,000, 600 and 400 ohms resistance, dead beat plug of simple construction, brass body, and heavy controlling magnet, in stained wooden case, with one mirror plug..".

Dates from Crawforth 1988,8.

3085 UDE111 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS. LONDON.

B 158x158x46; H 375. Mid to late 19 C. G.

Ebonite base; brass; two turned pillars to coil housing with pillar above for curved adjustable magnet.

Base has three brass level screws and three brass screw contacts, two of them on a brass U-bar with three segments and three holes for a brass and ebonite key; below the coil housing is a short open cylinder for the missing needle damping system; the coil housing has windows at each side and still contains the circular mirror, which is now missing its support fibre, and is detached.

See similar instrument in Elliott 1895,17&18.

3120 UDE145 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS LONDON. 257

CyHsD 116, W 78. Late 19 C. G.

Brass glazed cylinder housing for coil on oxidised brass support; tripod foot, top pillar and magnet gone.

On the back of the cylinder housing are two brass screw contacts on ebonite bosses; below the housing is a sleeve with a clamp screw for the missing foot; on top of the housing is a tangent worm screw with a thread for the missing pillar, which would have held a curved astatic magnet; the coil support, with the central mirror, can be removed from the housing.

Similar to instrument illustrated in Elliott 1895,13.

3082 UDE108 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS LONDON N0 321

Sp 215&261; B 197x181x15; Cv 186x132x115; H 482.

Late 19 C. G.

Ebonite base; two pairs of coils in ebonite housing; brass and glass cover with pillar and bent magnet on top.

The base has three level screws underneath and, on top, a circular bubble level and four brass screw contacts; there are mirrors in the centres of both pairs of coils; a tangent worm screw adjusts the orientation of the top magnet.

Probably corresponds to Figure 103 in Elliott 1895,13.

3119 UDE144 GALVANOMETER - ASTATIC MIRROR

NALDER BROS & CO WESTMINSTER No 1451

HsD 116, W 80; H 285. c1890. N.

Brass glazed cylinder housing with ebonite back for coil on oxidised brass ring support; incomplete.

There are two brass screw contacts on the back; on top of the housing is a brass pillar (H153,D8) which held the broken fibre for the mirror, and presumably also supported a missing astatic magnet; below the housing are four screw holes for the missing stand/foot.

Curtis 1861,107 records purchase of No.2040 in 1891.

3096 UDE122 GALVANOMETER - ASTATIC MIRROR

NALDER BROS. & CO. LONDON No 5604

BD 114; H 209; CoHsH 120, W 81, De 36. c1891. N.

Brass base; elliptical ebonite coil housing with six contacts and central mirror; magnet and bar on top.

The base has three brass level screws; above the housing is a small brass pillar on which a brass sleeve holding two rotatable metal bars (90x19) is located; only one of these is now magnetised.

Nalder Bros & Co. No.3084 dated 5:6:91 - 3073 UDE099; No. 8242 dated 20:4:92 - 3042 UDE068.

3099 UDE125 GALVANOMETER - ASTATIC MIRROR

W.G. PYE & CO CAMBRIDGE No 63

Sp 163; BD 173; H 230. c1896. N.

Ebonite base; central brass disc; turned brass pillar with an ebonite double coil housing revolves on this.

The base has three brass level screws; around the centre of the coil housing is a ring with four brass screw contacts, two now shorted with a copper wire, and a brass sleeve, presumably for a pillar to hold a missing adjustable astatic magnet; the brass disc on top of the base has eight un-numbered divisions; there are windows on each side of the centre of the coil housing revealing a detached rectangular mirror.

The firm was set up in 1896, Cattermole 1987,54.

3026 UDE052 GALVANOMETER - ASTATIC MIRROR

Yeates & Son Dublin

BD 151; H 129; CoHsD 57, W 34. Mid to late 19 C. G.

Mahogany base; two turned brass pillars to ebonite and brass coil housing; fibre suspension and magnet missing.

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Base has three brass level screws; there are electric screw contacts in holes in the pillars; the coil housing is secured to the pillars with two knurled brass screws; above the coil should be a pillar to hold an astatic magnet; the damping vessel under the coil is missing.

A small paper label on the base reads "83 No 24" and may refer to the year 1883.

Very similar to S.M. Yeates improved form of Sir William Thomson's Reflecting Galvanometer, Yeates 1877,26.

3097 UDE123 GALVANOMETER - ASTATIC MIRROR

Yeates & Son Dublin

Sp 170; BD 103; H 178. Late 19 C. G.

Brass tribach; ebonite base; two pairs of coils mounted on ebonite divider between oxidised brass plates.

On top is an ebonite disc with a brass disc at its centre having a rectangular aperture; the missing mirror system would have been suspended through this aperture, and there was originally, presumably, also a pillar on top with an astatic magnet; there are two brass screw contacts at the side of the base disc; a brass plumb-bar hangs from the upper ebonite disc through a hole in a bracket below.

3084 UDE110 GALVANOMETER - ASTATIC MIRROR

Unsigned

BD 201; H 375. Third ¼ 19 C. G.

Mahogany base; brass; two turned pillars to coil housing with pillar above for curved adjustable magnet.

Base has three brass level screws and two brass screw contacts; below the coil housing is a short cylinder open on the bottom, presumably for a missing oil damping system for the missing mirror.

See similar instrument in Elliott 1895,17&18.

3134 UDE159 GALVANOMETER - ASTATIC MIRROR

Unsigned

B 141x132x29; H 187. Late 19 C. G.

Ebonite base; two brass level screws; two oxidised brass arches for horizontal coil; crook for suspended frame.

The right-angled crook support has a brass screw to hold a missing fibre for a white-metal rectangular frame, its top above the coil, and its bottom through the centre of the coil, with a mirror plate near the suspension point (mirror gone); there are small bar magnets both above and in the coil; the base has four brass screw contacts.

3066 UDE092 GALVANOMETER - ASTATIC, NOBILI

YEATES & SON DUBLIN

BD 182; H 200; ScD 102. Mid to late 19 C. G.

Mahogany base; brass crook to suspend astatic needle above paper scale 0-90-0-90-0 and in elongated coil.

Base has three brass level screws and two brass screw contacts; the wire on the coil (split to allow insertion of the lower part of the needle), is green-covered; the scale is printed on paper and stuck on a metal disc; the suspension fibre is now missing.

3122 UDE147 GALVANOMETER - AYRTON MATHER

AYRTON-MATHER GALVANOMETER GRIFFIN LONDON 1892 PATTERN

Sp 132; BD 147; H 172; MD 100, H 51.

Late 19 early 20 C. G.

Brass; three level screws; horizontal black ring magnet; mirror insert between poles; circular bubble-level.

Two, the second missing its coil and mirror insert; two brass screw contacts on the base disc; small cut-off glazed cylinder (D29,H18) to view mirror; the bubble level is in the centre of the brass disc above the magnet.

3123 UDE148 GALVANOMETER - AYRTON MATHER

SUPPLIED BY GRIFFIN & SONS LTD LONDON.

Sp 134; BD 147; H 176; MD 100, H 50.

Late 19 early 20 C. G.

Brass; three level screws; horizontal black ring magnet; coil insert between poles; circular bubble level.

Essentially identical to 3122 UDE147, except for the different signature; the housing for coil and mirror is present but they are missing.

3124 UDE149 GALVANOMETER - AYRTON MATHER

AYRTON & MATHER R.W. PAUL. HATTON GARDEN, LONDON PATENT 1892 4276

Sp 132; BD 148; H 176; MD 103, H 50. 1891-1919. F.

Brass; three level screws; horizontal black ring magnet; coil insert between poles; bubble level.

Very similar, though not quite identical, to 3122 UDE147, and 3123 UDE148; the chief difference is in the size of the central circular bubble level, which is larger in this example.

Dates from Cattermole 1987,98-104.

3115 UDE140 GALVANOMETER - AYRTON MATHER

AYRTON-MATHER GALVANOMETER PATENT Robt. W. Paul, London, N. Nos 791 and 798

Sp 159; BD 178; H 198; CyHsD 122, H 155.

1903-1919. FA

Brass base; black ring magnet; coil insert with tangent screw below; brass cylinder housing.

Three brass screw level feet; two brass screw contacts and (empty) circular bubble level on base; No 791 has an oxidised brass cylinder housing with a brass top, while No 798 is all brass; both have circular windows to see the mirrors; the magnet on No 791 is numbered 46 and the coil insert 1587; for No 798, the magnet is numbered 25 and the coil 1058; the cylinder housings are interchangeable with galvanometer 3116 UDE141.

There is another oxidised brass and brass cylinder housing signed "AYRTON-MATHER GALVANR PATENT ROBT. W. PAUL 68 HIGH HOLBORN LONDON. W.C.", but with no galvanometer

Dates from Anderson 1990,63; Cattermole 1987,98-104.

3116 UDE141 GALVANOMETER - AYRTON MATHER

AYRTON-MATHER GALVANR PAT.No.4276.1892. R.W. PAUL 68. HIGH HOLBORN. W.C. No 795.

Sp 159; BD 178; H 198; CyHsD 122, H 155.

1903-1919. FA.

Brass; black ring magnet; oxidised brass housing

The instrument is identical to those in entry 3115 UDE140, but the signature is different; the magnet is numbered 52, and the coil 1032; the cylinder housing is of oxidised brass with a brass top.

Dates from Anderson 1990,63; Cattermole 1987,98-104.

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3030 UDE056 GALVANOMETER - AYRTON MATHER

H. TINSLEY & Co LONDON, S.E. No 1825

Sp 155; BD 163; H 253; CyHsD 111; TuD 19.

Early 20 C. G.

Ebonite base, three level screws; cylinder brass housing and tube for coil and mirror; three contacts on base.

Two of the latter can be shorted with a copper bar; the mirror is now gone; one of the level screws has been broken off and is glued on.

3132 UDE157 GALVANOMETER - AYRTON MATHER

Crossed staffs Trade Mark [ECCo Alleverd?] Nos 454 & 469

Sp 159; BD 177; H 196; Hs 256x198x192.

Late 19 early 20 C. G.

Two; brass; base on three level screws; horizontal black ring magnet; coil and mirror insert; glazed tin housing.

The base has two brass screw contacts with an (empty) circular bubble level between them; below the damaged coil insert is a copper ring D68; the coil insert can be adjusted by a tangent worm screw below the base; the coil on No.454 is numbered 1078, and that on No. 469, 1533; the tin housing is on a wood base, and has a sliding glass door on front.

3079 UDE105 GALVANOMETER - CURRENT

Unsigned but by James White, Glasgow. No.178

BL 348, MxW 155; CoOD 88, ID 58. c1887. N.

Mahogany base; boxwood scale; light coil; moving magnetometer and semicircular magnet missing.

The base has two screw legs at one end and a semi-circular foot at the other holding the vertical coil; the scale, running down the centre of the base, is divided 1/4 1/2 1 2 4 8 16 32 45 63, and is numbered No.178.

See 0219 QBP015, No.214 dated 25:2:1889, and potential galvanometer 0218 QBP014, No.46 dated 28:2:1883.

3091 UDE117 GALVANOMETER - D'ARSONVAL

ELLIOTT BROS. LONDON.

B 308x301x28; H 546; Hs 343x153x100. Early 20 C. G.

Three; black wood base and vertical housing for U-magnet with black cylinder for moving coil and pointer 7-0-7.

The vertical cylinder is between the ends of the upright arms of the magnet; a mirror is attached to the top of the revolving coil housing, as is the horizontal pointer to read the arc paper scale; the suspension fibre is missing in all three instruments; a glass panel slides down the front of the housing, broken or damaged in two cases.

Not in Elliott 1895, suggests later date.

3029 UDE055 GALVANOMETER - D'ARSONVAL

NALDER BRO' & C' WESTMINSTER No 1415.

Sp 174; BD 149; H 242; CyHsD 108. c1890. N.

Ebonite base, three level screws; four vertical U-magnets; fibre gone; cylinder brass housing, circular window; there are two brass contacts on the base.

A second identical instrument is missing its cover (and thus its signature and number), but contains the silver-metal cylinder (D19H51) around which the missing coil would turn - this is not present in No.1415.

Curtis 1861,107 records purchase of No.2040 in 1891.

3117 UDE142 GALVANOMETER - MIRROR

CROMPTON & CO LD LONDON & CHELMSFORD No 18

Sp 145; BD 165; H 325; CyHsD 144, H 73. Late 19 C. G.

Brass; three ebonite level screws; four horizontal curved magnets; revolving ring coil at poles; brass housing.

The fibre from the tall central brass pillar to suspend the mirror and coil is gone; the coil revolves around a metal disc between the magnet poles; there are two brass screw contacts on the base; a shallow brass cylinder sits over the magnets and mechanism, with one side cut off for a glass window; there is a groove on top of this cylinder housing presumably for a missing glass cover - see 3118 UDE143.

3118 UDE143 GALVANOMETER - MIRROR

CROMPTON & CO. LD. No.16

Sp 76; BD 85; H 161; CyHsD 82 & 56, H 65 & 67.

Late 19 C. G.

Ebonite base and three level screws; laminated horizontal magnet; revolving ring coil; brass and glass housings.

Miniature version of 3117 UDE142; the curved magnet is made up of sixteen plates; the ring coil revolves around a metal disc at the poles; on the base are two brass screw contacts; the mechanism is covered with a brass cylinder housing with a cut-out for a glass window; on top of this is a cracked glass cylinder housing with a brass top to cover the fibre suspension pillar.

3078 UDE104 GALVANOMETER - POTENTIAL

SIR WM THOMSON'S PATENT J WHITE GLASGOW No182

L 381; MxW 164; CoOD 130, ID 60. c1888. N.

Mahogany base; boxwood scale; heavy coil; moving magnetometer in glazed oxidised brass arc housing.

The base has two screw legs at one end and a semi-circular foot at the other holding the vertical coil; the scale, running down the centre of the base, is divided 1/16 1/8 1/4 1/2 1 2 4 5.15 "RES 6873 L.OHMS. 2416 YRS G.S. WIRE CONVNS 7265 TEMPR. OF COIL 13°C"; the magnetometer has scale 40-0-40 and has two curved side arms, one with a circular bubble level, for the missing semicircular magnet.

A booklet in QBP illustrates the apparatus - see 0218 QBP014, No 46 dated 28:2:83; No 214 0219 QBP015 25:2:89.

3083 UDE109 GALVANOMETER - VIBRATION

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND No L-13467A CAMPBELL VIBRATION GALVANOMETER

BD 203; H 344; HsD 121 & 62. c1924. N.

Ebonite base; double cylinder housing; mirror.

The base has three brass level screws; the lower cylinder housing is black-coloured and contains a circular window for the small rectangular mirror at the poles of a ring magnet; a knurled knob and worm screw fit into the bottom of the upper narrower brass cylinder housing, containing the mirror suspension.

No L-16797 is dated 18:8:26 - 3070 UDE096.

3021 UDE047 GALVANOMETER SCALE

GAMBRELL BROS. Ltd.

Hs 551x90x15; TuD 17, L 260. Early 20 C. G.

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Mahogany frame for paper-in-glass scale 25-0-25; clamping bracket below for brass tube.
Bracket secured by two brass wings with clamping knurled knobs.

3002 UDE028 GALVANOMETER SCALE

JOSEPH M. MAIBEN & CO. 31 EDEN QUAY DUBLIN

L 549; W 80; H 60. c1912. A.

Right-angled mahogany frame has glazed paper scale 25-0-25 in its narrower part.

Also a similar scale without the right-angled part of the frame, and with broken glass.

Bill/letter heads 2636 PRI071 include card 27:8:1912 with this address over stamped by 11 Westland Row.

3147 UDE172 GENERATOR - PORTABLE

PORTABLE GENERATOR No12239 EVERSHED & VIGNOLES, Limited, Woodfield Works, Harrow Road, LONDON, W.

B 189x189x14; Hs 170x165x163. 4:1899. D.

Oak housing, hinged door; handle turns gears and armature.

The ebonite and brass handle fits onto a sprocket on the back of the housing; it turns a brass cog-wheel system inside, which, in turn, revolves the armature; this has a brass four split-ring armature with brushes to two brass screw contacts at the base of the frame holding the pole pieces around the armature; a label on the inside of the door "S. & Co., 4/99" gives: "E.M.F. = 200 volts at 88 revs." and instructions.

3111 UDE136 INDUCTANCE

BALANCING INDUCTANCES FOR USE WITH CAMPBELL VARIABLE MUTUAL No L-18236

CAMBRIDGE INSTRUMENT CO. LTD. ENGLAND.

Hs 181x164x75. c1928. N.

Mahogany housing; three brass contacts on ebonite bar.

Between the brass screw contacts are inscribed 1/9 and 1/99; there is also an ebonite disc mound (D25H8) in the top centre, with two small holes, which can be pulled up a small distance.

No.L-16801 is dated 18:8:1926 - 3070 UDE096.

3104 UDE130 INDUCTANCE - VARIABLE

NALDER BROS. & CO. LONDON No.6065 MILLIHENRYS

BD 190; DiD 150; H 36; C 231x225x75. c1892. N.

Ebonite; base with silvered arc scale at side 10-25; on top, serrated disc with pointer; in mahogany case.

The hinges are missing from the case; the inductance is screwed to the bottom of the case; a wire extends from the top disc to the base, which has two brass screw contacts.

In the lid is a label from the "Royal College of Science for Ireland" dated 10:3:1915, with results for "Mr O'Connell & Mr Lerrynti[?]" and for "Mr Foley" in the "Fleming Anderson Method".

No.3084 dated 5:6:91 - 3073 UDE099; No.8242 dated 20:4:92 - 3042 UDE068.

3072 UDE098 INDUCTANCE BOX

CAMBRIDGE INSTRUMENT CO. LTD., No L-17152 CARY FOSTER AUXILIARY BOX FOR USE WITH CAMPBELL VAR: MUTUAL IND:

Hs 233x131x165. 1926. N.

Mahogany housing; ebonite top; two resistance dials.

Latter have ebonite turning switching knobs "R 10 50 100 1000" and "P 100 200 500 1000", with legend: "«P» ARM RESISTANCES INCLUDE RESISTANCE OF PRIMARY OF V.M.I. 40 S. 2 AT 20°C"; there are fifteen brass screw contacts on top, labelled: "GALVR OR TELEPHONE", "EARTH POTENTIAL CONNECTION", "SOURCE", "SEC. V.M.I.", "INSERT INDUCTANCE IF REQUIRED", "PRIM.V.M.I.", "UNKNOWN CAPACITY 'K'", "RES.BOX 'S'".

No L-16801 is dated 18:8:26 - 3070 UDE096.

3143 UDE168 LAMP - CARBON ARC

CROMPTON & POCHIN PATENT No 8664[?] 6 AMPERES No25860

H 970; HsDisD 210&190, H 235. Patent 1915.

Double coil and brass pulley system between two iron discs adjusts vertical carbon rods on a sliding frame.

A thong around the largest of three pulley wheels is pulled by an arm of a pivoted beam attached to bars which enter or exit the middle of the coils; the other pulley wheels are attached to thongs which adjust the position of the carbon rods; the housing discs are separated with four brass pillars; below the lower is a ceramic pulley wheel.

The first number of the patent is unclear.

3145 UDE170 LAMP - ELECTRIC

EDISON & SWAN COMPANY'S SAFETY LAMP WORKS PONDERS END LONDON

HsD 111, H 184. Early 20 C. G.

Oak housing with brass securing strips and hinged lid contains a decayed four-tube battery; bulb on side.

The latter has a brass base, and is protected by a blackened brass sleeve and glass dome; on top is a brass handle attached to a clamping strut to secure the lid; the bulb housing is numbered 2089.

3141 UDE166 LAMP - ELECTRIC

OSRAM PATENT GEC

From D 135-180. Early 20 C. G.

Collection of seven glass bulbs, two signed OSRAM; all with screw bottoms; and a display of making Osram lamps.

One Osram lamp is rated 105 volts, 400 watts, "MADE IN GERMANY"; one unsigned lamp is red, made 14:9:16, 1000 watts, 110 volts, "MADE IN HOLLAND LICENSED FOR SALE IN GREAT BRITAIN".

The display, in a mahogany glazed case, is labelled: "PRINCIPAL STAGES IN THE MANUFACTURE OF OSRAM DRAWN WIRE LAMPS Manufactured at OSRAM WORKS, HAMMERSMITH, LONDON, W."

3000 UDE026 LAMP - GALVANOMETER

JOSEPH M. MAIBEN & Co. MAKERS, WESTLAND ROW, DUBLIN.

B 170x103x21; MnH 318. 1912-1922. A.

Mahogany base and vertical support for sliding frame, with hinged cover for missing bulb; bracket for scale.

A brass knurled screw on front clamps the sliding frame at the required height; two brass contacts lead to brass projections for the top and bottom of the missing bulb; a metal box with a tube (D39) in front of the bulb is hinged to the frame, to make insertion of the bulb easy.

Dates from Morrison-Low 1989,130.

3001 UDE027 LAMP - GALVANOMETER

Unsigned

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B 172x110x18; MnH 348. Early 20 C. G.

Two; mahogany base and vertical support for slider with brass contacts for missing bulb; fluted switch cover.

Similar to, but different from, the Maiben lamp 3000 UDE026; here the brass clamp is on the back; and the Maiben example does not have the switch with the screw-on fluted cover; the tube in front of the missing bulb is secured to the support with four brass rods, and the whole does not hinge as in the Maiben case; both have brass brackets on top for scales.

3142 UDE167 LAMP - PENTANE

VERNON HARCOURT'S STANDARD PENTANE LAMP No 2 MADE BY WOODHOUSE & RAWSON ELECTRICAL MANFG: COY. No.2909.

Sp 126; TaMxD 95; MnH 445; C 330x212x144.

Late 19 early 20 C. G.

Oxidised brass base, housing and chimney; glass tank.

The base is on three level screws and holds the tank; above this is an adjustable wick in an oxidised brass cylinder with an outer cylindrical housing; this narrows on top, and above it an oxidised brass cylindrical chimney is held by two descending rods to screw clamps on the sides of the housing; a green glass shade fits in a sleeve on one of the rods; in a fitted mahogany case with a leather handle.

3106 UDE131 LENS SYSTEM

Unsigned

B 152x152, H 170, HsMxD 103; H 101, HsMxD 73.

Mid to late 19 C. G.

Two; brass; one has a base plate for a lantern, and one a screw thread; both are focused by rack and pinion.

The first has two springs behind the plate for slides; the second has a lens flap on front, turned by two knobs on tangent rods.

3862 UDE179 LEVEL - TELESCOPIC

STANLEY, GREAT TURNSTILE, HOLBORN, LONDON

L 404; H 195; TuD 41. Late 19 early 20 C. G.

Oxidised brass; two ring, four screw base; glazed compass under tube; crossed spirit levels on top of tube.

The compass has a revolving white-metal ring, divided 10-360°, with a clamping button; two supports from the ends of the compass table hold the tube, which has rack and pinion eyepiece focus and a hinged objective flap; the large spirit level is parallel to the tube; the smaller (which is cracked and empty) is at right-angles at the objective end.

Firm of W.F Stanley at Great Turnstile from 1860, Downing 1988,127; 1916 catalogue gives this address.

3095 UDE121 MAGNETIC PERMEABILITY APPARATUS

PROFESSOR EWING'S PERMEABILITY BRIDGE No.1786

B 664x380x82; H 344. Early 20 C. G.

Mahogany base; brass; two slate plates, one for four switches and one for five contacts; metal bridge for suspended magnet.

One arc switch joins three pairs of points "BREAK 0 100"; next, in the form of a circle, joins 11 pairs 0-100, as does the third; the fourth connects two pairs of points from a choice of three; one of the brass screw contacts has a brass T-plate "50" "100" to connect with either of two of the other contacts; the bridge looks like a magnet but is not now magnetic; two magnetic bars run into a brass housing below; at the top of the bridge is a horizontal brass cylinder (L90D21) with a cut-out to reveal a needle reading a small un-numbered scale, and below this is a vertical bar to hold a permanent magnet whose position on the bar can be adjusted with a brass clamping screw.

"This is a method of testing in which a comparison is made between the bar being tested and a standard bar whose curve is known." - apparatus introduced in "Electrician xxxvii" - about 1900, Glazebrook 1922,Vol.2, 477.

3140 UDE165 MAGNETIC PERMEABILITY APPARATUS

Unsigned

B 376x237x25; H 625 Late 19 early 20 C. G.

Thomson's Permeameter; wood base and bridge support to raise bars from coil in centre of iron rectangle.

Two brass screw contacts on the outside of the bridge connect to the ends of the coil; the turned wood and iron handle revolve a wood pulley wheel with a thong to a ring above each of the three iron rods.

Instrument identified by John Murphy as "Thomson's Permeameter", to measure the permeability of a magnetic material (here a bar) - i.e. the ratio of flux density B induced in it to the magnetising field H.

See Glazebrook, Vol.2,451ff.

3110 UDE135 MAGNETIC PERMEABILITY APPARATUS

Unsigned

B c350x300. Late 19 C. G.

"Ewing Double Bar Two-length Apparatus"; mahogany base with 16 contacts; two shallow brass covers for coils.

One of the brass arch covers is twice the length of the other; each has openings for two horizontal bars whose permeability is to be measured.

"This method of testing bars is a yolk method in which two similar bars of the material being tested are provided. The apparatus...consists of two pairs of magnetising coils. The shorter pair is exactly half the length of the longer pair and contains half the number of magnetising turns. Both pairs are provided with search coils for measuring...The main use of this method is in standardising bars which are afterwards to be used in the Ewing permeability bridge." Glazebrook 1922,Vol.2,476.

3094 UDE120 MAGNETOMETER

THE CAMBRIDGE AND PAUL INSTRUMENT CO., LTD, ENGLAND. PATENTED

HsD 100, H 26. 1919-1924. F.

Shallow brass glazed cylinder housing; white scale 0-90-0-90-0° with metal parallax mirror.

The needle system is pivoted on a brass bar; it consists of a metal plate with a rounded bottom in a hemispherical indent in the centre of the casing base, with a gap for the brass bar and, on the flattened top, the needle and a small elongated diamond-shaped magnet.

Company dates from Cattermole 1987,xiv.

3080 UDE106 MAGNETOMETER

SIR W. THOMSON'S PATENT J. WHITE GLASGOW. No 267

L 150; W 170; HsW 29. 1866-1892. R.

Oxidised brass c80° arc glazed housing; scale 40-0-40; mirror below bifurcated pointer; two arms at sides.

One arm has a circular bubble level and a small brass roller on a screw thread; the instrument is essentially the same as the magnetometers used in the current and potential galvanometers (see 3079 UDE105, 3078 UDP104, 0218 QBP014, and 0219 QBP015), except that it has three level screws and thus does not fit the galvanometers - it is presumably part of another

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larger piece of apparatus.

Thomson was knighted in 1866, and raised to the peerage in 1892, Smith 1989,130,799.

2990 UDE016 MECHANICAL MODEL - ANGLED COG-WHEELS

YEATES & SON DUBLIN

B 350x242x32; H 214; WhsD 173. Late 19 C. G.

Mahogany base; cast iron and brass; handle turns conical cog-wheel, which in sequence turns more angled cogs.

The wood and brass handle drives a horizontal rod with a small conical cog-wheel; this engages one of two matching six-spoke cog-wheels with angled cogs, and it, in turn, engages the second, which has the same axis as the smallest, but which turns in the opposite direction to it.

2995 UDE021 MECHANICAL MODEL - ARC MOTION

YEATES & SON DUBLIN

B 264x166x39; MxH 407. Late 19 C. G.

Cast iron and brass; a handle turns a crank whose far end slides up and down in a frame to oscillate a rod.

As the shaped brass rod, containing the frame with the sliding insert, is pivoted to the cast iron base, revolving the brass and turned wood handle results in a back and forth oscillating arc motion in the rod; there is a hole on the top end of the rod for a missing element.

3149 UDE174 MECHANICAL MODEL - BEAM ENGINE

E.M. CLARKE Maker 428 STRAND London

B 527x236x34 & 488x200x18; PvH 486; BmL 380; WhD

329. 1840-51. A.

Double tiered mahogany base; brass and iron; frame on six turned legs for beam pivot, cylinder pillars and wheel.

The cylinder and six-spoke wheel are painted red, the rest of the iron-work white; there is a pulley wheel (D62) at the centre of the large wheel, and the combination is coupled, using off-centre bars, to one end of the beam and to a tapering brass horizontal bar coupled to a small piston near the main cylinder, whose piston is attached to the other end of the beam; within the open triangular pivot supports is a brass two-ball governor, connected by a thong to the wheel axis (this does not now turn when the wheel is revolved).

Stamped on three sides of the base are the significant words: "ROYAL DUBLIN SOCIETY"!

Dates from Downing 1988,23.

3150 UDE175 MECHANICAL MODEL - BEAM ENGINE

WILLIAMS' PERRAN FOUNDRY CO Engineers CORNWALL

BmL c650; CyH c270. Mid to late 19 C. G.

Wood factory replica for model brass and oxidised brass water pump with cylinder, valve system and pivoted beam.

A central wall supports the beam pivot, one side of which is coupled to the cylinder which has a system of inlet and equilibrium valves, and an exhaust valve; the other end of the beam is attached to a long oak rod stretching to the hidden valves and pump above the factory well; between the latter end and the pivot, the beam is also connected to the condenser cistern on the factory floor.

2983 UDE009 MECHANICAL MODEL - CAM & BEAM

YEATES & SON DUBLIN

B 410x125x30; PvH 342; BmL 318. Late 19 C. G.

Cast iron and brass; handle turns cam attached to an arm which is pivoted to one end of the beam.

The beam thus oscillates; there is a sliding bracket with a spring insert which can slide along a cut running most of the length of the arm.

2996 UDE022 MECHANICAL MODEL - COG WHEELS

YEATES & SON DUBLIN

B 182x181x46; MxH 306; WhsD 130&35. Late 19 C. G.

Cast iron and brass; handle turns one cog-wheel, coupled to another, driving an off-centre sliding frame.

The brass handle, missing its turned wood end, revolves the smaller of the brass cog-wheels, which in turn revolves the larger; a frame is held in an off-centre pivot on the larger cog-wheel and a slide in this is pivoted also to the wheel nearer the circumference; thus, when the handle is turned, the revolving frame is pushed in and out as the large cog-wheel turns.

2997 UDE023 MECHANICAL MODEL - COG WHEELS

Unsigned

B 541x212x48; H 550; WhsD 182,128&81. Mid 19 C. G.

Broken mahogany base and two turned pillars to brass bracket for three wheels inter-connected by cogs.

The base, which has three (of four) disc feet, is split in two, and one pillar is broken; the large six-spoke wheel has no cogs on the outside, but has a cog axis which connects to the circumference of the five spoke middle-sized wheel; its cog axis similarly connects to the four-spoke smallest wheel; a spool at the axis of the latter could be for a turning ribbon, and there is a thong groove around the largest wheel.

2991 UDE017 MECHANICAL MODEL - CROSS CAM

YEATES & SON DUBLIN

B 182x181x49; H 316; WhD 253. Late 19 C. G.

Cast iron and brass; handle turns bar with rollers at its ends fitting in a cross which turns a flywheel.

The wood part of the handle is missing; the rollers at the ends of the bar turned by the handle run in right-angled grooves on the face of the cross, turning it; the axis of the cross then revolves a six-spoke flywheel.

3006 UDE032 MECHANICAL MODEL - DOUBLE CRANK-SHAFT

Unsigned

B 670x177x21; H 328; WhsD 187. Late 19 C. G.

Wood, iron and brass; a shaft with cranks at each end changes rotation from a horizontal to vertical wheel.

An iron and brass handle (incomplete) turns a U-shaped crank with a flywheel at the other point of the U and a rod on a pivot at the turn; this rod leads to an identical arrangement, but at right-angles to the first, at its other end, thus turning a second flywheel, perpendicular to the other.

2985 UDE011 MECHANICAL MODEL - DRILL

YEATES & SON DUBLIN

B 260x168x35; MnH 327; WhD 130. Late 19 C. G.

Cast iron and brass; handle and flywheel turn two cog-wheels at right-angles, which twist drill via a screw thread.

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The five-spoke wheel with handle is connected to the axis of one of the cog wheels (D65); this and the other at right-angles have angled cogs so that one turns the other; the second horizontal wheel has a screw thread through its axis connected to the drill, its upper end held between two brass discs, which thus raises or lowers the drill, depending upon which way the wheel is turned.

3151 UDE176 MECHANICAL MODEL - DROP VALVE ENGINE

Unsigned

L c1085; WhD c380. Late 19 early 20 C. G.

Iron and brass; heavy fly-wheel with handle has right-angled cog wheels for off-centre shaft to piston.

The piston is sectioned to show its interior; a parallel shaft is coupled to two small piston valves [drop valves?] on top of the main piston housing, and this also drives, via another cog-wheel system, a two-ball brass governor on top of a turned pillar; the engine can now be operated using a modern electrical motor.

2984 UDE010 MECHANICAL MODEL - LINEAR COGS

YEATES & SON DUBLIN

B 310x125x30; H 170; WhsD 93,62&30. Late 19 C. G.

Cast iron and brass; handle turns three cog-wheels, one of which moves a slide by means of linear cogs.

The handle turns the middle sized cog-wheel, which connects to the largest; on the axis of the latter is the smallest cog-wheel whose cogs connect to either the top or bottom of the row of 18 linear pegs; these are on a frame on a rectangular brass plate (223x70) which moves between two brass rails when the handle is turned.

2992 UDE018 MECHANICAL MODEL - PISTON

YEATES & SON DUBLIN

B 257x165x38; H 418; WhD 130. Late 19 C. G.

Cast iron and brass; handle turns wheel and crank to a bar pivoted to two vertical plates with central piston rod.

The wheel (no longer secured to its axis) has a turned wood handle, and these revolve the crank; this has a rectangular cut-out into which a horizontal cross bar fits; from the latter descend parallel iron plates, at the bottom of which is a pivot holding an iron rod; the top of the rod is guided by a hole in a brass arc above, and the bottom moves up and down in a piston housing.

2988 UDE014 MECHANICAL MODEL - PISTON

YEATES & SON DUBLIN

B 264x166x39; H 370. Late 19 C. G.

Cast iron and brass; missing handle or wheel turns a cam pivoted to a bifurcated bar with pivot to piston rod.

As the cam is turned, the divided bar containing the piston rod rises and falls, as thus does the piston rod, the top end of which is constrained above by a hole in a bracket on the A-shaped support.

2982 UDE008 MECHANICAL MODEL - PISTON

YEATES & SON DUBLIN

B 227x181x28; H 445; WhD 187. Late 19 C. G.

Cast iron and brass; flywheel drives a cam attached to a rod which is pivoted to the base of a cut-out piston.

The five-spoke wheel turns the cam pivoted to a white-metal rod, whose bottom end, in turn, is pivoted to the bottom of the sectioned piston in its housing, so that, when the flywheel is turned, the piston rises and falls.

2981 UDE007 MECHANICAL MODEL - PUNCH

YEATES & SON DUBLIN

B 182x180x47; H 260; WhsD 129&35. Late 19 C. G.

Cast iron and brass; handle drives two cog-wheel system and off-centre block to move punch up and down.

Part of the handle, which turns the smaller cog-wheel, is missing; this wheel drives the larger, whose axis is connected to the off-centre block in a brass sliding frame to raise and lower the punch.

3088 UDE114 MECHANICAL MODEL - RAILWAY SIGNAL LEVERS

Polytechnisches Arbeits-Justitut Fabrik für Unterrichtsmodelle und Zeichnenwerkzeuge von J. Schröder

B 360x199x33; H 485. Late 19 C. R.

"Hebelapparat" - lever apparatus; cast iron; five levers.

Iron base with three white enamel plates; one has the J. Schröder "in Darmstadt." signature; a second has "Hebelapparat für centr. Weichen- & Signalstellung System Rüppell Patent Büssing D.R.P. 1397,11055, 11687."; the third a diagram of what the levers do to the railway lines; the frame above the base is cracked; two levers are attached to wheels with chains to pulleys "1 u.2 Von A.n.B. 1 Von A.n.C. b c 2" 3 u.4 Von B.n.A. c 3 Von C.n.A a"; the other three do not have such wheels, but have engaging levers at the bottom of their handles - they are labelled "Weiche a"

"Weiche b" "Weiche c".

Anderson 1990,76 lists a catalogue of J. Schroder, Darmstadt, dated 1895.

2987 UDE013 MECHANICAL MODEL - REVOLVING CROSS

YEATES & SON DUBLIN

B 264x167x39; MxH 380; WhD 185. Late 19 C. G.

Cast iron and brass; handle and fly wheel turn cam whose end is the axis of a cross, with pivoted slide inserts.

The five-spoke fly wheel and handle revolve the cam and thus the cross; the motion of the latter is constrained by two slide pieces pivoted to stationary points at the ends of a brass bar attached to a support from the base; it thus moves up and down as well as around.

2986 UDE012 MECHANICAL MODEL - REVOLVING CYLINDER

YEATES & SON DUBLIN

B 225x180x28; H 240; CyD 66, L 143. Late 19 C. G.

Cast iron and brass; handle turns a cylinder with two sets of five grooves to drive a horizontal bar via an insert.

The cylinder grooves are so arranged that the insert moves along the top surface, turns, and goes back; the insert is attached to a vertical arm whose top slides along an iron bar; near the cylinder end of the arm is a horizontal brass tube on an iron bar, which thus moves back and forth as the cylinder handle is turned.

3005 UDE031 MECHANICAL MODEL - REVOLVING CYLINDERS

YEATES & SON DUBLIN

B 527x216x32; H 338; CysD 114-50. Mid to late 19 C. G.

Mahogany, iron, brass, and boxwood; a handle turns two cog wheels to revolve one of two tapering cylinders.

Mahogany base; cast iron supports; a wood and brass handle turns a brass cog-wheel (D93) and a worm screw; the latter drives a bracket, with two curved out-pieces on each side, along an iron bar; the cog-wheel also turns a second cog-wheel

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(D63) which revolves a tapering wood cylinder with brass disc ends; on top is a matching tapering cylinder set in the other direction with nothing connected to turn it.

3007 UDE033 MECHANICAL MODEL - ROTATION DIRECTION

YEATES & SON

L 710; H 198; W 322; WhsD 111. Late 19 C. G.

Cast iron and brass; handle turns wheel and rod ending in ring coupling to another rod for a second wheel.

A turned wood handle revolves the brass wheel with divisions 0-7; this turns a rod, leading to a semi-circular coupling attached to a brass ring; a similar coupling also attaches to the ring at positions 90° to the attachment of the other, and this drives the other brass wheel; the position of the latter can be altered along a scale on the base 0-50, and clamped at any point.

2989 UDE015 MECHANICAL MODEL - SPIRAL & COG-WHEEL

YEATES & SON DUBLIN

B 264x166x40; H 267; WhD 204. Late 19 C. G.

Cast iron base and brass; handle turns a disc with a spiral on its face which revolves a large cog-wheel.

The turned wood and brass handle revolve the disc spiral, which engages the cogs on the circumference of a six-spoke brass wheel, which thus also revolves.

2993 UDE019 MECHANICAL MODEL - THREE WAY MOTION

YEATES & SON DUBLIN

B 261x166x38; MxH 503. Late 19 C. G.

Cast iron and brass; handle turns crank pivoted to the centre of a three arm plate whose apices drive three rods.

The rods are constrained by pivoted brass sleeves, one secured to the top of the A-shaped support, and the others to side arms from it; thus, when the turned wood and brass handle is revolved, the bars are driven in and out in three different directions.

2998 UDE024 MECHANICAL MODEL - TRIANGULAR CRANK

Unsigned

B 480x248x14. Mid to late 19 C. G.

Mahogany base has a turning handle with brass crank and shaft to a triangle coupled to a handle and pointer.

The shaped base has two arc boxwood scales 1-4 and 4-0; a wood handle pivoted to one apex of the triangle moves a wood arrow pointer pivoted to another apex, the readings on the two scales for handle and arrow depending on the position of the triangle, which is turned via a brass crank mechanism by a brass and wood handle behind the base; the apparatus has been broken and repaired more than once.

2994 UDE020 MECHANICAL MODEL - VERTICAL MOTION

YEATES & SON DUBLIN

B 260x166x39; H 443; WhD 187. Late 19 C. G.

Cast iron and brass; a handle on a flywheel turns a crank pivoted to a rod constrained by a slide insert.

The five-spoke wheel has a turned wood handle; these revolve a brass crank, the far end of which is pivoted to a long rod with a rectangular cut-out; in this slides a pivoted insert held by a bar from the centre of the A-shaped support.

3004 UDE030 MECHANICAL MODEL - VERTICAL ROD DRIVE

YEATES & SON DUBLIN

B 463x165x39; MxH 617. Late 19 C. G.

Iron and brass; a handle turns a crank, leading to a diamond-shaped coupling to raise and lower the rod.

The turned wood and brass handle revolves a brass crank, the other end of which is pivoted to a bar, whose far end is at another pivot for four bars, two of which form the sides of a diamond; the other two brass bars of the diamond are pivoted to the bottom of a vertical iron rod, which, when the handle is turned, moves up and down through a hole in a support from the base; three brass pillars hold pivoted elements.

2975 UDE001 MELDOMETER - JOLY

Joly's Meldometer Sole Makers Yeates & Son Dublin

Sp 175&155; MhH 215. c1891. R.

Slate base on mahogany feet has support for brass travelling microscope moved horizontally by a worm screw.

The microscope has a rack and pinion focus and a handle to turn the worm screw to move the objective along the (missing) platinum wire; a hinged trough is below the wire supports, one of which has a spring contact to a drum micrometer 0-90 with a linear scale 0-20; at the eyepiece of the microscope is a coil with two contacts and a small magnetic needle with a red point in an ebonite frame; there are five more contacts on the base.

In his privately published (1900) "Astronomical and Physical Researches Made at Mr. Wilson's Observatory, Daramona, Westmeath", W.E. Wilson described Joly's meldometer as an instrument "for the purpose of finding the melting-points of minerals, hence its name. As used by him (Joly), it consists of a strip of platinum, on which minute fragments of any mineral can be placed, while any alteration in its length can be determined by means of a micrometer screw which touches a lever connected with one end of the strip. The strip can be heated by an electric current, and is calibrated by observing the micrometer readings corresponding to the temperatures at which some substances of known melting-points melt." Wilson adapted Joly's meldometer for his measurements of the radiation of the sun, the apparatus being made by Yeates & Son. See also the Meldometer entries 2687 TDP231 and Ex0589, and J. Joly, Proceedings of the Royal Irish Academy, 3rd Series Vol.2, 1891, 38-64.

3873 UDE190 OMNIMETER - ECKHOLD

Eckhold's Patent Omnimeter No.181

Sp 150; MhH 394; TuL 347, D 34. Late 19 C. G.

Oxidised brass; tribach on three arm clamp base; linear tangent scale on horizontal circle with microscope.

The instrument is like a transit theodolite, with the addition of the silver scale 1°-100 in a housing on top of the horizontal circle cover; this has a drum micrometer 50-500 at one side, and the scale is read from above with a microscope which has a right-angled bend before the eyepiece on top of the instrument; the silver horizontal circle 10-360° is read by two window verniers and magnifiers; there is a damaged bubble level on top of the horizontal circle housing, and another on top of the tube; trunnions rise to the axis of the four-spoke vertical circle, which has a silver scale 10-90-0-90-10-80-0° read by two vernier arms and magnifiers; the tube has rack and pinion eyepiece focus.

Stanley 1901,355 records that the instrument was invented by Chas A.C. Eckhold, a German engineer, described in the provisional British Patent (No.1859, June 1868 - Patent No.3759 Dec. 1868) as a person living in Alexandria; this "modern form" has the tangent scale placed in a horizontal position, firmly fixed on the vernier plate, read by a reflecting prism in the eye-piece of the microscope; the microscope and telescope are united on one axis so that they move at equal angles to each other; Stanley goes on to give details of the operation of the omnimeter.

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3087 UDE113 OSCILLOGRAPH - DUDELL

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND No L-18753

L 860; W 395; H 410. c1927. N.

Black enamelled metal housing, hinged side; magnet and mirror element (L-18720); tuning fork and slit system.

The housing contains the optical systems, and the element with a vertical U-magnet, mirror between the poles, and a mark for "OIL LEVEL"; a cover at one end is over twelve brass screw contacts "FIELD PLATES OF ELECTRO-STATIC VIBRATIONS 1 2 3 VIBRATING SYSTEMS"; on top is a viewing tube above a revolving mirror, turned by a five-spoke wheel with a brass handle, a double coil rheostat, three switches and fifteen ebonite and brass screw contacts; at the back is a large tuning fork with a lamp and slit arrangement leading to a prism inside the housing; at the other side of the back is a sprung wheel with two pulleys marked "FIRST QUARTER OR FIRST HALF OR WHOLE FILM SECOND QUARTER THIRD QUARTER OR SECOND HALF FOURTH QUARTER", and a box with a lever above an indented wheel "KEEP SPRING FULLY WOUND"; there are two other identical magnet and mirror elements - Nos L-18718 and L-18729; and another element in a rectangular ebonite housing, L-19014, like the others on three brass level screws, and with four, rather than two, terminals on top, for "FIELD" and "VIBRATOR".

L-16801 is dated 18:8:26 - 3070 UDE096.

3086 UDE112 OSCILLOGRAPH - IRWIN-PAUL

OSCILLOGRAPH TRACING OUTFIT No 16 IRWIN-PAUL SYSTEM Robt. W. Paul. London, N

L 1041; W 320; H 405. 1891-1919. F.

Mahogany base and housings for motor, elements and camera.

The main housing is blackened inside and contains a motor and the hot-wire oscillating mirror; on top is the camera "OSCILLOGRAPH CAMERA (IRWIN-PAUL PATTERN) No10 DRAW PLUNGER BEFORE DROPPING PLATE", with spring plunger on side; at one side of the main housing is a double coil rheostat (134 ohms 1 amp); attached to a double rectangular pillar device "IRWIN OSCILLOGRAPH PATENT No24" of oxidised brass with three brass level screws and two brass knurled knobs to revolve the pillars; this side also has a switch; on the other side of the housing are two switches and five ebonite and brass screw contacts for "8 VOLTS" "2 VOLTS" "2 VOLTS"; at the back is an ebonite plate with nine ebonite and brass screw contacts "LOAD" "SHUNTED CONDENSER" "SECONDARY INDUCTIVE SHUNT" "PRIMARY INDUCTIVE SHUNT"; on top are two switches "VOLTS" "AMPERES"; a diagram is available giving "Connections of Irwin's Hot-Wire Oscillograph." Dates from Cattermole 1987,98-104.

3034 UDE060 PHONOGRAPH

Unsigned

B 380x240x43; H 230; W 575; WhD 222. Late 19 C. G.

Cast iron base has supports for axle for handled wheel and grooved cylinder; hinged head from base supports.

The base is coloured dark red with gold lines; the massive wheel at the side has a turned wood handle; a horizontal iron shaft leads to the recording cylinder, and beyond this is a worm screw extension so that the cylinder moves as the wheel handle is turned; the head has a central bakelite(?) disc in a heavy iron brass-bound support, and this holds the needle on the cylinder grooves; the wheel is numbered 36.

3865 UDE182 PLANIMETER - AMSLER

ELLIOTT BROS LONDON

MnL 285; TaH 45; DiD 120. c1884. PC.

Brass; arm with steel leg and cogged wheel turns a disc; below is an expanding arm; above the Amsler wheels.

An adapted planimeter, differing from the usual pattern by the inclusion of the horizontal brass disc with a white card top; the horizontal white metal Amsler wheel (0-9) and the vertical wheel (0-9) with vernier are on a hinged bracket on top of the disc; the arm below (cross-section 5x5) is held in a sleeve.

This is identified by Dr Joachim Fischer as an Amsler polar disc planimeter - Model No.8 - introduced in the mid 1880s; a heavy circular weight and a smaller pole weight are missing; the instrument was varied over the years, this model being close to the 1884 design; it is sometimes referred to as a "precision planimeter".

3114 UDE139 POTENTIOMETER

CROMPTON & CO CHELMSFORD [On scale] STANLEY LONDON

Hs 783x215x88. Early to mid 20 C. G.

Oak base; ebonite top for glazed scale 0-105, three circular dials, 18 contacts, tapper, and adjusting knob.

The three dials are glazed, but in two cases the glass is broken - knobs move contacts 0-14, A-F, and 0-14; the silver-metal scale has a slider and also a smaller scale "CLARKE CELL VALUE AT 35-5 DEGREES CENTIGRADE"; between the tapper and the left dial is inscribed "POTENTIOMETER COILS"; between the right dial and the adjusting knob "ADJUSTING RHEOSTAT"; silver-metal screw contacts include "GALV", "ST CELL", "TEST", "BATTY", and "B +", "C +", "D +", "E +", "F +".

There is also an oak and ebonite contact box (Hs220x217x83), signed "CROMPTON & CO CHELMSFORD, with "FOR 300 VOLTS MAXIMUM", having seven silver- metal screw contacts with inscriptions "150 150 15 1.5" between pairs - it has a slide bottom revealing five coils.

3069 UDE095 POTENTIOMETER - VERNIER

TINSLEY'S VERNIER POTENTIOMETER H. TINSLEY & CO LONDON S.E. MANGANIN No. 10534

Hs 610x361x202. 20:2:1920. D.

Mahogany lidded housing; ebonite top; three vernier switch and one rheostat dials; switches and contacts.

Inside the lid is a blue drawing (No.590, dated 20.II.20) giving the connections; the vernier dials have multiple switch contacts, that "X BY .1" in a semicircle, the others "X BY .001" & "X BY .00001" in a full circle; there is selector switch, a rheostat dial 0-18-INF, a reducing ratio bar, ten brass screw contacts, and a clampable galvanometer tapper.

3861 UDE178 PROTRACTOR

J. Potter, London. P 200

D 147; L 234. 1911. AQ

Brass and oxidised brass; arc c196° divided 0-180°(X2); plotting arm with window vernier and clamping screw.

At the centre of the arc is a ring hinge for the arm, with its central hole half-covered, and a small indent at the centre of both it and the arc; the ends of the brass arc are joined by an oxidised brass bar holding the bottom of the ring hinge.

On the back of the instrument is a small label: "SCIENCE & ART MUSEUM, DUBLIN 1911 ART 291", which presumably gives the acquisition date.

John Potter was successor to R.B. Bate; firm lasted from 1851 to 1966+, Downing 1988,105, Taylor 1966,458.

3031 UDE057 PROTRACTOR - CIRCULAR

Troughton & Simms, London.

OD 380; ID 310; B 406x400x15. Mid 19 C. G.

Brass ring; one diagonal whose centre is at the centre of the ring; scale 10-360°; on mahogany base.

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Below the diagonal, the open part follows the curve of the ring at the bottom, but is shaped inwards towards the bottom of the diagonal; the base has raised portions to fit in this opening and across the top of the diagonal, the top one having two securing hinged clasps.

3075 UDE101 RESISTANCE

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND No L-19049
DUDELL-MATHER PATENT ANTI-CAPACITY GAUZE RESISTANCE
Hs 307x280x267; H 464. c1928. N.

Metal grill and mahogany housing; two ebonite top panels.

There are two large ebonite-handled brass keys which fit into five holes on the top panels; pairs of these are calibrated 1000, 900, 100, 9900 and 10000 "OHMS"; there are also three ebonite and brass screw contacts on top; on two sides of the housing are hinged brass handles.

No. L-16801 is dated 18:8:26 - 3070 UDE096.

3081 UDE107 RESISTANCE - STANDARD

BAIRD & TATLOCK LTD LONDON

CyHsD 56-85, H 38-82. Late 19 early 20 C. G.

Collection of 21 resistances, 1-10000 ohms, all but two smallest in brass cylinder housings, those two in wood.

All but the two with wood housings have ebonite tops, and all have two brass screw contacts on top; thirteen match - 4x5 ohms, 6x10, 2x1000, and 1x5000.

All but three unsigned resistances are signed by Baird & Tatlock.

3054 UDE080 RESISTANCE - STANDARD

Gambrell Bros. Ltd. London No 3182 1 MEHOHM

Hs 389x91x102. Early 20 C. G.

Mahogany housing with ebonite top; on this, 11 ebonite pillars ending in brass screw contacts - 0,.1,.2--1.0.

3074 UDE100 RESISTANCE - STANDARD

1 TRUE OHM RIGHT AT --°C LIQUID HOLE NALDER BROS. & CO. LONDON No.4084

CyHsD 104; H 102; ToD 114; C 232x147x140. 1891. N.

Silver-metal cylinder housing; ebonite top; case.

The top has two holes, one labelled "LIQUID HOLE", the other unlabelled; it also has a metal rod with an ebonite top, probably for stirring the liquid; below the housing are one long L62, and two short L5 ebonite bosses with metal projections; the instrument is housed in a hinged boxwood case with a brass handle.

No.3084 dated 5:6:91 - 3073 UDE099; No.8242 dated 20:4:92 - 3042 UDE068.

3073 UDE099 RESISTANCE - STANDARD

NALDER BROS & CO. LONDON No.3084 RIGHT AT 17.0°C

C 213x213x201; ToD 166. 1891. D.

Boxwood hinged case holds brass cylinder housing with ebonite top; six brass contacts; 10000-50000 "TRUE OHMS".

The instrument cannot be removed from its box; the brass screw contacts are on ebonite pillars on top.

A hand-written label inside the lid reads: "June 5th 1891 High resistance coil 150000 Ohms. Double-silk-covered platinum wire 2.5 mils = 1/400 inch = .0025 inch Temp-erature coefficient .02% per degree Cent MB"; between the pairs of contacts are inscribed: 10000, 20000, 20000, 50000, 50000; brass handle on top of case.

3056 UDE082 RESISTANCE - STANDARD

.02 SECOHM NALDER BROS & CO LONDON No 4411

HsMxD 139, H 54. c1891. N.

Ebonite housing; top held by four screws; on this two brass screw contacts.

No.3084 dated 5:6:1891 - 3037 UDE099; No.8242 dated 20:4:92 - 3042 UDE068.

3053 UDE079 RESISTANCE - STANDARD

W.G. PYE & CO CAMBRIDGE 1 MEGOHM

Hs 221x110x102. Early 20 C. G.

Mahogany housing with ebonite top; on this, two ebonite pillars ending in brass screw contacts.

There is also a standard one Megohm resistance by the Cambridge Instrument Company Limited No L-60104, dating it to 1924 (Hs181x98x75).

3076 UDE102 RESISTANCE - VARIABLE

CAMBRIDGE INSTRUMENT CO. LTD, LONDON & CAMBRIDGE C57721

H 308; CyHsD 250, H208. 1924. N.

Metal grill cylinder; bakelite top; 12-laminate brass brushes connect terminal arc to one of six disc contacts.

The bent brushes are turned using a metal tube handle; the circular iron base has three projecting bosses with screw holes.

There is also a variable resistance signed: "CAMBRIDGE INSTRUMENT CO. LTD. ENGLAND No-L 16703" (i.e. 1926) in a brass cylinder case (D75H51) with an ebonite top, having three brass screw contacts and an ebonite knob to positions "GALVO UNSHUNTED 500 100 10 SHORT G1G2", contacts labelled "G2 G1T1 T2".

3057 UDE083 RESISTANCE - VARIABLE

JAMES WHITE GLASGOW & LONDON

HsMxD 135, H 79. Pre 1900. G.

Oxidised brass cylinder housing; ebonite top; contacts "CIRCUIT" (x2) & "MULTI" (x2); five-position switch.

The switch positions - OFF, 5, 4, 2, 1 - seem to tap a coil inside the housing; an ebonite and brass contact (with central damage) revolves from the top centre to engage the switch positions; there is a central hole vertically through the instrument D20-25, and rings of small holes around the top and bottom of the housing; one brass screw from a MULTI contact is gone.

The firm became Kelvin & James White Ltd in 1900, Clarke 1989,260.

3060 UDE086 RESISTANCE BOX

BAIRD & TATLOCK (LONDON) LTD

Hs 231x119x116. Late 19 early 20 C. G.

Mahogany housing; ebonite top; three brass bars in the shape of an elongated S; 18 segments, 17 holes for keys.

Latter of brass and ebonite; holes labelled 1, 2, 3, 4, 10, 20, 30, 40, 100, 200, 300, INF, 400, 1000, 2000, 3000, 4000; there are two brass screw terminals on the ends of the bar; most of the keys are now secured with a wire.

3070 UDE096 RESISTANCE BOX

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND. No L-16797 & 16801

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Hs 293x132x120. 18:8:1926. D.

Two; wood and metal grill housing; ebonite top; brass U-bar, 12 segments, 23 holes, 11 keys, two contacts.

Grill can be seen behind 14 holes (D34) in the housing; ebonite and brass keys; "MEGANIN OHMS TO CARRY 0.5 AMP" on top; holes in centres, as well as between, segments; latter numbered 0.04, 0.1, 0.2, 0.3, 0.4, INF, 1, 2, 3, 4, 10.

An attached label gives No.L-16797 (as on the instrument), date 18.8.26, Sold to T.H. Mason; another label with the same date is available for No. L-16801.

3071 UDE097 RESISTANCE BOX

CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND. No L-18656, 18659 500 OHM COILS TO CARRY 0.2 AMP

OTHER COILS 0.5 AMP

B 284x265x20; Hs 251x233x195; H 294. c1927. N.

Two; wood base; metal grill; brass U-bar; nine keys.

The brass-edged metal grill takes up four sides of the housing; the top is ebonite on wood; the brass bar has ten segments and seventeen holes - the ebonite and brass keys can fit in the segments as well as between them; inter-segment holes are numbered 10, 20, 20, 50, 100, 200, 200, 500, 500; the two ends of the bar have brass screw contacts.

No L-16801 is dated 18:8:1926 - 3070 UDE096.

3055 UDE081 RESISTANCE BOX

EVERSHED'S PATENT EVERSHED & VIGNOLES LTD LONDON

Hs 324x151x131. Early 20 C. G.

Two; "BRIDGE-MEGGER" TESTING SET WITH DIRECT READING RESISTANCE BOX"; mahogany housing; four dials 1s - 1000s.

Housing has hinged lid; the top of the instrument is of oxidised brass, and has four turning knobs, with small glazed windows to read "UNITS" TO "THOUSANDS" of "STANDARD OHMS"; it also has two oxidised brass screw contacts.

Inside the lid are instructions, for measuring resistance of conductors and locating a leak; the address; "Acton Lane Works, Chiswick, London, W." is printed on the instructions; one has a metal plaque on the top of the lid: "EVERSHED'S PATENT DIRECT READING RESISTANCE BOX No 48241 Maximum 9999 Ohms EVERSHED & VIGNOLES LTD LONDON".

3058 UDE084 RESISTANCE BOX

DAMPING RESISTANCE FOR IRWIN OSCILLOGRAPH Robt. W. Paul, London, N.

Hs 187x114x80. 1891-1919. R.

Metal grills in mahogany housing; ebonite top; brass.

The grills are seen through fourteen holes (D30) in the housing; on top is a U-shaped brass bar with nine segments and eight holes; four of the eight ebonite and brass keys remain; the holes are labelled 10, 20, 30, 40, INF, 100, 100, 200; there are two brass screw contacts on the ends of the arms of the U.

Dates from Cattermole 1987,98-104.

3109 UDE134 RESISTANCE BOX

H. TINSLEY & CO. LONDON. S.E. No 2203 2204 2205

Hs 216x98x206. Early 20 C. G.

Three, 1, 1000 and 1000 ohms; oak case with lid; ebonite top with brass bar - five segments, two contacts, four keys.

In the one ohm instrument (No 2205) the key holes are labelled, .1 .2 .3 .4; in the two 1000 ohm instruments, 100 200 300 400.

3052 UDE078 RHEOSTAT

L. CASELLA LONDON

B 330x152x18; H 145; CyD 104, L 106. Late 19 C. G.

Mahogany base; brass supports for wire-wound brass cylinder; handle and worm screw move contact along wire.

The brass handle has a bakelite end; there are three screw contacts, one on each of the supports, and one at the base of the spring contact to the resistance wire on the cylinder.

3089 UDE115 RHEOSTAT

Robt. W. Paul. London, N 10Ω 2A

B 279x76x16; H 75; CyD 28. 1891-1919. F.

Black metal base; horizontal ceramic cylinder wound with wire; brass laminated semi-circle slider.

The slider has a wood handle and is mounted on a bar between two brass pillars, one with a brass screw contact on top; two other such contacts are at either end of the cylinder.

Dates from Cattermole 1987,98-104.

3146 UDE171 SECOHMMETER

PROFS. AYRTON & PERRY'S SECOHMMETER PATENT NALDER BROS & CO WESTMINSTER No1489

B 275x178x25; Hs 155x134x110. c1890. N.

Mahogany base and housing; handle for brass gear system.

On the base are two ebonite bars each with four brass screw contacts; the ebony and brass handle, which has two sleeves for the cog-wheel axle, turns a system of five brass cog wheels and a cylinder flywheel; outside the brass housing for the gear system there is, on each side, an ebonite-centred brass split ring commutator and four copper spring brushes; the top and two sides of the mahogany housing can be removed; pairs of the screw contacts are labelled: "BATTERY", "BRIDGE", "BRIDGE", AND "GALVANOMETER".

Curtis 1861,107 records purchase of No.2040 in 1891.

3866 UDE183 SEXTANT - ANGLE

H. HUGHES & SON'S ANGLE SEXTANT. No.521 H.O.^3 59 Fenchurch St.. LONDON.

D 116; H(-Ha) 44; C 177x149x68. 1911. AQ.

Oxidised brass double disc with two angled mirrors.

On top of the upper disc is a white ivory covering with a ring scale 0-90-0 around the outside, read by a revolving arm attached underneath to a cog wheel connecting to a larger cog attached to the larger angled mirror (Hs43x21); the bottom disc has three circular holes (D38) and a screw hole for the brass and turned wood handle; between the discs is a viewing tube (ID17) leading to a half-mirrored glass; the handle has a screw-in white-metal and brass pin used to adjust the clamping nuts of the mirrors.

The sextant is contained in a fitted mahogany case, with a dark blue and gold elliptical trade label: "HENRY HUGHES & SON, MARINE OPTICIANS. 59, FENCHURCH STREET, LONDON."; there is also a small disc label: "SCIENCE & ART MUSEUM, DUBLIN 1911 ART 274", presumably giving the acquisition date.

Henry Hughes & Son were at 59 Fenchurch Street from 1877 into this century, Downing 1988,65.

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3032 UDE058 SHUNT

ELLIOTT BROS LONDON

BD 104; H 132; HsD 85. Mid to late 19 C. G.

Brass cylinder housing; ebonite top; on this, six brass segments - two contacts, 1/9, 1/99, 1/999, star; two ebonite and brass keys.

The keys fit into four holes between the segments - one between the two with contact screws, one between the central star and the 1/9 segment, one between star and 1/99, and the last between star and 1/999.

The instrument is similar to that illustrated in Elliott 1895,23, which notes that it has coils reducing the sensibility of a galvanometer to 1/10th, 1/100th or 1/1000th of its unshunted value.

3103 UDE129 SHUNT

INDUCTIVE SHUNT IRWIN-PAUL SYSTEM No 16 Robt. W. Paul, London, N.

B 396x197x28; H 87. 1891-1919. F.

Mahogany base holds horizontal coil, segmented brass grid with keys, and spiral resistance ribbon.

An ebonite plate on top of the coil gives "AMPS 0 TO 5 PLUG IN 4. 5. 6"; 5-10, 2. 4. 6. 8. 11; 10-25 1. 2. 3. 7. 8. 9. 10 - the numbers referring to holes in the brass grid, which is on an ebonite plate in the centre of the base with four brass screw contacts, two for "PRIMARY" and two for "SECONDARY"; the horizontal resistance ribbon, between ebonite rods, has eleven 180° turns.

Dates from Cattermole 1897,98-104.

3144 UDE169 STANDARD CELL

1.0183 VOLTS AT 20°C Robt. W. Paul. London. N.

BD 143; CyHsD 89, H 92. 1891-1919. F.

Mahogany base; cylinder brass housing over glass dome containing four glass tubes of chemicals; four contacts.

The brass screw contacts are on an ebonite arc on the base; the pairs are labelled "1" or "2", and their polarity is noted; the housing is black on the outside.

Dates from Cattermole 1987,98-104.

3017 UDE043 STANDARD CELL - ZINC/MERCURY

STANDARD CELLS MUIRHEAD'S Patent MUIRHEAD LONDON No. 275

BD 78; H 107. Late 19 early 20 C. F.

Brass cylinder housing; ebonite top, four contacts and bent glass mercury thermometer 10-30° "Cente".

Contacts of brass and ebonite; "Hg" and "Zn" also inscribed on top; scratched on side: "1.435 VOLTS at 15°C".

Muirhead & Co. listed from 1895-1910, Crawforth 1988, 18 and Anderson 1990,55.

3018 UDE044 STANDARD CELL - ZINC/MERCURY

ZN CLARK CELL E.M.F. = 1.434 VOLTS AT 15°C. R.W. PAUL, 68 HIGH HOLBORN HG

BD 74; H 109. 1903-1919. FA.

Two; brass cylinder housing; ebonite top.

Each has two contacts of brass and ebonite and a bent glass mercury thermometer 0-40°; one has a paper label at the back with the hand-written legend: "3% low June 29th 1916".

Dates from Anderson 1990,63; Cattermole 1987,98-104.

3867 UDE184 SURVEYING TARGET

Unsigned

Sp 181; H 306; DiHsD 115. Late 19 C. G.

Two; brass and oxidised brass; tribach base; table for crossed spirit levels; revolving white disc target.

The base has two level screws; a central pillar rises to the table, which holds a shallow glazed cylinder containing crossed spirit levels; two supports from the sides of the table hold a semicircular mount for the revolving disc of white glass in an oxidised brass frame having, on one side, a cover with four outer holes (D39) and one central hole (D11); attached to the table is a triple hinged arm for a candle holder.

3108 UDE133 SWITCH

Unsigned

B 305x254x48 & 280x204x18. Late 19 C. G.

Slate base on larger mahogany base; turned wood handle revolves four-laminate brass brush to one of seven contacts.

The disc contacts (D18) are labelled ½ 1 2 4 8 12; one of the four feet on the mahogany base is missing.

3107 UDE132 SWITCH

Unsigned

Various sizes. Late 19 early 20 C. G.

Seven assorted heavy-duty switches on wood, slate or ebonite bases; all use metal bars in slots.

2978 UDE004 SWITCH - ELECTROMAGNETIC EXPLODER

Yeates & Son, Dublin. [On base BREGUET 55835]

B 188x137x34; H 96; L 285. Mid to late 19 C. G.

Mahogany base and cover for laminated magnet with brass-bound poles to two coils; pivoted knob moves keeper.

The green wire coils have black covers and are wound on wood bobbins (one cracked) labelled "F.32 12000 126 K°" and "F.32 12000 117 K°"; a keeper at the other side of the coils can be moved away by a right-angled brass arm with a turned wood knob; a spring arm from this makes or breaks contact with a brass fitting connected to a wire in the coils; a pivoted arm under the knob can prevent it from being pressed.

3100 UDE126 SWITCH - THOMSON'S REVERSING KEY

Unsigned

Connect ELECTROMETER with Upper Screws

BD 163; H 92; HsMxD 73. Mid to late 19 C. G.

Mahogany base; vertical ebonite mount for four contacts, side lever, and glazed circular brass switch cover.

The legend is on an ivory plaque on the side of the brass screw contacts; the brass lever turns an ebonite plug to move one sprung contact bar from one arm of a U-bar, and allow another to touch the other arm; for use with electrometers - identification from Elliott 1895,66.

2977 UDE003 TELEGRAPH - ALPHABETICAL

TÉLÉGRAPHIE pour la démonstration Froment à Paris

B 300x200x20; H 222; DID 167. 1844-1865. G.

Two; mahogany veneer base; support for brass alphabet ring; handle with window for letter turns cog behind.

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Latter attached to two springs which are in turn connected with spiral wires to contacts on base; copper wires connect these to two brass terminals; there is a brass switch, with a spherical ivory knob, which can connect copper wires from two more brass terminals; the veneer is damaged on both instruments. the letters are white, behind a glass ring shield.
Dates from Payen 1985,176.

2976 UDE002 TELEGRAPH - MORSE

YEATES & SON DUBLIN

B 258x111x38; H 280; DID 175. Mid to late 19 C. G.

Mahogany base on four feet; white disc dial has morse and alphabet key, and needle; behind, coil on brass bobbin.

Second instrument identical except that the base is smaller with short feet (254x114x20); the key is painted on a boxwood disc and has long and short ticks for the dash and dot of the morse key; the base has two brass contacts with spiral wires to the coil, in the middle of which is a deflecting needle attached through the axis to that in front.

2979 UDE005 TELEGRAPH APPARATUS

WATKINS & HILL 5 CHARING CROSS LONDON

B 234x125x38. 1822-1856. F.

Mahogany base; four brass contacts; two vertical copper springs; switch "ALARUM" or "TELEGRAPH"; incomplete.

Base has two remaining of four feet; a hole on the base between the copper springs, and with two vertical pillars beside it (H44,D3), is for an important missing part which, underneath the base, is connected to the telegraph side of the switch - this is in the form of an arrow, the point of which connects to copper arc plates on a boxwood mount.

Dates from Clifton 1995,291.

2980 UDE006 TELEGRAPH PRINTER

J. ROBINSON & SONS PHOTOGRAPHERS & OPTICIANS 65 GRAFTON ST. DUBLIN.

B 238x128x14; H 165. 1885-1903. F.

Mahogany base; electromagnetic device prints letters.

Two supports, one with a wooden bobbin, presumably held a tape; this was fed through a mechanism which, using four electromagnetic coils and escapements, turned a disc with alphabet letters on its circumference, which would have printed on the tape; made of brass, oxidised brass, and wood.

Dates from Morrison-Low 1989,133.

3101 UDE127 TESTING SET

ELLIOTT BROTHERS LONDON No.25599

Hs 444x188x140. 18.3.1914. D.

Hinged mahogany casing; oxidised brass top; windows for ammeter 0-100, wattmeter 0-10, and voltmeter 0-110.

The casing has three rows of small holes on the bottom front; there are seven ebonite and brass screw contacts, two with "AMPS" inscribed between them, the others marked +, 110, 220, 440, 660; above each meter is a pivoted metal bar to pull up a rod which clamps the meter needles when lid is closed; inside the lid is a "DIAGRAM OF CONNECTIONS" for "A.C. TEST SET No 25599"; with date 18.3.14 and address Century Works Lewisham.

3148 UDE173 TESTING SET

EVERSHED'S OHMMETER PATENT No12598 PORTABLE TESTING SET (EVERSHED'S PATENT). S & Co., 500, 4/1900

Hs 167x150x142. 4:1900. D.

Oak hinge-lid housing and base; oxidised brass and ebonite top; silvered scale 0-INF; switch, level, four contacts.

The base below the housing has two level screws in front; the four brass screw contacts are labelled "LINE", "EARTH", "G", and "G"; the two-point brass and ebonite switch can go to points "A" or "B"; there is a circular bubble level in front of the switch.

Inside the lid is a label giving instructions, with the date 4/1900.

3093 UDE119 TESTING SET

TELEGRAPH WORKS. SILVERTOWN. LONDON. PATENT. No281

Hs 204x191x141. Late 19 early 20 C. G.

Mahogany hinged case; two circular brass key dials, one straight, one E-shape, one U-shape; glazed meter 50-0-50.

The case is lined with royal purple velvet; on top of the base section is the ebonite plate with brass fittings; one circular dial is labelled "HUNDREDS", the other "TENS"; the straight dial has three pairs of proportional coils 1000, 100, 10; the E-shape has "SHUNTS" 5, 20, 100; the U-shape "10000 OHMS" and "INSULN"; there is also a taper, four screw contacts, and two pairs of key contacts "INSULN" and "BRIDGE".

3092 UDE118 TESTING SET

LORK KELVIN'S PATENTS TESTING SET No 112 JAMES WHITE, GLASGOW.

C 210x191x130; MsL 76, D 6. 1892-1900. R.

Oak case; coil; two switches; meter 20-0-20; four contacts.

The lid of the hinged oak case is broken but complete; the brass-bound coil is labelled "50,000 OHMS AT 18° C"; on it is a pivoted brass frame for two parallel bar magnets; the meter, in a glazed oxidised brass housing, has a parallax mirror; one switch has four pairs of contacts for shunts 1/9 1/99 & 1/499; the other has two points "LINE" 1 or 2, with screw brass contacts; two more of these for "BATTERY" 1 or 2.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

3871 UDE188 THEODOLITE - PLAIN

STANLEY Gt Turnstile Holborn LONDON 8963

BD 87; MnH 280; TuL 363, D 19&31. Late 19 C. G.

Oxidised brass; two disc, four screw base; covered horizontal circle; half vertical circle; Y-brackets to tube.

The silver horizontal circle 10-360° is read by two verniers with a rotating magnifier; on top of the housing are two crossed spirit levels and a glazed compass with a silvered face 10-360°; trunnions rise to the vertical half-circle below the tube, which has a silver scale 60-0-90° read by a magnifier on an arm; on the other side is the "Diff. of Hypo & Base" scale 30-0-30; two Y-brackets hold the tube, which has a spirit level below, a long narrow eyepiece tube, objective rack and pinion focus, and an objective lens flap.

3868 UDE185 THEODOLITE - TRANSIT

AUGUST LINGKE & CO. FREIBERG IN SA. No 1221

Sp 183; MnH 298; TuL 255, D 29. Mid to late 19 C. G.

Brass and oxidised brass; tribach base; covered horizontal circle; four-spoke vertical circle; three spirit levels.

The silvered horizontal circle 0-360° is read through two window verniers with angled frosted glass panels and mounted magnifiers (one missing); one spirit level is on the horizontal circle housing, another on one of the trunnions

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to the axis of the vertical circle 0-90-0-90-0°, read by two verniers; they also have angled frosted glass and magnifiers; the tube has eyepiece rack and pinion focus with a spirit level on top.
Lingke workshop founded in 1791, exhibited Dresden 1875, London 1876, Paris 1900, Brachner 1985,144.

3869 UDE186 THEODOLITE - TRANSIT

STANLEY Gt. Turnstile Holborn LONDON 8893

BD 87; MnH 335; TuL 268, D 31. Late 19 C. G.

Oxidised brass; two disc, four screw base; covered horizontal circle with compass; four-spoke vertical circle.

The silver horizontal circle 10-360° is read by two verniers with brackets for slide-in magnifier frames (magnifiers missing); on the horizontal circle housing is a broken spirit level and, in the centre, a glazed compass with a silvered face 10-360°; trunnions, one with a spirit level, rise to the vertical circle, which has a silver scale 0-90-0-90-0° - but the reading arms and magnifiers are missing; on the other side of the vertical circle is the scale of "Diff. of Hypo. & Base", 30-0-30; the tube has a broken spirit level on top, and has objective rack and pinion focus.

3872 UDE189 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LTD. LONDON

Sp 163; MnH 368; TuL 355, D 41. Early 20 C. G.

Oxidised brass; tribach on three arm clamp base; variation compass; covered horizontal and four spoke vertical circle.

The damaged variation compass is below the horizontal circle housing; the silver circle 10-360° is read by two window verniers with hinged magnifier rings (magnifiers missing); there is a spirit level on top of the housing, and one at the side of the vertical circle; the circle has a silver scale 10-360° which is read by two vernier arms with magnifiers on arms (one missing), and is held by trunnions; the tube has rack and pinion eyepiece focus.

3870 UDE187 THEODOLITE - TRANSIT

TROUGHTON & SIMMS LONDON UNIVERSITY COLLEGE DUBLIN

Sp 186; MnH 382; TuL 390, D 47. Early 20 C. G.

Oxidised brass; tribach base; variation compass; covered horizontal circle; four-spoke vertical circle.

The damaged variation compass is under the horizontal circle housing; the silver horizontal circle is read by two magnifiers with eyepiece drum micrometers; on top of the housing are two crossed spirit levels; there is another spirit level at the upper side of the vertical circle, which is read by two vernier arms and magnifiers; the vertical circle is balanced by a counter-weight disc on the other side of the tube, which has a bulbous eyepiece end, objective rack and pinion focus, and a (missing) objective flap.

3112 UDE137 VOLT RATIO BOX

VOLT RATIO BOX H. TINSLEY & CO. LONDON. S.E. No.4216

Hs 247x220x199. Early 20 C. G.

Mahogany housing with lid and two metal grill windows; ebonite top - four contacts, seven-segment brass grill, key.

Two of the brass screw contacts are labelled "+ MAINS -", the other two "+ POTR -"; a brass bar inscribed "X READINGS BY" has six short side pieces "10 20 50 100 200 500" any one of which can be connected to the bar with an ebonite and brass key; also inscribed on the top are "VOLT RATIO BOX 500 VOLTS" and "25,000 OHMS".

3028 UDE054 VOLTMETER

CAMBRIDGE INSTRUMENT CO., LTD. ENGLAND No L17811.

Hs 185x178x64. c1926. N.

Mahogany housing; black iron top; glazed "THERMAL SCALE" 0-120 "MV"; two added "SCALE FACTOR"s.

The scale has an arc parallax mirror, and has on it: "10 CU. RES. 500 OHMS. AT 20°C" and "PATT. L."; the 0-120 scale is divided in two ways - linear and log; the scale factors (89x54x51) are each attached to two brass terminals; one is inscribed: "0.36 VOLT THERMAL CONVERTER No L-18784" and "SCALE FACTOR .003V PER DIVISION RES. 10w CONNECTED MAXIMUM .4050 V".

No.L-16801 is dated 18:8:1926 - 3070 UDE096.

3016 UDE042 VOLTMETER

EDMUNDSONS LTD ELECTRICAL ENGINEERS, DUBLIN. VOLTS

BD 202; HsD 167; W 61. Post 1891. RD.

"RD. NO. 184776" (1891); glazed brass cylinder housing for white scale 0-90 on silver-metal face.

Two brass contacts on ebonite block below housing; ivory signature plaque on scale plate may be addition after manufacture by another firm.

3023 UDE049 VOLTMETER

VOLTS VOLTMETER PORTABLE RANGE 5 25 & 250 VOLTS PATT. No 5526

EVERETT EDGCUMBE & CO., LTD LONDON 163324

Hs 146x139x96. Patented 1915. P.

Oak hinged housing; iron and glass scale cover.

Three black (5, 25, 250) and one red (+) contacts on top of the housing, as is a metal plaque: "CAUTION (1) BEFORE CONNECTING IN CIRCUIT TAKE CARE THAT NEGATIVE TERMINAL BEING USED IS HIGH ENOUGH FOR VOLTAGE TO BE MEASURED. (2) WHEN MEASURING UNKNOWN VOLTAGES ALWAYS COMMENCE BY USING 250 VOLT NEGATIVE TERMINAL."; scales 0-5 and 0-250.

3011 UDE037 VOLTMETER

HARTMANN & BRAUN FRANKFURT No 15810

B 272x180x26; H 328; Cv 308x258x153.

Late 19 early 20 C. G.

Mahogany base and support for arc scale 0-3.5 and 0-35; pivoted pointer from sprung device from coil centre.

Base is cracked, and has three brass contacts; a vertical green coil in a brass spool has a moving metal insert in the centre, hung under a spring; when this is attracted into the coil, it turns a rod to which the pointer is attached; behind the vertical support, green wire is wound in a rectangle; the scale includes the legends: "Spulemviderst.8.73" & "Gesamtrviderst.87.3 Ω "; broken glazed card cover.

3015 UDE041 VOLTMETER

JOHNSON & PHILLIPS LTD. LONDON. 9994 & 10031

Hs 194x183x86. Early 20 C. G.

Two; mahogany housing; hinged flap for white scales 0-150 (No 9994), or 0-100 (No 10031); parallax mirrors.

Two ebonite-covered contacts, and brass and wood handle, on top; legend on scale: "CALIBRATED IN HORIZONTAL POSITION"; glass cover for scale.

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3014 UDE040 VOLTMETER

JOHNSON & PHILLIPS LTD. LONDON. 10041 & 10043

Hs 213x201x141. Early 20 C. G.

Two; mahogany housing with metal grills at sides and back; hinged flap for scale 0-30 with parallax mirror.

Two ebonite-covered contacts, and a brass and wood handle, on top; legend on white scale: "CALIBRATED IN A VERTICAL POSITION"; glass cover for scale.

2999 UDE025 VOLTMETER

JOHNSON & PHILLIPS, LTD. LONDON.

Nos 9998-10004

B 296x243x29; H 318; CyHsD 205 Early 20 C. G.

Six; wood base and vertical support for ebonite back to brass cylinder scale housing; scales 0-80, 0-100, 0-150.

The white arc-shaped scales are glazed; labels on several give "INSTRUCTIONS FOR FIXING HOT WIRE INSTRUMENTS", and the back of one is missing showing a frame for thin wire behind the mechanism; Nos 10000 and 10001 have scale 0-80, Nos 10003 and 10004, 0-100, and Nos 9998 and 9999, 0-150; No 10002 does not seem to have survived.

3020 UDE046 VOLTMETER

CARDEW'S VOLTMETER, PATENT. PATERSON & COOPER, LONDON. No 680

L 1065; TuD 40; HsMxD 155, W 68. Patented 1915. P.

Iron and brass glazed scale housing 0-150 and 10-360"; long black-covered brass tube rises from face.

A brass elliptical plaque on the side of the housing reads: "CARDEW'S PATENT D & G No 2476"; the 0-150 scale numbers and the serial number 680 are hand-written in red on the printed degree disc scale; the glass on the scale housing is cracked; there are two brass contacts below the housing.

Patent No.2476 would be dated 1915.

3013 UDE039 VOLTMETER

SH (Monogram for Siemens & Halske Aktiengesellschaft)

Hs 194x194x101. Early 20 C. G.

Three, Nos 604667, 762232, & 770704; mahogany housing with circle glass window; scales 0-60, 0-120 & 0-5.

Two ebonite-covered contacts on top of each; all have a zero correcting screw on top also; 604667 has an ebonite lever on top which can be set to 65, 130, or 260; 762232's lever reads 130, 260 or 520; 770704 has no lever; all have ebonite grills on the back.

SH monogram from Siemens Zeitschrift booklet in UDE, dated July 1965; firm founded 1847, Brachner 1985,150.

3027 UDE053 VOLTMETER

AYRTON & PERRY'S DIRECT READINGSRING VOLTMETER

THE WESTMINSTER ENGINEERING CO. LTD.. LONDON, N.W. No.E249.

B 121x119; H 123; SHsD 98. Early 20 C. G.

Mahogany base; coil around cylinder; scale 0-110.

The base is not steady, either missing feet or side walls; it has two brass contacts, and a small compass, "BLUE INWARDS WHEN A POSITIVE"; the vertical coil rises to the brass ring scale housing, whose glass is almost entirely gone; the card scale has an arc parallax mirror; the vertical central bar, which holds the scale pointer, is damaged.

3022 UDE048 VOLTMETER

WESTON'S DIRECT-READING VOLT-METER. WESTON ELECTRICAL INSTRUMENT CO. NEWARK, N.J.; U.S.A. No 5758

B 168x150x28; H 68; C 192x168x100. 1890-1896. PD

Mahogany base and case; brass; glazed scale 0-150.

The base has three contacts labelled "+", "H", "L"; the brass fan-shaped instrument housing has leaf and berry decoration; the arc scale has a parallax mirror, and has a red scale 0-5 under the 0-150 black divisions;

Patents are noted on plaques: 6:11:1888 - 392386-7; 14:5:89 - 403311; 29:4:90 - 426992 & 427022; 10:6:90 - 19895-6; mahogany case, whose slide-in lid has an Elliott Brothers certificate No.5758, dated 21:7:1896 - the address is given as 101, St. Martin's Lane, London, and the certificate is signed "A.C. Heap"; the glass disc over the needle bearing is cracked, and the needle is missing; as well as the three contacts on the base there is a push-button.

3063 UDE089 VOLTMETER - MULTICELLULAR

SIR W. THOMSON'S PATENT No.183 J. WHITE, GLASGOW

Sp 167; H 321; ScHsD 191; CyHsD 103. 1866-1892. R.

Brass; tribach base on three blocks; cylinder housing; wider glazed housing for silvered dial, scale 0-160.

Above the centre of the dial is a tall brass tube (D17H150) for the needle suspension; the needle is secured when not in use by a brass ring; there is a circle bubble level on the face; at the side of the housing is an ebonite block with two brass contacts and a switch which can connect with one or the other; the instrument is mounted on a wood base.

Thomson was knighted in 1866, and raised to peerage in 1892, Smith 1989,130,799.

3064 UDE090 VOLTMETER - MULTICELLULAR

LORD KELVIN PATENTS MULTICELLULAR VOLTMETER No.1386 JAMES WHITE GLASGOW

Sp 148; H 367; ScHsD 199; CyHsD 103. 1892-1900. R.

Brass; tribach base; cylinder housing; scale 0-400.

The glazed scale housing is wider than the rest of the housing, and the scale is on a brass arc on the silvered face; a pillar above holds the needle suspension; below the housing is a cylinder (D39H60) containing damping oil for a brass disc on a vertical rod; a plumb-bob drops from the scale housing to one of the tribach arms; at the side of the housing is an ebonite block with a switch and two brass contacts, one labelled "CASE"; the instrument is mounted on a wood base which has an indent and catch to hold a brass bar (L186W9); the major differences between this and the earlier version 3063 UDE089 are in the missing securing ring for the needle, the addition of the plumb-bob, and the damping cylinder below.

Kelvin was raised to the peerage in 1892, Smith 1989,799: firm became Kelvin & James White in 1900, Bryden 1972,59.

3009 UDE035 VOLTMETER - MULTICELLULAR

LORD KELVIN'S PATENTS MULTICELLULAR VOLT METER No 1418 [& No 1422] JAMES WHITE GLASGOW

Hs 168x146x113; L 380; TusD 63&38. 1892-1900. R.

Pair; brass glazed housing for vanes mechanism.

Mechanism involves a plate with fourteen parallel slots for white metal vanes; a pointer projects from the mechanism to the white arc scale 0-250; there are brass tubes at either side of the housing, one with an ebonite adjusting knob at its end; No.1418 is mounted on a cast iron frame; No.1422 is not; both have an ebonite plate with two brass contacts on the side of the housing, one contact labelled "CASE".

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

3019 UDE045 VOLTMETER - MULTICELLULAR

LORD KELVIN'S PATENTS DIAL MULTICELLULAR VOLT METER No 470

KELVIN & JAMES WHITE LTD GLASGOW & LONDON.

H 341; HsD 308, W 160. 1900-1914. F.

Black iron base and glazed cylinder housing.

The mechanism has a pair of grey-metal, three parallel plate frames with two vanes pivoting into the gaps; the pointer, in front of a brass disc, reads a replacement arc scale plate with pencilled figures: 5.2 100, 68KV 200mg, 400 82, and 500mg 9.2KV; at the back are two brass contacts, one labelled "H.T.".

Dates from Clarke 1989,260.

3012 UDE038 VOLTMETER - UNIPIVOT DYNAMOMETER

CAMBRIDGE INSTRUMENT CO., LTD. ENGLAND No.L 17319 RES.1500 OHMS.AT 20°C UNIPIVOT DYNAMOMETER VOLTMETER

178x172x72. c1926. N.

Case missing; ebonite top and bottom plates; scale 0-30.

Coil and spring mechanism between the plates; two brass contacts on top; glazed white scale with arc parallax mirror; also on top: "CLAMP FOR TRANSIT DEPRESS AND TURN".

No L-16801 dated 18:8:1926 - 3070 UDE096.

3113 UDE138 WATTMETER

DUDELL-MATHER STANDARD WATTMETER No L-20080 CAMBRIDGE INSTRUMENT CO. LTD., ENGLAND.

B 255x255x22; Hs 202x202x153. c1930. N.

Marble base; mahogany, glass, and ebonite housing.

The marble base has three brass level screws; the mahogany housing has glass windows on four sides (one side broken), and contains a four-coil mechanism; the ebonite top has a revolving disc (D145), divided 0-98, under an ebonite bridge with a glass and mercury thermometer 10-50°C; a bunch of stout wires connects the meter to an unmarked heavy mahogany, ebonite and brass resistance box with ebonite and brass keys.

No.L-16801 is dated 18:8:1926 - 3070 UDE096.

3102 UDE128 WATTMETER

ELLIOTT BROTHERS (LONDON) LIMITED No 27604

Hs 225x197x142. 26:4:1921. D.

Mahogany hinged housing; metal face; curved scale window; white scale 0-1.0; two bakelite and brass contacts.

The housing has rows of small holes on the front and bottom; there are two heavy silver-metal screw contacts on the side of the housing as well as the two on an ebonite plate on the face; the scale has a parallax mirror and the words: "ALTERNATING AND DIRECT CURRENT WATTMETER."; inside the lid is a "DIAGRAM OF CONNECTIONS" for this "SINGLE PHASE WATT-METER" dated 26-4-21.

3133 UDE158 WATTMETER

ELIHU THOMSON PATENT RECORDING WATTMETER THE BRITISH THOMSON-HOUSTON CO. LD. 83 CANNON STREET LONDON E.C. 2 W 50 AMP 100 VOLTS No 205831 K=1MADE IN PARIS

Hs 261x212x190. Early 20 C. G.

Revolving copper disc turns with armature in two coils.

A broken wood base and horizontal support hold a cast iron frame for the disc and coils mechanism; the revolutions are read on a silvered plate above with four red watch-hand dials each reading 0-9 for 1 10 100 and 1000 units; the mechanism is covered by a blackened tin hood with a window and a signature plate.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

UNIVERSITY COLLEGE DUBLIN PHYSICS - UDP

Belfield

Dublin 4

Telephone (01) 706-7777

2259 UDP337 AMMETER

MODEL 45. NO 641; MADE BY THE WESTON ELECTRICAL INSTRUMENT CO. NEWARK. N.J. U.S.A. PATENTED

Hs 200x199x109. Early 20 C. G.

Oak housing; white metal arc frame; white scale 0-5.

Parallax mirror under needle; two white-metal contacts.

Patents noted from 6:11:1888 to 16:7:1901.

2234 UDP312 AMPERE APPARATUS

YEATES & SON DUBLIN

B 360x188x30; H 456; PrsD 13. Mid to late 19 C. G.

Mahogany base; two parallel brass pillars turn at right-angles ending in cups to hold variety of copper coils.

Base, with four turned feet, has two brass contacts with copper strips to the pillars; nine attachments - two single squares, two double squares, circle, two solenoids, two double spirals - one in plane of connecting wires, one perpendicular to them.

0769 UDP037 AMPERE GAUGE

JAMES WHITE, GLASGOW, LORD KELVIN'S PATENTS AMPERE GAUGE No 2263

D 220; H 77; HsBD 240. 1892-1900. F.

Brass cylinder housing with glass top; plunger in solenoid connected to pulley for pointer to scale.

Brass counter-weight opposite pulley; scale 0-20 on white arc; spherical brass plumb bob at side with hole and cross to ensure vertical setting; screwed to crude wooden housing.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

0954 UDP046 AMPERE TABLE

E. Ducretet a Paris

B 474x290x42; CoD 251. Late 19 early 20 C. G.

Mahogany base; Bertin commutator; coil in housing around copper vessel; ring/pillar support for coils gone.

Base has four feet and has also four contacts and a switch; a pillar in the centre should be present carrying coils attached to a ring dipping into acid in the copper vessel; changing the direction of the current causes the wire to rotate in a different direction.

Demonstrates the rotation of a vertical by a horizontal current.

Apparatus illustrated in Turner 1983,176 and acquired by the Tyler Museum in 1892. The Turner illustration notes that this is part of a collection of apparatus acquired from Ducretet by the Tyler Museum which is for demonstrating "the discoveries, during 1820-1825, of André Ampère (1775-1836) on the electromagnetic properties of a current in a wire."; in the illustration it has a coil on top of a ring support which fits into and around the centre of the large reservoir; the illustration also features the trough 0904 UDP170.

A description of this instrument and associated apparatus is given in an undated leaflet: "NOTICE SUR LA TABLE D'AMPERE MODIFIÉE PAR M. BERTIN Construite par E. DUCRETET & CIE, rue des Feuillantines, 89, à Paris".

0904 UDP170 AMPERE TROUGH

Unsigned - attributed to E. Ducretet

280x96x27. Mid to late 19 C. G.

Mahogany tray, with four feet, divided into two reservoirs each with a brass contact; division lengthwise; a bent wire (gone) joins the two mercury reservoirs.

To demonstrate that successive portions of the same rectilinear current repel each other.

Identical to instrument illustrated in leaflet entitled: "NOTICE SUR LA TABLE D'AMPERE MODIFIÉE PAR

M. BERTIN Construite par E.DUCRETET & Cie, rue des Feuillantines, 89, à Paris", undated, "REPULSION D'UN COURANT SUR LUI-MEME".

Instrument also illustrated with other apparatus "to demonstrate the discoveries, during 1820-25, of André Ampère (1775-1836) on the electromagnetic properties of a current in a wire. Signed: E. Ducretet à Paris." and acquired by the Tyler Museum in 1892, Turner 1983,176 - the collection also includes the Ampère table 0954 UDP046.

Name from Griffin 1910,788.

2173 UDP259 ANTI GRAVITY ROLLER

Unsigned

L 262; MxD 73; FrL 393, W 220. Mid to late 19 C. G.

Black bi-conical roller with side arms runs down sides of diamond frame and back up, seemingly against gravity; frame is hinged at four joins and has a cloth strip to set its width.

Also modern iron frame which works better with original roller.

0859 UDP125 ARTIFICIAL HORIZON

Unsigned

D 69; H 28. Mid to late 19 C. G.

Glass disc with black back in circular brass mount with three level screws.

0855 UDP121 ASTRONOMICAL MODELS

Unsigned

254x98; DiD 75; WhD 61. Mid to late 19 C. G.

Four; mahogany base; disc window; capstan with brass and wood handle to drive upper discs (missing).

Showing "the various Eclipses of the Sun, with the transit of Venus", "the cause of Spring and Neap Tides, shows the Moon's Phases during its revolution round the Earth", "the apparent direct and retrograde motion of Venus or Mercury, and also its stationary appearance", "the solar system, showing the revolution of all the Planets, with their Satellites, round the Sun".

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0866 UDP132 BARLOW STELLAR WHEEL

Unsigned
B 456x184x20; H 330; WhD 141. Late 19 early 20 C. G.
Mahogany base; turned wood pillar for bracket to 14 pointed star; horse shoe magnet with mercury trough.
The wood pillar holds a brass bar and suspension for centre of red-painted star; points of star dip into mercury trough between the poles of the horizontal magnet; contacts on brass bar and to mercury trough.

2264 UDP342 BAROMETER - FORTIN

J. HICKS 8 HATTON GARDEN LONDON NO 465
L 1017; C 1258x215x171. 1864-1884. A.
Black metal tube; brass fittings; silver double scale 68-32cm and 27-32"; mahogany base board; glazed case.
Knob to alter mercury level judged by reflection of ivory pin; central vernier for scales adjusted by another knurled knob; frosted glass panels behind scale and mercury meniscus; signature on ivory plaque and on cistern cover.
Dates from Downing 1988,59.

2263 UDP341 BAROMETER - FORTIN

Yeates & Son DUBLIN
B 1170x160; L(-Mos) 940; W 68. Mid to late 19 C. G.
Oak base-board; two iron mounts to pivots; tube cased in two oak edges; brass double scale 68-80cm & 27-31".
Central vernier between scales adjusted by a knurled knob; another adjusting knob for mercury level judged by the reflection of an ivory pin; thermometer 10-120° and -20-0-50°; mirror behind scale.

0833 UDP099 BAROMETER - STICK

J. HICKS 8 HATTON GARDEN LONDON
H 918; TuD 14; RsD 44. 1864-1884. A.
Black tripod stand; short pillar to pivot; revolving cistern reservoir; thick glass tube; top scale 500-820; pivot can be clamped.
Dates from Downing 1988,59.

2172 UDP258 BATTERY - VOLTAIC PILE

Unsigned
BD 109; H 234; DisD 64-68. Late 19 early 20 C. G.
Mahogany base and three pillars contain c200 discs of copper, zinc, and cloth; top of battery missing.

0952 UDP220 BOILING POINT APPARATUS

Unsigned
BD 154; H 388; HsD 154&89. Late 19 early 20 C. G.
Brass; cylinder chamber below; double cylinder jacket above; on top, lid with sleeve for thermometer.
Glass thermometer has no scale and has a spherical mercury reservoir; tube to jacket to allow condensed water to flow out; another to inside chamber for manometer; height measurement does not include thermometer.

2189 UDP275 BOW

BAIRD & TATLOCK * GLASGOW & LONDON
L 697; MxW 66. Late 19 C. R.
Mahogany(?) with ebony sliding support and tightening knob; hair gone.
Second similar unsigned.
Baird moved to London in 1890, Brian Gee, Bull SIS 27,1990,33.

0950 UDP032 BOW

Unsigned
L 690&610; W 72&53. Late 19 early 20 C. G.
Two; brown and black wood; the large one has black horse hair and wood tightener; the small one dark brown hair and brass tightener.

0785 UDP052 BRIDGE

YEATES & SON DUBLIN.
B 770x102x22; WiD 3. Pre 1898. D.
Mahogany base; two fixed brass clamps at ends; two long wires, bent ends free; movable brass plate on wires.
Used by Fr G. Molloy - note on rere: "Saturday, August 20, 1898. Arrangement of exper. Distance between the 2 circuits 3'4".
Timing secondary spark came CERTAIN and BRIGHT when bridge laid down 2½" from black ebonite. Secondary spark disappeared when bridge moved away in either direction 3½". These positions marked with pencil in the board. G.M."

0885 UDP151 BRIDGE - WHEATSTONE

GRIFFIN, LONDON
C 295x173x166. Early 20 C. CT.
Two Post-Office Pattern bridges; mahogany case; brass key resistance bars and two push key contacts.
Case has hinged lid; inside, three rows of brass bars with circular interruptions closed with brass and ebonite keys; eight brass contacts; proportional arms 1000, 100 and 10; resistance coils from 1-5000 ohms and infinity; battery and galvanometer push keys.
Apparatus illustrated in Griffin 1910,762.

2224 UDP302 CALORIMETER(?)

Unsigned
TMxD 166 H 35; LdD 155, H 75. Late 19 C. G.
Brass pillar (foot gone) holds copper table with edge; in centre, small white-metal cup; lid fits table.
Three screws remain where a boss fitted into a foot or other base; the base of the pillar screws into this; at H80 is a clamping knob for the rest of the pillar on a pin into the lower part; on top is the table; in the centre of the table is a small pillar (H44) into which fits a brass rod holding the cup (H13,D10) and it can be raised or lowered and clamped; on top of the lid is a vent with a side screw.
Purpose unknown.

0675 UDP003 CATHETOMETER

Spencer & Son Dublin
H 1210; PrSis 51. 1864-1886. F.
Red painted cast iron tribach foot; brass cylinder base; triangular pillar with moving sleeve; no telescope.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Scales of inches 1-36, and centimetres 1-100; verniers on moving sleeve.
Dates from Morrison-Low 1989,136.

0826 UDP092 CHESHIRE DISC

CHESHIRE'S DISC. JOHN J. GRIFFIN & SONS, LTD. 20-26 SARDINIA ST. LINCOLN'S INN FIELDS. LONDON.
D 208&207; W 4. 1899-1905. A.

Two glass discs with off-centre concentric lines.

Pivot in centre; backing glass on one disc cracked.

Used to represent the motion of the particles in stationary waves due to longitudinal vibration; should be accompanied by a mahogany frame for use with lantern.

Instrument illustrated in Griffin 1910,390; described in "Nature" 1892; dates from Anderson 1990,34.

0943 UDP211 CHLADNI PLATE

BAIRD & TATLOCK LONDON & GLASGOW NO 3

H 210; PD 303. Late 19 C. R.

Black painted iron tripod foot and turned pillar support brass plate blackened on top.

Also unsigned brass square plate (H143,P308x312) with a green painted circular fluted iron foot, with the blackened on both sides.

Baird moved to London in 1890, Brian Gee, Bull SIS 27, 1990 33.

0942 UDP210 CHLADNI PLATE

Unsigned

BD 240; H 249&241; P1 303x304x3; P2D 306, W 3.

Early 20 C. G.

Two; turned boxwood base and pillar; brass plates, one square, one circular.

2177 UDP263 CHLADNI PLATE CLAMP(?)

Unsigned

L 231; W 165; PI 54x31. Mid to late 19 C. G.

Brass; U-shaped bar; screw for mahogany clamping disc at open end; on top right-angled bar for missing part.

The vertical bar is near the centre of the top; at one end is a small horizontal platform.

Apparatus possibly used for clamping Chladni plate to table.

0919 UDP184 CHRONOSCOPE - HIPPI

E. ZIMMERMANN LEIPZIG No 109

B 259x206; H 535; T 220x169. Late 19 early 20 C. G.

Wood base; four pillars; table, clockwork mechanism and contacts; to time weight fall, testing human response.

"The apparatus is controlled by the fall of a weight (for approximately one minute) which turns two hands on the dials reading to thousandths of a second by means of a vibrator. The weight can be stopped and released during its fall by an electro-magnetic command." - catalogue description of similar (not identical) instrument from the Piéron Museum in Paris; Matthias Hipp (1813-1893) was a clockmaker from Wurtenburg.

Name, Parot 1987,18; E. Zimmermann founded a work-shop in Berlin in 1887, Brachner 1985,152.

2253 UDP331 COIL

GAMBRELL BROS

HsD 135; CosD 40. Late 19 early 20 C. G.

Mahogany ring housing; glass disc; through it, at right-angles, are two parallel coils; four brass contacts.

2262 UDP340 COIL

Unsigned

B 577x104x13; H 102; CoD 45, L 545. Late 19 C. G.

Wood base and supports for horizontal coil wound on brass spool; free iron bar (L747,D16) in centre.

2186 UDP272 COIL

Unsigned

L 322-335; MxW 48; TuD 34. Mid to late 19 C. G.

Four; thin copper wire wound on glass tubes; turned mahogany ends; metal boss and brass contact on each; two are marked: "AK2" & "BK2".

2184 UDP270 COIL

Unsigned

HsOD 165, ID 120; H 66. Mid to late 19 C. G.

Mahogany spool housing; insulated twisted copper wire; on one side, three metal bosses for missing insulating rods.

Probably coil belonging to missing Tesla coil apparatus - see 1813 MAY296.

Also coil wound around iron ring (D113) in mahogany ring frame (D139) with two brass contacts, one missing its tightening screw.

2183 UDP269 COIL

Unsigned

Fr 177x98. Mid to late 19 C. G.

For Ampère experiments; rectangular open mahogany frame; multi-turn coil; brass contacts and stand sleeve.

The latter is in the form of a sphere with a pipe (D11) running through it.

2185 UDP271 COIL - INDUCTION

Unsigned

D 124 & 79. Mid to late 19 C. G.

Five; smaller three - copper wire in spiral, red and black; larger two - double spiral, brass contacts, red and green.

2165 UDP251 COIL - INDUCTION

Unsigned

B 128x64x16; CoD 28. Late 19 C. G.

Mahogany base; four feet; two brass contacts to red-covered horizontal coil; metal trough through centre.

2161 UDP250 COIL - INDUCTION

Unsigned

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

L 382; WiD 8; CoOD 78. Late 19 early 20 C. G.

Thick copper wire, wood handles on ends, twisted into five-turn coil around ebonite cylinder; two points on arms.

The copper points are on white-metal blocks with holes and screw clamps for wire inputs - they face each other and would spark if they were held close enough, and the induced current was sufficient.

In the identical instrument 2821 UCP274, the points are replaced by nails, which are arc-welded together when the induced current is large enough.

0938 UDP203 COIL - INDUCTION

Unsigned

B 742x329x125; H 650; L 770; CoHsD 215.

Early 20 C. G.

Oak base and supports for ebonite end housings to yellow-covered coil; top white metal point and plate electrodes.

Two white metal contacts at one end of housing; point electrode slides on scale 20-30; two more white metal contacts on base.

2158 UDP247 COIL - INDUCTION, MEDICAL

HARRY W. COX & CO. LTD. Medical Electricians 47, GRAY'S INN ROAD LONDON, W.C. 1609 C

B 176x127x40; H 184; CoHs 159x110x101.

Early 20 C. G.

Mahogany base and coil housing; input and output contacts.

Two brass contacts at side of base labelled "BATTERY"; two more on top of coil housing on ebonite discs; push-button on side of housing; electrodes gone.

Chalk mark below "Dud" and pencil inscription "Secondary beyond repair"!

0781 UDP048 COIL - INDUCTION, RUHMKORFF

APPS 433 Strand LONDON PATENT No 858

B 442x236x84; CosD 122&67, L 239&345. Late 19 C. G.

Mahogany base; ebonite coil ends; blue velvet cover for secondary; ivory and brass commutator; eight contacts; arc points are brass on universal joints to brass pillars on ebonite insulators.

Attractively refurbished.

Firm was at 433 Strand from 1866 until at least 1900, Downing 1988,4.

0835 UDP101 COIL - INDUCTION, RUHMKORFF

APPS 433 Strand LONDON PATENT NO 944.

B 605x288x104; CosD 160&84, L 358&520.

Late 19 C. G.

Mahogany base; ebonite coil housing; ivory and brass commutator; eight brass terminals; spark electrodes gone; one ebonite and brass pillar for spark electrodes present and one missing.

Firm was at 433 Strand from 1866 until at least 1900, Downing 1988,4.

0836 UDP102 COIL - INDUCTION, RUHMKORFF

APPS 433 STRAND LONDON PATD. 1881-264 NO. 1132

B 599x287x112; CosD 165&82, L 354&510.

Patented 1881.

Mahogany base; ebonite coil housing; ivory and brass commutator; eight brass terminals; spark electrodes on brass universal joints on ebonite pillars.

Similar to RDS instrument 0394 RDS005.

0780 UDP047 COIL - INDUCTION, RUHMKORFF

APPS' INDUCTION COIL MADE BY NEWTON & WRIGHT LTD. ELECTRICAL & SCIENTIFIC

INSTRUMENT MAKERS 72, WIGMORE STREET, LONDON, W. NO. 1593N

B 316x164x80; CosD 101&43, L 185&253. Early 20 C. G.

Mahogany base; two ebonite squares at ends of secondary; ivory and brass commutator; two brass terminals; two more on top of thin ebonite coil cover.

J.R. Millburn, Bull SIS 20,1989,5, records that the firm moved to this address just before World War I.

0793 UDP059 COIL - INDUCTION, RUHMKORFF

Yeates & Son, Dublin

B 598x294x90; CoHsDisD 150&190. Mid to late 19 C. G.

Mahogany base; two vertical ebonite supports for ebonite discs on sides of coil (D115); ebonite disc in centre.

Central disc rests on base and has ebonite housing on top (broken, repaired and again broken) for two brass contacts; base also has four contacts and brass and ebonite commutator plus interruptor system; two of four feet on base missing.

2215 UDP293 COIL - INDUCTION, WEINHOLD

BAIRD & TATLOCK LONDON

Sp 124; CosHsOD 98&45. Late 19 early 20 C. G.

Iron tripod base; pillar to oxidised brass coil housing; larger coil housing attached to handle.

Smaller coil is of thicker insulated wire and is held vertically with its housing on a bar at right-angles to the pillar; both it and the larger coil have two brass contacts; the handle of the larger coil housing, with thinner wire, is in the form of an ebonite bar (D10).

Griffin 1910,785 describes this apparatus as: "Weinhold's Induction Coils. Two coils of thick and thin wire wound on frames to explain induction."

2216 UDP294 COIL - INDUCTION, WEINHOLD

BAIRD & TATLOCK * LONDON

BD 108; 195; CosHsOD 102&50. Early 20 C. G.

More-recent variation on 2215 UDP293; black wood base, pillar, and coil housings; brass fittings.

Handle broken off larger coil housing, which fits snugly over smaller housing; in 2215, the inside diameter of the larger coil housing ring is larger than the diameter of the smaller housing - here they are matched and will stay together when not in use.

Name from Griffin 1910,785.

2243 UDP321 COMMUNICATING VESSELS

Unsigned

BD 132; H 367; W 410. Mid to late 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Glass cylinder goblet; brass side arm with stop-cock; supported limb for one straight and two bent glass tubes.
The side arm (195x18c18) is supported at its other end by a brass pin to the ground; glass tubes are held by brass sleeves; one of the bent tubes has only one slight bend to move tube from vertical; other is bent in a zig-zag with five 180° turns.

0766 UDP035 COMMUTATOR - BERTIN

E. DUCRETET & CIE A PARIS

B 176x123x25; DiBD 66. c1880. F.

Mahogany base; four brass contacts; copper connectors; two brass terminals - one horse-shoe, one straight in centre. Terminals on ebonite disc with handle; when this is moved the copper connectors move from touching one end of the horse-shoe terminal and the straight terminal to the straight terminal and the other end of the horse-shoe.
Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0767 UDP207 COMMUTATOR - BERTIN

E. DUCRETET & CIE A PARIS

B 202x149x33; H 96; DiD 68. c1880. F.

Mahogany base, four feet; four brass contacts; brass springs contact with brass horse-shoe and straight terminals; ebonite disc with handle revolves terminals to disconnect or reverse the current.
Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0926 UDP191 COMMUTATOR - RUHMKORFF

Unsigned

B 161x101x29; CyL 36, D 23. Late 19 C. G.

Mahogany base; two brass mounts hold revolving ebonite cylinder with two brass plates; two springs attached to brass contacts; two other contacts attached to the brass mounts; wood handle to turn cylinder.

2271 UDP349 CONDENSER

KING, MENDHAM & CO ELECTRICAL ENGINEERS BRISTOL.

B 375x241; Hs 349x221x45. 1895-1897. W.

Three; stepped mahogany base and mahogany housing; ebonite plate on top with two brass contacts.
Dates from Crawford 1988,10.

0891 UDP157 CONDENSER - VARIABLE

CONDENSER MICRO-FARADS H. TINSLEY & CO LONDON S.E. No 12648 T. MASON 5, DAME ST. DUBLIN

222X175X175; SHsD 113. c1922. N.

Mahogany case, lid; ebonite top; cylinder scale housing, glass top, scale 0-10 microfarads.

Ebonite top has two contacts "L" & "E"; scale housing cylinder of oxidised brass; ebonite knob turns silvered scale so that any desired division is opposite an arrow.

Morrison-Low 1989,131 gives the T. Mason address from 1900-1916, but No.10534 3069 UDE095 is dated 20:2:1920.

2255 UDP333 CONDENSER - VARIABLE, AEPINUS

Unsigned

B 587x258x30; H 450; DisD 250,258&303.

Mid/late 19 C. G.

Mahogany base; scale board 1-10x2; sliders for insulated pillars for two brass discs; central ebonite disc.

Pillars and mounts for brass discs on turned wood bosses - that for the ebonite disc being stationary, and having an ebonite arc mount for the disc; latter was not with instrument but may belong.

2270 UDP348 CONDENSER BOX

ELLIOTT BROS LONDON STANDARD CONDENSER NO.86

B 415x187; Hs 387x161x132. Late 19 C. G.

"1 MICROFARAD"; mahogany housing, ebonite top; two parallel brass bars; 12 cross bars; 25 holes for keys.

Two brass contacts at ends of bars; brass keys for .001,.002,.002,.005,.01,.01,.02,.05,.1,.1,.2,.5 micro-farads.

2273 UDP351 CONDENSER BOX

W.G. PYE & CO ENG. CAMBRIDGE MICA CONDENSER NO.5880

B 395x186; Hs 374x171x75. Early 20 C. G.

Mahogany housing; ebonite top; two parallel brass bars; five cross bars; 10 holes for ebonite and brass keys; four brass contacts on top.

2272 UDP350 CONDENSER BOX

H. TINSLEY & CO LONDON. S.E. NO 10512 ONE MICROFARAD T. MASON 5, DAME ST. DUBLIN

Hs(+Ld) 367x188x184. 1900-1916. A.

Mahogany housing; ebonite top; brass bars and keys.

Two parallel brass bars; 12 cross-bars; 36 holes for brass keys; two contacts at sides of bars; mahogany lid.

Mason dates from Morrison-Low 1989,131.

2237 UDP315 CONDUCTOR

Unsigned

BD 130; MxH 468; Ds 100,100,75. Mid to late 19 C. G.

Three matching; iron base; brass sleeve; white insulating pillar; grey wood sphere, cone, and tear-drop.

The wood tops fit very imperfectly on the pillars and would appear not to be original; this is supported by insulating stand 2238 UDP316, where the base matches these, but at the top is a well-fitting sleeve with a rod to a brass table.

Second tear-drop shaped wood conductor without a stand.

2192 UDP278 CONDUCTOR - SPHERICAL

YEATES & SON DUBLIN.

B 463x175x24; H 140; SrD 18. Mid to late 19 C. G.

Mahogany base; central rod to brass sphere; one side has foil disc with strip to conductor base; incomplete.

Four mahogany bosses around the foil disc; on the side opposite to this is a hole for a support (D18) for missing part.

0901 UDP167 CONDUCTOR - SPHERICAL

Unsigned

BD 170; H 480; PrD 20; SrD 107. Mid to late 19 C. G.

Mahogany base; brass sleeves for glass pillar; hollow brass sphere with top cut off; sealing wax at contacts between sleeves and glass.

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Also four other conductors - wooden sphere on iron base with brass sleeves and glass pillar (BD107,H340,PrD11, SrD100); brass cylinder conductor with hemispherical ends, without a stand, with a brass rod through the centre (L204,D51); wood cylinder with hemispherical ends on iron base with brass sleeves and glass pillar (BD108,H312, L301,D76); brass sphere (D93); two iron, brass and glass stands.

0853 UDP119 CRYSTAL - ICELAND SPAR

W. LADD & CO LONDON
160x58x58. 1873-1883. F.

Mahogany parallelepiped model breaks in half to give two (white paper-covered) diamond sections; brass studs which fit into holes on the matching face.
Dates from Crawforth 1988,11.

0819 UDP085 CRYSTAL - ICELAND SPAR

YEATES & SON DUBLIN

33x33x26 & 33x30x29; C 140x70x41. Mid to late 19 C. G.

Mahogany cased pair of parallelepipeds, one of which has opposite faces cut to leave equilateral triangles; case has two compartments and is lined with cotton wool; triangle sides 36 and 32.

2142 UDP231 CRYSTAL - ICELAND SPAR

Unsigned (stand base inscribed: "Double Image prism")

45x36x40; HsD 57; StBD 124. Mid 19 C. G.

Crystal in cork surround; double image moves on rotation; brass stand base probably does not belong.

Crystal cross-section is a parallelogram with parallel faces at right-angles to the long side, around which is the cork housing; the stand base is without a pillar and has no necessary connection with the housed prism, except to echo what the prism does to an image seen through it.

0771 UDP039 DIP CIRCLE

Troughton & Simms, LONDON

BD 215; H 335; HsD 252. Second ½ 19 C. G.

Brass; revolving disc base, scale 0-180-170°; glazed vertical housing, glass sides; needle on diagonals.

Base has three level screws and spirit level; needle mount also has spirit level and agate planes for needle axis raised using side knob; silvered scale within housing 0-90-0-90-0°; vernier to read base scale with tangent and clamping screws.

Mahogany case with sliding top (227x81x25) contains three needles all broken to different extents at their axes.

0674 UDP002 DIP NEEDLE

Spencer & Son 19 Grafton St. Dublin

B 458x181x43; NHs 370x63x18; H 240. 1866-1883. A.

Mahogany base - curved corners; brass pillars and open rectangular needle support; flat iron needle.

Dates from Morrison-Low 1989,136.

0874 UDP140 DISCHARGE TUBE

MAX KOHL A.G. Fabrik physikalischer Apparate CHEMNITZ Made in Germany

BD 114; H 420; TuD 15. Late 19 early 20 C. G.

Wood base; glass U-tube; electrodes in open ends.

Black turned base; wire electrodes through corks in upper open ends extend two thirds the way down tubes; brass contacts on top of these.

0834 UDP100 DISCHARGE TUBE

YEATES & SON, 2 Grafton Street, DUBLIN

B 692x71x5; L 670; H 127; TuD 18. 1840-1864. G.

Black wood base; two supports for long glass outer tube; this contains another with coils inside and out; outer tube narrows at ends; inner and outer coils connected to separate terminals.

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

0880 UDP146 DISCHARGE TUBE

Unsigned - Labels with "Bon" & "Pektolith B"

BD 84; H 187; D 58. Mid to late 19 C. G.

Black turned wood base holds egg-shaped glass flask; two side arms with ring electrodes; contains crystals; base cracked and with flaking paint.

0878 UDP144 DISCHARGE TUBE

Unsigned

BD 71; H 319; TuD 50. Late 19 C. G.

Black turned wood base for vertical irregular glass tube; top and side electrodes; at bottom, coral on pillar.

Disc electrode at top of vertical tube; pillar in the shape of a tree with branches; "18/6" hand-written on base.

0877 UDP143 DISCHARGE TUBE

Unsigned

BD 138; H 272; D 138. Late 19 early 20 C. G.

Turned wood base holds glass sphere with two electrode arms, side arms on each with contacts.

One cylindrical arm has a cylinder electrode in a cylindrical metal sheeting attached to side arm contact; other is egg shaped with a disc electrode; at join of this to sphere is another cylinder electrode with one side open and the other closed save for a small hole.

"Vacuum tube to show that cathode rays carry a negative charge" - Baird 1924,584.

0873 UDP139 DISCHARGE TUBE

Unsigned

H 216; MxD 55. Late 19 early 20 C. G.

Glass; ground female opening leads to egg; vertical and horizontal side arms with cylinder and wire electrodes.

2250 UDP328 DISCHARGE TUBE - CROOKES

Unsigned

BD 103; CyD 46; L 292. Mid to late 19 C. G.

Turned wood base; closed horizontal cylinder contains diagonal metal strip with slit attached across tube;

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Disc and point electrodes; the diagonal metal strip (L161,W40) is painted white on one side; at one end it bends in rather less than a right-angle and the cross-piece has a horizontal slit 44mm from the disc electrode.
For showing that the cathode stream is deflected by a magnet - Griffin 1910,960.

2249 UDP327 DISCHARGE TUBE - CROOKES

Unsigned

BD 125; H 270; W 313; MxD 126. Mid to late 19 C. G.

Turned wood weighted base; glass pillar to closed tapering tube; disc electrode and hinged Maltese cross.

"If the cross is allowed to stand across the cathode stream, a sharp shadow will be formed at the end part of the tube. After a while, if the cross is shaken down, the part of the tube which was formerly in shadow will fluoresce more brilliantly than the surrounding parts." - Griffin 1910,959.

0872 UDP138 DISCHARGE TUBE - CROOKES

Unsigned

L 175; MxD 66. Late 19 early 20 C. G.

Glass; tapering; disc electrode at narrow end and hinged maltese cross at wide end; glass tube below.

Maltese cross attached to a contact in side arm below; under centre of tube is attached glass cylinder, ending in a female ground glass joint (L274,D30); a variation of 2249 UDP327.

See Griffin 1910,959.

0881 UDP147 DISCHARGE TUBE - CROOKES

Unsigned - label marked "Bon"

BD 102; H 255; D 82. Late 19 early 20 C. G.

Black turned wood base; spherical glass vessel; disc anode and concave disc cathode; platinum foil in centre.

Anode on top, cathode below; rectangular piece of platinum foil attached to side contact between electrodes.

"Crookes tube with concave cathode and platinum foil in the focus. The platinum is heated to glowing point." - Griffin 1910,962.

0879 UDP145 DISCHARGE TUBE - CROOKES

Unsigned

BD 102; H 275; SrD 94. Late 19 early 20 C. G.

Black turned wood base holds glass sphere on bent tube; four electrodes in side arms, three wire, one disc.

Sphere cracked, but still complete; base cracked.

"..The luminous discharge will pass from the cathode to whichever electrode is made the anode." - Griffin 1910,958.

0875 UDP141 DISCHARGE TUBE - HITTORF SPIRAL

Unsigned

BD 81; H 255; W 210. Late 19 early 20 C. G.

Turned wood base; glass spiral; ends lead to connected bulbs with electrodes; electrodes of wire into glass bulbs and ending close together in the horizontal arm joining the bulbs.

Hittorf's Spiral Tube, to show that when the distance between the electrodes is less than the length of the dark space, the discharge will pass more readily through an alternative route although this may be very much longer - Griffin 1910,955.

0876 UDP142 DISCHARGE TUBE - OSCILLOSCOPE

Unsigned - Made in Germany - attributed to Max Kohl

BD 115; H 447; MxD 37. Late 19 early 20 C. G.

Black turned wood base; bent glass tube leading to vertical glass cylinder; electrodes with short gap.

Cylinder narrows slightly at ends; long wire electrodes at top and bottom through short glass cylinders and extending to meet each other with a gap of only about 2mm.

Similar in design to signed Kohl instrument 0874 UDP140; "this instrument is useful in the detection of inverse current and to indicate the direction of unidirectional current" - oscilloscope tube which can detect if a Coolidge tube is connected the right way.

Quote from Baird 1924,586.

0892 UDP158 DISCHARGER - JOINTED

Unsigned

L 500; SrsD 25; HasD 13. Mid to late 19 C. G.

Pivoted curved brass arms; spheres on ends; on other ends, brass sleeves and glass insulated handles (broken) - one replaced with a capillary tube.

2146 UDP235 DIVIDED CIRCLE

Yeates & Son Dublin

OD 243; ID 202. Mid to late 19 C. G.

Brass ring divided 80-0-90-0-80°, with a hole (D5) at the missing 90° spot; original purpose unknown.

The ring was evidently attached to something at the hole, which has two very small satellite holes; the ring has a small indent at the opposite side to the hole, but it does not go through the ring; the element attached to the hole had slightly tapering edges and W17-20 at the point of attachment to the ring, judging by the shadow it has left on both sides of the ring.

2141 UDP230 DIVIDED CIRCLE

Unsigned

OD 515; ID 471. Mid 19 C. G.

Brass ring divided 10-90-10° on one side and 80-0-80 on other; pivot holes at 90/0° position.

Looks like meridian ring for a terrestrial or celestial globe.

2140 UDP229 DIVIDED CIRCLE

Unsigned

D 319; CeRiD 58. Mid to late 19 C. G.

Brass ring divided 0-90-0-90-0°; four slightly tapering spokes to a central ring; seven (of eight) brass screw feet.

Purpose unknown.

2148 UDP237 DIVIDING ENGINE

Unsigned

B 299x78x54; L 377; H 90; P 132x95. Late 19 C. G.

Iron open-work base; on top, brass plate, scale 0-110; side handle for white metal screw to move plate table.

Red ebonite on turning bar for brass disc handle; this revolves a bar with a brass drum scale 0-45; the bar extends to the screw thread; the divided plate is attached to the moving table with a wing nut, and there is a side vernier 0-10 attached to

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the base; a circular groove D73 is scratched on the plate, a brass screw in its centre; there are four other screw holes on the plate to attach it to the table, but no screws.

0813 UDP079 DRUM RECORDER

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY LIMITED

Sp 331; H355; DrH128, D161. Late 19 early 20 C. G.

Two; red painted iron tripod legs; brass disc on this for metal drum axis; drum has four spokes; pulley drive.

The spokes hold a sleeve at the top which rests on the pointed apex of the axis, and another at the bottom; brass knob turns the drum via double pulley disc.

2231 UDP309 EARTH INDUCTOR - DELEZENNE CIRCLE

GAMBRELL BROS LTD LONDON

B 558x301x31; H 548; RiD 289. Late 19 early 20 C. G.

Mahogany base, supports, square frame, and ring; frame revolves within supports; ring and coil within frame.

Brass fittings; handle above turns ring; below is a commutator with brushes leading to two contacts; one side of support has a tightening screw; the other a scale 90-0-90°; "400 TURNS. 10' DIA" stamped on base.

Name from Griffin 1910,793.

2230 UDP308 EARTH INDUCTOR - DELEZENNE CIRCLE

YEATES & SON DUBLIN.

B 464x189x27; H 623; RiOD 355. Mid to late 19 C. G.

Mahogany base, supports, square frame, and ring; frame revolves within supports and ring and coil within frame.

Brass fittings; handle above turns ring; below is a commutator with brushes leading to two contacts; one side of support has a tightening screw; the other has a silvered scale 0-90-10-90-10-90-0°; ring marked in pencil: "RADIUS = 17cm".

Name from Griffin 1910,793.

0794 UDP060 ELECTRIC DISCHARGE DEMONSTRATION

FERDINAND ERNECKE BERLIN S.W. Hoflieferant Sr. Maj. D. Deutschen Kaisers

B 609x456x35; H 230. Late 19 early 20 C. G.

Wood base; two insulated boxes for bichromate cells; double rheostat; box for fixed and movable electrodes.

The movable electrode can be screwed out from the central wood box using a brass rod with an ebonite handle and attached to a tall brass insulated electrode on the base; cell boxes have brass contacts; double rheostat is on a wood mount; base has four feet.

Workshop founded in 1859, Brachner 1985,139.

2145 UDP234 ELECTRIC MOTOR

E. DUCRETET PARIS RUE CLAUDE BERNARD, 75

B 225x171x60(28); H 237(205). Late 19 early 20 C. A.

Heavy iron base and frame; two cylindrical coils; central wound armature with multi-strip contact to two springs.

Iron base on wood block (heights in brackets without this block); on other side of armature to the two springs are three separate brass complete ring discs with three more spring contacts; the springs lead to five brass contacts on the base.

Anderson lists this address in 1900.

2239 UDP317 ELECTRIC MOTOR

Unsigned

B 393x144x25; H 144; ArMxD 73. Mid to late 19 C. G.

Model; mahogany base; two brass supports to wood and string armature and brass commutator; wood encircling "magnet".

Latter breaks in two parts, one of which, labelled "N" has two brass pins to fit into the base, and the other "S" three; each has a string coil wound around the base; bundles of copper wire form the brushes to the commutator cylinder, which has five brass panels.

2132 UDP226 ELECTRIC MOTOR

Unsigned(?)

BWc365; Hc348. Mid to late 19 C. G.

Mahogany base; decorated green triangle frame for four coils; six-spoked wheel, bars across poles; now missing.

Photograph available, but instrument cannot now be found.

0928 UDP193 ELECTRIC MOTOR

Unsigned

B 191x125x13; H 175. Late 19 C. G.

Mahogany base; green painted iron frame; two electro-magnetic coils; coil armature on laminated frame.

0915 UDP180 ELECTRIC MOTOR

Unsigned

B 190x110x19; H 85. Late 19 C. G.

Mahogany base; brass plate; rectangular iron bridge, two coils on sides; armature; brass and ebonite commutator.

Armature attached to commutator with brass contact; motor at one end of base; two brass contacts at other; instrument rather rickety since a support for the comm-utator end of the armature is missing.

0909 UDP174 ELECTRIC PISTOL

Unsigned

H 110; D 55. Mid to late 19 C. G.

Japanned metal cylinder bottle; arched top and neck for stopper; electric contact in glass sleeve at bottom; the brass conductor for the end of the contact is missing.

A mixture of hydrogen and oxygen is put in the flask and the contact is given a charge from an electrical machine, when the cork is blown out.

Van Camp 1988,43 calls the apparatus a "Volta pistol"; see also Ganot 1890,763.

2154 UDP243 ELECTRIC TROUGH

E. DUCRETET & CIE A PARIS

B 433x78x23; H 81. c1880. F.

Mahogany base on two iron feet and brass level screw; central trough has oxidised brass sides and ebonite ends.

Two brass contacts connect to the sides of the trough to enable a potential difference to be set up between them, though what goes in the centre, and thus the purpose of the instrument, are unknown.

Anderson 1990,25 gives this name for the firm in 1879 and 1880.

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0929 UDP194 ELECTRO DYNAMOMETER

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY

BD 159; H 185; CoHsD 103. Early 20 C. G.

Incomplete; brass base, three level screws; brass revolving frame for double coil ebonite housing.

Each coil has four brass contacts; on top of coil is a brass ring with three securing knobs, presumably for a missing fibre housing.

0870 UDP206 ELECTROLYSIS APPARATUS

Unsigned

BD 130; H 742. Late 19 early 20 C. G.

Black metal base; square-section brass pillar; brackets for two glass burettes joined below; central funnel.

The two burettes have stop-cocks on top and have open bottoms; from the centre of the glass bridge joining them rises a tall glass rod with a pear-shaped funnel and ground glass opening on top; scales on burettes 5-60 ccm.

2214 UDP292 ELECTROMAGNET

Unsigned

B 257x121x39; H 90; CosD 39. Mid to late 19 C. G.

Mahogany base for two slide inserts; each holds a horizontal coil with an iron core; brass contacts.

Apparatus has similarities with the "Faraday Electro-Magnet" shown in Griffin 1910,783, which includes a means of supporting bodies between the polar surfaces (not present here); it also includes a system for studying the action of magnetism on polarised light (also not present here); however, the apparatus here is likely to be used also to look at objects in strong magnetic currents.

2128 UDP188 ELECTROMAGNET

Unsigned

Bc 643x475x115; H c857; MD c75. c1895. D.

"Preston Magnet"; mahogany base, frame and table; iron U core; brass bound coils; movable iron pole pieces.

Coils wound around upper arms of U, their bases resting on the table, on which there is also an ivory and brass commutator. Used by Thomas Preston (1860-1900) for research for his paper "Radiation Phenomena in a Strong Magnetic Field" - Scientific Transactions of the Royal Dublin Society, Series II, Vol.6, 385-392, 1898. Preston discovered the "anomalous Zeeman effect" - relating to the splitting of spectral lines in a magnetic field.

0694 UDP022 ELECTROMAGNETIC INDUCTION APPARATUS

E. DUCRETET ET CIE A PARI

B 630x128x31; H 100. c1880. F.

Mahogany base and two supports; hollow brass tube, strip removed, moving coil; magnet, rod or coil inserts.

The moving coil is around the tube connected to two brass terminals; the cylinder permanent magnet, brass rod with terminals at each end, or coil - with bundle of wires in centre, can be inserted into the hollow tube to demonstrate different induction effects with the moving coil.

Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0922 UDP187 ELECTROMAGNETIC ROTATION APPARATUS

DUCRETET A PARIS No 6599 28

B 204x164x30; CoD 73; DiD 41. Late 19 early 20 C. G.

Mahogany base with four feet; three phase horizontal coil, three brass contacts; central pin for copper disc with agate bearing. Presumably when current is passed through the coil, the disc spins.

Van Camp 1988,89 illustrates a similar instrument which he calls a "Demonstration apparatus on turning current", "This device demonstrates the turning magnetic field generated by the coils when it is powered by a three phase current source", though his has a non-original magnetic needle, not a disc.

0908 UDP173 ELECTROMAGNETIC ROTATION APPARATUS

HARVEY & PEAK LONDON

B 207x120x25; H 296; PrsD 16&10. 1884-1909. F.

Mahogany base; central hollow brass pillar for cylinder magnet; side pillar for wood ring mercury reservoir.

Contacts at bottom of brass pillar and into reservoir; indent on top of magnet for missing part which would connect with the mercury in the reservoir and revolve.

Dates from Downing 1988,57.

2199 UDP285 ELECTROMAGNETIC ROTATION APPARATUS

YEATES & SON DUBLIN.

BD 98; H 155; PrD 28. Mid to late 19 C. G.

Turned wood reservoir base (half gone); copper and brass cage, with small cup on top, revolves around pillar.

0884 UDP150 ELECTROMETER - GOLD LEAF

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD CMBRIDGE. ENGLAND. No 9213

H 156; ChD 75. 1910. N.

Oxidised brass chamber; windows off centre; metal disc below; above, plunger insert with gold leaves; below the chamber is a removable brass circular support for metal disc; stand missing.

Date from Jim Bennett PC.

0770 UDP038 ELECTROMETER - GOLD LEAF

JAMES WHITE. GLASGOW. LORD KELVIN'S PATENT

As 114x112 & 124x112; AcD 117. 1892-1900. R.

Rectangle brass right-angle plates and arc hypotenuse; glass sides; repelling plate and hinged frame for leaf.

Scale on glass sides 0-90; one arm has two contacts, one on an ebonite plate; the other has two screw mounts.

Illustrated in White 1898,51-2.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

0910 UDP175 ELECTROMETER - GOLD LEAF

Unsigned

BD 105; H 148; CyD 84; DiD 65. Mid to late 19 C. G.

Mahogany base; glass cylinder, arched top, red neck; stopper, brass disc above, rod to plate for leaves; actual gold leaves missing from the plate on the bottom of the rod.

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0932 UDP197 ELECTROMETER - QUADRANT, DOLEZALEK

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD CAMBRIDGE ENGLAND 3506, 7060 & 9421

BD 150; H 313&330; HsD 95. Pre 1907 & 1908. N.

Three; cylinder brass housing with window; amber quadrant pillars; only 9421 still has its mirror; 3506 and 9421 are taller than 7060 because they have an adjust screw for the fibre; 3506 has a square window, the others a circular window. Dates from Jim Bennett PC.

0933 UDP198 ELECTROMETER - QUADRANT, DOLEZALEK

W.G. PYE & CO CAMBRIDGE

BD 103; H 330; HsD 101. Early 20 C. G.

Iron tripod legs; brass housing, three level screws; amber pillars for quadrants; torsion fibre and mirror missing; one of the level screws is badly bent.

Instrument illustrated in Baird 1924,563.

0693 UDP021 ELECTROMETER - TORSION, COULOMB

ELLIOTT BROS. 449 STRAND LONDON

BD 330; H 680; HsD 245 & 25; SPD 303. 1864-1886. A.

Mahogany base; glass housing with mirror on bottom; glass scale plate and fibre housing - topped by scale.

Engraved scale on plate on top of lower housing 10-360°; two oxidised brass circular ports at sides of housing; three brass level screws and torsion fibre housing sleeves; silvered circular disc vernier with scale 10-360° attached to brass torsion fibre support.

Dates from Crawforth 1988,8.

2236 UDP314 ELECTROPHORUS

Unsigned

Ds 227&302; HaD 12; SrD 12. Mid to late 19 C. G.

Brass; disc only; sleeve for white insulating handle; attached rod, bent in right-angle, ends in sphere; resin disc gone.

See Griffin 1910,646.

0701 UDP029 ELECTROSTATIC GENERATOR - CARRÉ

Yeates & Son Dublin

B 500x430x42; H 885; CyD 155. c1877. CT.

Open mahogany base; two wood and glass pillars; two ebonite discs counter-rotated; large brass cylinder on top.

A handle and belt drive rotate the discs (D310&450); combs on upper larger disc to one glass pillar and to cylinder conductor, Instrument used for illustration in Molloy's "Gleanings in Science",

Yeates 1877,2-3 offers Carré's Electrical Machine with two plates in five sizes from 5 and 8 inches diameter to 18 and 24 inches - "This machine is a combination of the Frictional and Induction Machine. It consists of two revolving plates; the smaller one, revolving between rubbers in the usual way, is excited by friction and, thus electrified, acts on the large plate by induction. It is an extremely powerful machine, and can be put in full action at a moment's notice."

Van Camp 1988,67 illustrates an example with a glass and an ebonite disc, - a charge is generated by friction on the (lower) glass disc; the lower brass comb transfers this to the ebonite disc and the upper to the cylinder conductor; the was machine introduced in 1868.

0699 UDP027 ELECTROSTATIC GENERATOR - CUTHBERTSON

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST LONDON

B 315x148x21. Late 19 C. F.

Mahogany base and two supports bridged; brass conductors; one plate; leather friction pressure pads; handle.

"Cuthbertson's final pattern" from Turner 1983,188; firm founded in 1884, Downing 1988,57.

0698 UDP026 ELECTROSTATIC GENERATOR - CUTHBERTSON

J. ROBINSON & SONS OPTICIANS 65 GRAFTON ST DUBLIN

B 345x146x22; H 441; DiD 310. 1885-1903. F.

Mahogany base and two supports bridged; brass conductors; one glass plate; friction leathers; handle missing.

Very similar, though not identical, to Harvey & Peak instrument 0699 UDP027.

"Cuthbertson's final pattern", Turner 1983,188; dates from Morrison-Low 1989,133.

0689 UDP017 ELECTROSTATIC GENERATOR - HOLTZ

E Ducretet à PARIS

B 697x399x60; PsD 593&608; H 664. Second ½ 19 C. G.

Open mahogany base; four glass pillars to support conductors; four glass plates - two in centre larger.

Apertures in two larger plates; base also supports a disc with a handle (missing and handle mounts broken) which has a belt drive to another disc with two diameters connecting via another belt drive to the plate axis; brass combs and conductors.

Van Camp 1988,67 notes that this: "is a pure inductive machine; it is not self starting. The combs must be electrified with an ebonite plate rubbed with a catskin."

0889 UDP155 ELECTROSTATIC GENERATOR - VOSS

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST LONDON

B 441x237x38; PD 266; H(-PTO) 361. Late 19 C. F.

Mahogany base and support for axis; larger plate gone; iron brackets for handle axis; comb conductors.

Smaller plate broken (half remains); handle missing; belt drive for plates; one of the double-comb conductors has brass arms at each side which connect to leyden jars (missing - but mountings for them on base).

Name from Deschanel 1891,583; firm founded in 1884, Downing 1988,57.

0940 UDP208 ELECTROSTATIC GENERATOR - WIMSHURST

PHILIP HARRIS & CO LTD BIRMINGHAM & DUBLIN Scientific Instrument SPECIALISTS

B440x220x110; H522; PsD310; ToPsH450.

1902-1911. F.

Open wood base and supports to axis of ebonite plates; foil strips; pulley drive; white metal conductors.

Two discs on base for leyden jars (D53,H185); four turned wood feet; metal and ebonite handle to turn pulley drive.

Dates from Morrison-Low 1989,126.

2124 UDP054 ELECTROSTATIC GENERATOR - WIMSHURST

YEATES & SON DUBLIN

B 530x314x30; AxH 372. Fourth ¼ 19 C. G.

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Open mahogany base, supports to axis, and pulley wheels; two brass and ebonite pillars, spheres on top; rest gone.
Brass spheres (D40) on top of the insulating pillars have bars through their centres, with a smaller sphere (D24) on one end;
brass handle to turn pulley missing outer wood part.
Machine invented in 1883, Van Camp 1988,63.

0778 UDP045 ELECTROSTATIC GENERATOR - WIMSHURST

YEATES & SON DUBLIN

B 533x303; AxH 335; PsD 382. Fourth ¼ 19 C. G.

Open mahogany base and supports; broken ebonite plates; brass comb conductors on black glass pillars; two wood discs on iron handle for counter-rotating plates.

2144 UDP233 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned

B 486x267x45; AxH 387. Late 19 C. G.

Open mahogany base; two wood pulley wheels to counter-rotate missing discs; axle with conductors; two combs.

Base has two metal sleeves (D57) for missing Leyden jars; from the base rise two brass sleeves and glass pillars to brass double-sphere conductors attached to the black metal combs, which would have been around the missing rotating discs; a "necklace" of brass beads with two hooks at ends hangs from one of the conductor spheres.

0761 UDP030 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned

B 591x387x155; H 654; CysD 454&445. Late 19 C. G.

Open mahogany base; Wimshurst type machine but with two concentric ebonite cylinders rather than disc plates.

The cylinders have tin foil strips; the base has four black wood turned legs and two black wood turned pillars above ending in brass spheres attached to brushes on each side of the cylinders (outside brush on one side detached); mahogany supports from centre of base to axis of cylinders, which are closed at one side and open at the other; belt drives revolve the cylinders in opposite directions.

0937 UDP202 ELIHU THOMSON APPARATUS

GRIFFIN GRAMME STANDARD LONDON

B 305x250x32; H 280; CoD 44&37. Early 20 C. CT.

Mahogany base; vertical coil wound around core of metal wires, wider at the bottom than the top; mahogany ring on three insulating pillars at about half height.

Cylinder copper (or brass?) sleeve fits over coil inside ring; heavy copper ring with water jacket and curved spout sits on mahogany ring.

Shows repulsion between electro-magnet and conducting ring; water in copper ring will turn to steam blowing cork out of curved spout when electro-magnetic repulsion is experienced.

Described in Griffin 1910,794; Van Camp 1988,82&84 describes an earlier version of the apparatus.

2180 UDP266 EXPANSION APPARATUS

Yeates & Son Dublin

H 153; W 51. Mid to late 19 C. G.

Missing bars, when expanded, push up three brass pivoted rods which, in turn, push pivoted and sprung mirrors.

A stand for the apparatus is missing; this would have screwed into a hole in the brass plate holding the rod and mirror pivots; an ebonite plate extends from the brass plate and ends in an oxidised brass fitting to hold the bottoms of the expanding bars; actual mirrors, which would have been stuck to the pivoted disc mounts, are now gone.

More complete instrument 1284 TDP044.

0814 UDP080 EXPANSION APPARATUS - BAR BREAKER

YEATES & SON DUBLIN PATENT

BL 453x85x40; H 133; BrL 367, D 14. Mid to late 19 C. G.

Red painted iron base; supports at each end for rod, screw thread at one end, hole for breaking bar at other.

Base has three feet and broken gas heating element which fitted under the rod.

0867 UDP133 EXPANSION APPARATUS - FERGUSON

Unsigned

B 447x118x33; BrL 430,D4; SR 109. Mid to late 19 C. G.

Wood base; two brass supports for heating tube; bar above, end moves pointer to read 90° brass arc scale.

Heating tube a brass cylinder with wick inside and lever at one side to close off cylinder putting out flame; the bar to be heated is supported on two brass pillars; it is clamped at one end and the other pointed end touches a small plate attached to the pointer; scale 0-90°.

"Ferguson's pyrometer" - similar to Yeates 1883,9 illustration.

0772 UDP040 EXPANSION APPARATUS - 'S GRAVESANDE

W B NICOLSON GLASGOW.

H 273; BaD 38; RiD 53; PrD 10. Early 20 C. G.

'S GRAVESANDE pyrometer; iron tripod foot; brass pillar, movable ring; arm and hook for ball and chain.

Ball will fit through ring when cold but not when hot; chain and ball can be removed for heating.

Also larger iron ball (D70) with two ring suspension (ODs24&51) for older pyrometer, the rest of which is now gone.

0832 UDP098 EXPANSION APPARATUS - TWO METALS

YEATES & SON DUBLIN

L416; Br246x13; SP58x30; HaD21. Third ¼ 19 C. CT.

Wood handle holds bar, copper on one side and iron on other (brass rivets); pointer reads white scale.

Only zero numbered on scale with two divisions on each side; scale has brass back attached by bent bar to handle.

When one side expands relative to other, the pointer moves over the scale.

Catalogue description "Apparatus for showing unequal expansion of iron and copper Yeates & Son's improved" - Yeates 1883,7.

2218 UDP296 EYEPIECE - MICROMETER

Yeates & Son. DUBLIN.

L 128; W 86; Hs 55x32. Mid to late 19 C. G.

Brass; optical tube, missing lenses; at right-angles, housing for slit adjusted by drum micrometer 0-90°x2; housing has letter "B" inscribed.

Another smaller micrometer eyepiece (L98,W78), also missing its optics, is similar except it has a silver vernier in the housing.

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Also a plate glass square (9x9) in a cork surround with brass housing to fit into missing instrument - signed: "Yeates & Son Dublin".

0907 UDP205 FARADAY NEEDLE

Unsigned

B 214x111x43; H 267; RssD 66. Mid to late 19 C. G.

Mahogany base; two magnets with mercury reservoirs rise from this; central T-bar, cups to suspend needles.

Shaped base has four feet; magnets slightly tapered; wooden rings on top for mercury with brass contacts; central brass pillar has insert which can be moved up or down.

Suspended copper needles would rotate around the magnet, their lower ends running in the circular troughs of mercury.

Griffin 1910,789 shows single needle example.

0768 UDP036 FARADAY WHEEL

E. DUCRETET & CIE A PARIS

B 221x149x32; H(-Wh) 250. c1880. F.

Mahogany base; vertical horse shoe magnet; extending brass pillar for mercury reservoir between poles.

Magnet has straight parallel poles; the ebonite reservoir can be adjusted between these; on top of poles are housings for axis of wheel (missing); two brass contacts and brass block to hold magnet on base.

Example described as "Roue de Faraday" in the Conservatoire des Arts et Métiers in Paris; it is also by Ducretet, and dated 1894.

Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0927 UDP192 FARADAY WHEEL

HARVEY & PEAK LONDON

B 355x152x27; ML 183, W 115; WhD 78. 1884-1909. F.

Mahogany base; horizontal magnet with coils around arms; copper wheel between poles; pulley drive system.

Base has one of four feet missing; on the axis of the wheel is a disc (D25) which can be attached by a belt drive to a cooper disc (D78) with a handle.

When the driving disc is rotated, a current is generated whose direction does not depend on the direction of rotation of the disc; on the other hand, the direction of the wheel rotation does depend upon the direction of an applied current.

Name from Griffin 1910,788; dates from Downing 1988, 57.

0837 UDP103 FIRE SYRINGE

Unsigned

L 380&365; D 27&30; HasD 46&47. Mid to late 19 C. G.

Two; thick glass cylinder, tight fitting piston attached to metal rod; brass fittings; wood handles.

One handle unscrews to allow tinder to be inserted; smaller syringe is missing piston handle.

Name from Preston 1894,37.

2178 UDP264 FOUNTAIN

Unsigned

BD 82; VMxD 105, H 123; TuD 11. Mid to late 19 C. G.

Glass squashed sphere flask; brass sleeve for broken glass capillary tube to second sleeve for missing flask.

Lower flask has glass disc base; upper glass flask broken at brass sleeve attaching it to the top of the capillary tube.

0700 UDP028 FRICTION HEATING APPARATUS - CALLENDAR

CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD ENGLAND NO 2319 CALLENDAR'S PATENT

Sp 334; H 609; WhD 293. Pre 1907. N.

Iron tripod foot; driving wheel; brass calorimeter.

The foot holds a T-cross-section mount for a table; bracket on this holds axis for black metal driving wheel (with handle) which turns the calorimeter; brass pillar from table has clamp for thermometer at centre of calorimeter; ribbons and weights missing.

0791 UDP057 GALVANOMETER - ASTATIC MIRROR

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY 1884 No 27

BSis 150&61; H 513. 1884. S.

Six-sided ebonite base; vertical brass plate, arched top; four coils on ebonite mounts; curved magnet on top.

Base has three level screws and four contacts (centre two

can be shorted); two coils on each side on arched ebonite plates; windows between top and bottom pairs of coils; mirror appears to be missing from top window; magnet on top can be moved up and down.

0792 UDP058 GALVANOMETER - ASTATIC MIRROR

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY 1888 No 28

BSis 150&61; H 513. 1888. S.

Six-sided ebonite base; vertical brass plate, arched top; four coils on ebonite mounts; curved magnet on top.

Base has three level screws and four contacts (centre two can be shorted); two coils on each side on arched ebonite plates; windows between top and bottom pairs of coils; mirror (corroded) in top window; brass sphere weight in lower; magnet on top can be moved up and down.

0783 UDP050 GALVANOMETER - ASTATIC MIRROR

YEATES & SON DUBLIN

H 209; CoHsD 61, W 35; ML 117, W 12.

Mid to late 19 C. CT.

Ebonite and brass housing; curved permanent magnet; base gone; above housing, brass pillar holds movable magnet.

Torsion fibre (missing) for small magnet in centre of coil, attached below to a bracket holding a mirror (red back - now detached) in a glass cylinder housing with rounded closed bottom; pillars and base missing.

S.M. Yeates improved Sir William Thomson's reflecting galvanometer - Yeates 1877,26.

0934 UDP199 GALVANOMETER - AYRTON MATHER

AYRTON-MATHER GALVANR PATENT SUPPLIED BY GRIFFIN LONDON Nos 434, 604 & 691

BD 177; H 195; HsD 132. Late 19 C. G.

Three; coil numbers 1056, 1368 and 1435; cylinder housing; ring magnet; coil enclosed in narrow cylinder (D6).

One (434) has brass cylinder housings, but others have tin housings; bases have three level screws and two contacts; mirror missing in all cases; torsion fibre complete in 691; the signatures on 604 and 691 do not include the words "SUPPLIED BY GRIFFIN LONDON".

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0844 UDP110 GALVANOMETER - AYRTON MATHER

Unsigned Nos 1937A & 1937B

B 240x170x19; H 382; CoHsD 41. 1937 (?). S.

Two matching inserts for (missing) galvanometer on wood base; brass; detachable cylinder coil housings.

Leather lining in coil housings; long brass fibre housing (D41); rectangular copper coils; oxidised brass viewing window between coil and fibre housings; torsion fibres and mirrors missing.

A similar complete instrument is illustrated in Van Camp 1988,110, which notes that the "galvanometer has an exchangeable moving-coil system".

Van Camp 1988,106&110.

0935 UDP200 GALVANOMETER - BROCA

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD No 6969

BD 171; H 250. 1908. N.

Brass; vertical support for ebonite coil housings; window for mirror; ball socket on base for magnet.

Base has three insulated level screws, two spirit levels and two contacts; torsion fibre adjust screw on top; two coils - 48.0 W at 15°C and 47.3 W at 15°C.

Name from Griffin 1910,732; date from Jim Bennett PC.

0936 UDP201 GALVANOMETER - CAMPBELL VIBRATION

ROBT. W. PAUL., London. N. No 112

BD 136; H 230; HsD 103. Late 19 C. N.

"Campbell unifilar vibration galvanometer"; brass, black metal housing; ring magnet; fibre for coil between poles.

Ebonite top; base has three level screws and two contacts; tiny coil between poles supported by (broken) torsion fibre.

Firm operated from 1891-1919, Cattermole 1987,98-104; low serial number suggests early date.

0925 UDP190 GALVANOMETER - CURRENT

J. WHITE GLASGOW. SIR W. THOMSON'S PATENT No 260 '93

B 326x151x52; CoD 88; AcD 114, H 28. August 1893. S.

Mahogany base; boxwood scale; six-turn coil; moving magnetometer in arc housing; semicircular magnet.

Magnetometer in right-angled arc oxidised brass housing, scale 40-0-40, with double pointer and mirror below, jewelled bearing, thick glass top, two curved arms at sides, one with bubble level; base has scale 1/4, 1/2, 1, 2, 4, 8, 16, 32, 43.46; red and blue magnet (could belong to potential galvanometer 0924 UDP189) has written: "I=14.117 AUG. 4th '93".

Instrument in parts - completed by reference to 0219 QUB015.

0679 UDP007 GALVANOMETER - D'ARSONVAL

J. Carpentier Paris Galvanomètre Deprez d'Arsonval

BD 194; H 305; DoD 174. Post 1878. R.

Mahogany base; three U-shaped permanent magnets; rectangular coil (mirror attached) moves around cylinder.

Three brass feet and two contacts; brass pillar curved at top to hold torsion fibre (missing); cylinder of silver metal; covered by glass dome with oxidised brass framed circular port.

Jules Carpentier succeeded Ruhmkorff in 1878, and was active until at least 1901-2, Brieux 1980,36.

2211 UDP289 GALVANOMETER - D'ARSONVAL

Gambrell Bros. Ltd London Nos 167, 5315, 5316, 5364, 5616 [On 5616] T. MASON 5, DAME ST., DUBLIN

BD 132; H 184; HsD 106, H 142. 1900-1916. A.

Five; mahogany base; ring magnet and metal cylinder housing.

Housing top not blackened; housing has circular window (D38); base disk has three brass level screws and four contacts, two of which can be short-circuited by means of a bar; inside, coil on white rectangular frame with mirror moves around metal cylinder; brass bracket for fibre; 5315 is incomplete.

Also zinc/copper electrodes, mahogany top: "GAMBRELL BROS"; and key switch on ebonite base: "GAMBRELL BROS. & CO LTD. LONDON".

Mason at this address from 1900-1916, Morrison-Low 1989,131.

2157 UDP246 GALVANOMETER - D'ARSONVAL

NALDER BROS. & CO. WESTMINSTER NO. 18,612

BD 150; H 274; CyD 90, H 242. 1890-1910. F.

Brass disc base and cylinder housing; three level screws; black magnet; copper coil around blue metal cylinder.

Fibre with mirror to suspend copper coil in centre of magnet is broken, and mirror is missing; cylinder housing has an oxidised brass framed circular window (D38); base has two brass contacts on ebonite discs.

The firm issued catalogues from 1890-1901, Anderson 1990,57-8.

0931 UDP196 GALVANOMETER - D'ARSONVAL

J. PITKIN. LONDON. No. 330

H 174; W 159; MD 76. Late 19 C. G.

C-shaped ebonite base; laminated magnet, incomplete ring; metal cylinder between poles; brass fittings.

Base has three brass level screws and two brass contacts; magnet has brass plates top (with two contacts) and bottom; brass pillar at back holds adjustable bracket for torsion fibre; this, the coil (which would have been around the metal cylinder, (H29,D21), and the mirror are all missing.

Downing 1988,103 gives dates 1858-1949 for the firm of James Pitkin.

0930 UDP195 GALVANOMETER - DEAD BEAT MIRROR

W.G. PYE & CO CAMBRIDGE 7925B

H 183; HssD 89 & 23; Early 20 C. G.

Moving coil; black metal cut-off cylinder housing; three brass level screws; brass fibre housing.

Bubble level, a later addition on top of coil housing, masks signature; two brass contacts on top; mirror attached to moving coil, not fibre; mirror window on flat side of housing; lever labelled "clamped" and "free" below main housing; knob on top of fibre housing - labelled "set zero".

Instrument illustrated in Baird 1924,452.

0924 UDP189 GALVANOMETER - POTENTIAL

J. WHITE, GLASGOW. SIR W.M. THOMSON'S PATENT No 254

B 393x151x72; CoD 135; AcD 114, H 28. 1893. SI.

Mahogany base; boxwood scale; heavy coil; moving magnetometer in arc housing; semicircular magnet gone.

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Magnetometer in right-angle arc oxidised brass housing, scale 40-0-40, with double pointer and mirror below, jewelled bearing, thick glass top, two curved arms at sides, one with bubble level; base with heavy coil "1664 yards of No 32 G.S. wire with 4520 convolutions, resistance 5463 ohms at 16°", scale marked 1/6, 1/8, 1/4, 1/2, 1, 2, 3.44; current galvanometer 0925 UDP190 No 260 has magnet date 4:8:93 which could belong to this.
Instrument in parts - completed by reference to 0218 QBP014.

2152 UDP241 GALVANOMETER - TANGENT, GAUGAIN

* ELLIOTT BROTHERS * 449 * STRAND LONDON

Sp 256; BD 230; H 445; CoHsD 337. 1864-1886. A.

Mahogany disc base, table, and pair of coil housings; three brass level screws; centre now altered.

Four brass contacts on ebonite bar on table above disc base; multi-turn coils on each of the circular housings, which have one diameter spoke; single-turn copper coils are missing, and the instrument no longer turns about its base; in the centre now is an oak frame to support a revolving copper disc with electrical brush contacts.

"Gaugain" from Griffin 1910,742; Baird & Tatlock 1924,448 call it "Helmholtz"; dates from Crawforth 1988,8.

0782 UDP049 GALVANOMETER - TANGENT, GAUGAIN

Yeates & Son Dublin

B 241x151x13; H 348; CoHsD 336. Mid to late 19 C. G.

Wood base, rectangular, rounded ends, holds pair of wood housings for two parallel coils; magnetometer gone.

Coil housings have a single spoke in the middle and are 125mm apart; a crude wooden platform replaces the pillar and magnetometer in centre.

0917 UDP182 GALVANOMETER - UNIPIVOT NEEDLE

CAMBRIDGE INSTRUMENT CO. LTD. ENGLAND No 969 & 970

178x171x58. Pre 1907. N.

Two; mahogany housing; cut-off arc scale 60-0-60, with parallax mirror; two front contacts.

969 has "Patt.K CU. RES. 8.92 OHMS at 20°C"; 972 has same but 13.5 OHMS.

Date from Jim Bennett PC.

0765 UDP034 GALVANOMETER - UPRIGHT

E. DUCRETET & CIE A PARIS

H 565; CoHs 233x136x44; M 174x11. c1880. F.

Brass tripod foot and stand; mahogany coil housing; moving magnet; white arc scale 40-0-40 on open fan.

Base has three level screws; pillar adjusted with rack and double pinion knobs; green-covered wire on coil; four brass contacts at back; magnet rests on knife edges at top of coil; needle (missing) attached to this reads scale at top of open fan-shaped brass scale holder.

Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0916 UDP181 GALVANOMETER - UPRIGHT

YEATES & SON, DUBLIN.

B 220x140x41; H 255; SW 314. Mid to late 19 C. G.

Mahogany base; green coil on elongated O-shaped brass housing; moving magnet; pointer to wood fan scale.

Scale 40-0-40 has white front; two of four feet on base missing; coil of green wire.

2223 UDP301 GALVANOMETER SCALE

Unsigned A 3611 (signature disc missing)

Hs 553x71. Mid to late 19 C. G.

Mahogany frame holds yellowed perspex-like scale 0-500 cm; two knurled brass knobs on side for missing support; one side of the frame is missing.

2167 UDP253 GLASS BELL JAR

Unsigned

BD 149; FrSp 228; H 450. Late 19 C. G.

Open bottom; metal clad neck and stop-cock on top; three metal spokes below cock hold screwed-on legs.

Purpose unknown.

2149 UDP238 GOBLET

Unsigned

BD 120; H 472; CyD 90. Mid 19 C. G.

Glass; disc base has turned stem leading to a tall cylinder vessel; "P L Nat. Phil 6" scratched on sides.

0824 UDP090 GONIOMETER - CRYSTAL, WOLLASTON

Yeates & Son, Dublin.

D 112; H 146. Mid to late 19 C. G.

Brass; base missing; tapering pillar holds cube; two brass discs with silvered scale and vernier on this.

Scale on one disc goes all the way around 0-360°, other has vernier 0-30; former disc is revolved by a knurled knob on the other side of the cube; rest of instrument missing.

2139 UDP228 GRAPHOMETER

Unsigned

D 165; L 393. Late 17 early 18 C. G.

Brass; incomplete; semicircular; scales 10-180, 360-290, 10-180°; fixed and moving alidades; no compass.

Instrument base consists of an alidade (L393,W26), with a spoke at right-angles, both of these supporting the semicircular scale, which has a curved decoration on top; the moving alidade is only half the length of the base alidade and now has two modern double spring clips crudely soldered onto it.

2126 UDP178 GRATING - DIFFRACTION

Ruled on Prof Rowland's Engine John's Hopkins University Baltimore Md, USA 1894

Plate prepared for ruling at the Astronomical and Physical Instrument works of J A Brashear, Allegheny Pa, USA 1894

[Inscribed on other side] 1st spectrum bright on one side 2d and 3d spectra bright on opposite side JAB

Gt 147x45; P 161x135; C 241x182x94. 1894. S.

Ruled on speculum metal plate; in boxwood housing 180x150x38 with handle and sliding lid; mahogany case.

Tesseract 10,1985,6 records that Henry Augustus Rowland (1848-1901) was an extraordinary physicist/ engineer, who made landmark progress in the design and manufacture of ruled gratings, his ruling engines being the best in the world for several decades - John Alfred Brashear (1840- 1920) was a mechanical genius who produced numerous superb telescope objectives,

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and who excelled at creating extremely accurate surfaces (uniform to 1/5 of a light wave!) on speculum metal plates for Rowland's gratings.

0691 UDP019 GRATING - DIFFRACTION

Made A.E. Ruled on Rowlands Engine Johns Hopkins University Baltimore Maryland U.S.A.
Plate prepared at the Astronomical & Physical instrument works by J A Brashear Allegheny City USA.
Plate has 14400 lines to 1 inch 568 lines to 1 mm
YEATES & SON DUBLIN
BD 85; H 110; Mo 77x75. Late 19 C. R.
Oxidised brass mount; speculum metal; 14400/inch.
Base disc has three feet, two adjustable; this holds square mount with circular aperture (D55) for rectangular grating (46x33); mount can be adjusted back and forth with a knob behind mount supported on a Z-shaped pillar fixed at its centre.
Bennett 1984a, 100-2 records Rowland gratings dated between 1888 & 1891.

0692 UDP020 GRATING - DIFFRACTION

THORP'S Transparent Replica Rowland Metal Diffraction Grating of 14,850 lines to the inch.
The surface of the Grating must not be touched.
51x38x3; Gt 26x23; C 63x51x17. Late 19 early 20 C. G.
Glass plate with thin transparent grating; in case.
Mottled brown paper-covered case with blue velvet lining; grating damaged.
Legend on paper above and below; the 14,850 has been crossed out and 15043 hand-written in its place.
Another case is present, but the grating is missing.

0776 UDP043 GRATING - DIFFRACTION

Yeates & Son Dublin.
BD 69; Hs 54x52x13. Mid to late 19 C. G.
Brass disc base; square brass housing with circular aperture for grating ruled on metal; 14438 lines/inch; base has three level screws.

2127 UDP179 GRATING - ECHELON

Unsigned but with manuscript signed "Adam Hilger"
Sp 98&185; BP 189x67; H 71. 9:6:1900. D.
Brass base plate and blackened frame; three level screws; 25 plate glass echelon; with instruction manuscript.
Three page hand-written foolscap manuscript signed Adam Hilger, dated 9 June 1900, giving instructions for the Michelson Echelon Diffraction Grating - "For the theory of the Echelon see Michelson's paper in the Astrophysical Magazine for June 1898."
Adam himself died in 1897 (Cattermole 1987, 142), so the manuscript cannot actually be written by him, rather signed on behalf of the firm.

2194 UDP280 GUINEA & FEATHER APPARATUS(?)

Unsigned
L 655; TuD 56; SvMxD 67. Mid 19 C. G.
Glass cylinder; brass ends - one has a hole now covered by glass slide; second, tapering screw-in for glass disc.
Presumably the end with the slide once had a pipe with a stop-cock to allow evacuation of the tube.
Purpose guessed since tubes like this seemed to have been used for this experiment.

0812 UDP078 GYROSCOPE

Sole Makers Newton & Co., 3 Fleet St., London BRENNAN'S PATENT
H 446; FrW 118; D 13; RiD 93. Late 19 early 20 C. G.
Oxidised brass frame, three cross bars; rotating brass ring supports brass gyroscope.
Latter (D75) on an iron axle with tension adjust screws at each side; frame is pointed at bottom and ring is between top two cross bars.

0815 UDP081 GYROSCOPE

Made by Yeates & Son, Dublin
B 151x81x17; H 148; DiD 56. Mid to late 19 C. G.
Wood base; iron plate; right-angled blue pillar; brass gyroscope between base plate and (missing) top circle.
Pillar has T-shaped section; one long (bottom) and one short needle supports on either side of gyroscope.
Ducretet 1906, 12 describes this as: "Tore à rotation périmétrique de M.G. Sire" (1862).

2228 UDP306 GYROSCOPE

Unsigned
H 155; HsOD 87; RiOD 64; DiD 46. Mid to late 19 C. G.
Metal pin leads to semicircular brass housing; in this revolves brass ring, and in this copper gyroscope disc; knurled tightening screw at one side of housing.

0673 UDP001 HELIOSTAT - STONEY

SPENCER & SON DUBLIN
B 409x164x26; TH 119, D 133. 1864-1886. F.
Mahogany base; oxidised brass disc and pillar to brass hours table; space for driving clock (missing).
Usual Stoney arrangement on top - but mirror missing; below table is a pulley wheel attached to the sun sight arm which would have been driven by the missing clockwork mechanism on the other end of the base.
Mirror housing subsequently found (150x78), metal with two brass counterweights behind and wire arm - it is not certain that it belongs to this heliostat, but seems certainly to be a Stoney type mechanism.
Dates from Morrison-Low 1989, 136.

2256 UDP334 HOPE APPARATUS

Unsigned
BD 122; 129; CyD 90; H 308. Mid to late 19 C. G.
For maximum density of water; glass cylinder with central brass reservoir; two ports for thermometers.

2275 UDP353 HYDROMETER

Unsigned
Universal Arometer from 0,700 to 2,000 Tp: 15°..C
L 433; RsMxD 17; SCyHsD 17. Mid to late 19 C. G.

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Glass; narrow elliptical mercury reservoir; slim stem to wide cylinder scale housing; paper scale.

Plus three others.

Second instrument: "Hydrometer from 700 to 1000 Specif. Gravity Temp. 60° F" (L330,CyD21).

Third also has scale 700-1000 (L222).

Fourth: "Twaddells [sic] Hydrometer No.3. Temp. 60°Fah", SC monogram [large S through small c] (L225,BuMxD26); all are glass/mercury with paper scales.

0871 UDP136 HYDROMETER - TWADDELL

Unsigned Twaddell's No 1, Made in Germany

H 157; BuD 17. Late 19 early 20 C. G.

Glass; elliptical mercury reservoir; paper scale 0-24.

Three other hydrometers - scales 2x700-850, 1x700-1000.

All glass with elliptical mercury reservoirs and paper scales.

Others H 219, 314, 328, BuD 25, 18, 20.

0808 UDP074 HYGROMETER - DINES

L. CASELLA LONDON MAKER TO THE ADMIRALTY & ORDNANCE

B 392x94x57; H 200; Ch 155x94x75. Late 19 C. G.

Mahogany base and chamber housing; tin lining for chamber; brass stop-cock and curved outlet; thermometer.

Latter has scale 30-100°; black glass with hand engraved signature: "L. Casella London".

0951 UDP118 HYGROMETER - DINES

Signature plate missing - attributed to L. Casella.

B 354x69x44; Ch 142x71x71. Late 19 C. G.

Mahogany base and chamber housing; tin lining for chamber; stop-cock; copper outlet tube; black glass.

Similar to 0808 UDP074 but smaller and less solid; signature plate missing but circular space for it like that on 0808; chamber top and glass framed in brass.

0807 UDP073 HYGROMETER - REGNAULT

Yeates & Son. DUBLIN.

H 262; FrH 147; HsD 16; PrD 9. Mid to late 19 C. G.

Green painted tripod foot; gas inlet at base; brass T-shaped support; silver thimble housings for two thermometers.

One thimble has an air inlet and thermometer scale 0-50°; other without, scale 10-70°.

2190 UDP276 HYPSONETER

Unsigned

BD 40; H 372. Early 20 C. G.

Brass; cylindrical; shield for candle to heat chamber for thermometer bulb; chimney with boxwood disc above.

Chamber has three pipes turned 180 degrees below; and has three vents to the outside sloping from the candle shield.

0838 UDP104 ICE MOULD

Unsigned

D 94&127; H 42&129. Mid to late 19 C. G.

Two; each made up of two cylinder wood blocks; one set with biconvex indents, one set with concave/convex; joined by pillars. In the larger, the connecting wood pillars project above the top of the upper cylinder; in the smaller the pillars are brass and do not.

Ducretet 1906,140 describes the instrument as: "Moules en bois pour répéter les expériences de Tyndall sur le regel; ces expériences font comprendre comment peut avoir lieu l'écoulement lent des glaciers....donnant, par compression, une lentille.."

0845 UDP111 IMPEDANCE ARCH

Unsigned

BD 90; H 396; W 125. Late 19 early 20 C. G.

Turned black wood base; copper wire passes through rising vertically to arch and back; three bulb contacts.

When current is passed through the wire, it will apparently go through the bulbs rather than around the arch?

0906 UDP172 INDUCED CURRENT HEATING RING

Unsigned Made in Germany

H 84; RiD 76; HasMxD 26. Late 19 C. G.

Brass ring with reservoir containing low melting point metal held by three white delph handles.

An induced current will cause the metal to melt.

2221 UDP299 INTERRUPTOR

Unsigned (signature disc missing)

B 170x170x29; H 50; CoHsD 24. Mid to late 19 C. G.

Hard wood base; four brass contacts and copper strips; central coil on wood bobbin; iron make-break bar.

Two of the terminals labelled "2" & "3" with ivory discs - spaces for "1" & "4" but discs missing.

0803 UDP069 KALEIDOPHONE - WHEATSTONE

RK (Rudolph Koenig monogram)

BFr 250x141x14; H 345; Sp 370&262. Late 19 C. CT.

Black metal open rectangular frame; four feet, one with brass level screw; six varied rods on brass discs.

Tesseract 44,1994,50 records that the kaleidophone was invented by Wheatstone c1826 following studies on Chladni plates and musical acoustics; he published the details in the Proceedings of the Royal Institution in 1827 "Description of the Kaleidophone or Phonic Kaleidoscope: a new Philosophical Toy, for the Illustration of Several Interesting and Amusing Acoustical and Optical Phenomena"; little silvered glass spheres were mounted on top of the rods with sealing wax; when struck, the rods would vibrate with compound standing waves made visible by the Lissajous patterns traced out by reflection of a point source (e.g. a candle); due to persistence of vision, one sees a pattern of lines and not just a moving point of light. Name from Koenig 1889,88.

0841 UDP107 LAMP - CARBON ARC

SOCIÉTÉ DES LAMPES ELECTRIQUES FRANCAISES SYSTÈME REYNIER BTÉ S.G.D.G.

SAUTEUR FRERES CONSTRUCTEURS No75

BD 122; H 478; PrD 23. Mid to late 19 C. G.

Brass; tall pillar; grinding wheel; curved housing

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Base has three terminals; the curved housing on top is in the form of two arcs holding a hinged limb with a round hole (for the carbon?); below this is the grinding wheel on a pivot from the pillar.

0953 UDP156 LAMP - ELECTRIC

E. DUCRETET A PARIS

B 200x163x29 & 193x162x29; H 118 & 89.

Late 19 early 20 C. G.

Two; mahogany base with four feet; three brass contacts; three wood cylinders each with two small and one larger coil for three bulbs.

Second similar instrument with same signature, but missing bulbs, and with additional communal contact in centre.

0883 UDP149 LAMP - MINER SAFETY

Unsigned

H 230; DisD 52; TuD 34. Mid to late 19 C. G.

Iron disc base; top ebonite disc, two brass contacts; glass geissler tube and coil between, egg-shaped ends.

Two thin pillars between base and ebonite disc; wire contacts in egg-shaped bulbs; coil protected by glass cylinder with side arm for evacuation; requires battery and induction coil for operation.

2181 UDP267 LENS - BICONVEX

A. HILGER LONDON

HsD 132; H 211. Late 19 early 20 C. G.

Brass sleeve (for missing stand) leads to oxidised brass circular housing for biconvex (cracked) lens.

0957 UDP160 LENS - BICONVEX

Unsigned

D 166. Late 19 C. G.

Biconvex lens with four concentric black bands painted on one side.

0825 UDP091 LENS - CONCAVE-CONVEX

Yeates & Son. Dublin.

D 77; W 20. Mid to late 19 C. G.

Cells; four concave-convex lenses in circular oxidised brass mounts; two of four glass discs on sides; inlet pipe set into mounts.

When dry, the cells appear to make very little difference to magnification; presumably the addition of liquids make them effective.

0687 UDP015 LENS ON STAND

J. DUBOSCQ A PARIS

BD 111; H 398; Le 49x50; HsD 123. 1849-1883. F.

Plano-convex cylindrical lens; brass expanding stand; on top, oxidised brass housing containing lens; there is a horizontal bracket on the plano side for some attachment.

Dates from Brenni 1988,3-4.

0868 UDP134 LENS HOLDER

Unsigned

B 106x103x33; H 300; PrD 14. Mid to late 19 C. G.

Iron base; expanding brass pillar; on top, screw thread with turned brass sleeve to move holding arms.

The arms are of oxidised brass held on a brass bracket; when the sleeve moves up or down the arms move together or apart; each arm has three vertical grooves to take edges of lens.

0828 UDP094 LENSES

YEATES & SON, DUBLIN R. COLL. OF SC. PHYS. LAB.

D 59(2)&55(1); C 402x78x26. Mid to late 19 C. G.

Black wood case; six squares - only three lenses; red velvet lined; concave-convex, plano-concave and double-concave.

Squares in case also for double-convex, plano-convex and meniscus lenses (missing); case also contains a brass screw-thread bound concave-convex lens (D48) which does not belong to set.

2251 UDP329 LENSES

Unsigned

D 63-63; C 228x150x41. Mid to late 19 C. G.

Purple paper-covered, blue velvet-lined case; six compartments below, six in tray for six whole and nine of 12 half-lenses.

Plano-convex, two bi-concave, two convex-concave, plano-concave whole lenses; similar selection split in two; lid detached, two hooks on one side.

0864 UDP130 LESLIE CUBE

Unsigned

BD 55; H 80; Sis 65. Late 19 C. G.

Brass; base holds cube, concave on bottom, circular hole on top (D17); one white, one black and two brass sides.

0898 UDP164 LEYDEN JAR

Unsigned

H 190-390; D 26-128. Various dates.

Collection of 14 jars of various sizes; from test-tube size up; one filled with gold and silver foil.

Two of them are joined together by a brass band; one (L430D65) has spherical bottom and long cylinder neck.

0900 UDP166 LEYDEN JAR BATTERY

HARVEY & PEAK LONDON

H 210; D 97; ToD 89; Hs 359x245x131. 1884-1909. F.

Boxwood housing for six jars; five remain; glass cylinders, foil inside and out; mahogany tops; brass conductors.

Only four retain mahogany disc tops (with signatures), these have brass conductors but only two retain brass spheres on top; fifth jar has non-matching mahogany top; one jar is cracked.

Dates from Downing 1988,57.

2147 UDP236 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned

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MxD 97-121; H 255. Mid to late 19 C. G.
Brass; tapering cylinder cup; glass cup inside this missing; central closed vessel with wire hook above; hook ends in screw thread, presumably for a sphere conductor.

0887 UDP153 LODESTONE

Unsigned
57x29x22; HsTo&Bo 70x34x15; H(-Ha) 66.
Mid to late 19 C. G.
Oxidised brass side panels and mounts around stone; two pole pieces below; hook handle; no longer magnetic.

2225 UDP303 MAGDEBURG HEMISPHERES

Unsigned
L 207; MxD 68. Mid to late 19 C. G.
Brass; one hemisphere has an unscrewing ring handle; the other has a stop-cock between it and the ring.

0905 UDP171 MAGNET

Unsigned
B 228x113x80; H 310; P 48x39. Late 19 C. G.
Black wood base; five U-shaped magnets held together; S-shaped hook on keeper; doesn't support weight.
Also 2 U-shaped magnets (L248W110).

2242 UDP320 MAGNETIC NEEDLE SUPPORT

E. DUCRETET & CIE A PARIS
BD 56, H 16; H 132. c1880. F.
Brass; cylinder base holds pillar tapering at top, with pin for missing needle.
Two more similar unsigned.
Anderson 1990,25 gives this name for the firm in 1879 and 1880.

2191 UDP277 MANOMETER

T. MASON OPTICIAN 5. DAME ST., DUBLIN.
B 151x98x18; H 261. 1900-1914. A.
Wood base and frame for horizontal glass tube with vertical S-shape mercury tube above; stop-cock on one limb.
Stop cock on vertical tube soon after it leaves the horizontal tube; the far end of the S is closed and has mercury up to the top.
Dates from Morrison-Low 1989,131 and Mason 1980,12.

2166 UDP252 MANOMETER

Unsigned
BD 76; RsD 76; H 589; TuD 13. Late 19 C. G.
Cast iron mercury reservoir; brass side arm and stop-cock; closed tall glass capillary tube.
Described as "The manometer with compressed air is founded on Boyle's law: it consists of a glass tube closed at the top, and filled with dry air. It is firmly cemented in a small iron box containing mercury. By a tubulure..in the side.., this box is connected with the closed vessel containing the gas or vapour whose tension is to be measured." - Ganot 1877,138.
Second similar instrument measurements BD88;RsD53; H419;TuD10.

2159 UDP248 MANOMETRIC FLAME APPARATUS

Unsigned - attributed to R. Koenig
BD 89; PD 10; H 475; TD 79. Late 19 C. CT.
Turned iron base and pillar; oxidised brass moving sleeve attached to disc table with three pipe sleeves (D5).
One of the latter holds an insert with a pipe on top giving a T-shape.
A similar piece of apparatus (though with a tripod foot) is shown in Koenig 1889,88 attached to the manometric flame interference apparatus (trombone type - see 0678 UDP006), one of the "Accessory pieces to adapt (it) for the graphical and optical composition and comparison of two vibratory movements and for Melde's experiments."

0684 UDP012 MANOMETRIC FLAME APPARATUS - ANALYSER

RK (monogram of Rudolph Koenig, Paris)
H 906; RnsD 40-230; W 597-357. 1858-1901. F.
Eight brass spherical Helmholtz resonators on frame with manometric capsules and revolving mirror.
Frame of black painted iron; mirror (cycloscope) turned by handle through two toothed wheels at right-angles.
Koenig's newly invented manometric flame apparatus was displayed at the International Exposition in London in 1862, where it won him a gold medal; the RK monogram is on the resonators.
Dates from Payen 1986,160; instrument illustrated in Turner 1983,144.

0686 UDP014 MANOMETRIC FLAME APPARATUS - CAPSULE

RUDOLPH KOENIG A PARIS
H 123; D 48. 1858-1901. F.
Wood housing; clamp to fit pillar; narrow wooden input at one side and wider brass output at other; on one side at top is a turned brass gas input with a stop-cock.
Dates from Payen 1986,160.

2179 UDP265 MANOMETRIC FLAME APPARATUS - CAPSULE

RUDOLPH KOENIG A PARIS
B 155x128x23; TuD 13; MxW 336. Fourth ¼ 19 C. G.
Mahogany plate; two manometric flame capsules on one side; metal pipes out other side, bent and ending in Y joins.
Three small pipes stick out from the capsules (two of them broken off on one capsule).
Also matching pipe bent in two right-angles (MxL 257) with turned mahogany join (MxD48) in centre - this has the same signature.
The former apparatus illustrated in Koenig 1889,89 as part of the set-up for the use of the interference apparatus 0678 UDP006.

0678 UDP006 MANOMETRIC FLAME APPARATUS - TROMBONE

RUDOLPH KOENIG A PARIS
H 742; Sp 312. 1872-1901. R.
Interference apparatus; iron tripod foot; pillar for fixed and moving trombone-like arched sound pipes.
Scale on the silver metal supporting pillar 0-35 cms; stop-cock outlet on top of both pipes; brass fittings.

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Devised by Koenig in 1872 - Turner 1983,144.

Koenig 1889,88 refers to this as: "Manometric flame interference apparatus"; a table on a turned foot and pillar for use of singing flames with this apparatus 2159 UDP248 (also shown in Koenig catalogue) is present too.

Firm dates from Payen 1986,160.

0869 UDP135 MASSON APPARATUS

Unsigned

BD 118; H 329; RiD 72. Mid to late 19 C. G.

Weighted ring base; three curved brass supports to brass ring; glass vessels screw into this; incomplete.

Only one vessel, conical, remains, painted red inside and with ground glass bottom and lip on top; disc for bottom missing; base also supports thin (D4) brass pillar with curved pointer on sleeve.

Another red-painted conical glass funnel on brass sleeve and disc base does not fit and seems likely to be part of another missing Masson Apparatus (H217,MxD223, MnD49).

0680 UDP008 MELLONI APPARATUS

E. Ducretet et Cie Rue des Feuillantines 89 Paris

B 761x171x70; Bn 1024x30x8. c1875. A.

"Optical" type bench used for emissive powers; mahogany base; brass bench; units on pillars on brackets.

Base has four brass level screws; two short turned brass pillars hold the bench, with scale 0-95; brass expanding pillars for units - e.g. thermocouple, parallel metal plates with clamping screw; single plate; blue glass in metal housing; brass circular dish; mahogany rectangular table; black cylinder lamp housing; at one end (0 on scale) disc with scale 0-90-0-90-0, second similar scale on broken-off pillar above.

Anderson 1990,25 gives this name and 75 rue des Feuillantines (ancien no.89) address in 1879 and 1880.

0789 UDP055 MICROPHONE

YEATES & SON DUBLIN

B 164x100x30 & 85x48x7; H 158&92. Mid to late 19 C. G.

Two; mahogany base; black wood or mahogany support; two contacts to carbon blocks; carbon rod with one only.

Contacts are brass; in the first a sharpened carbon rod fits between the blocks; this is missing in the second, which has the word "OPTICIAN" in the signature.

See Deschanel 1891,839.

0921 UDP186 MICROPHONE

Unsigned

B 150x103x20; H 220; MxD 78. Early 20 C. G.

Wood base; two brass terminals; black metal support revolves c15°; circle membrane housing; ebonite cone; conical ebonite speaking tube in centre; four feet on base.

0858 UDP124 MICROSCOPE - SOLAR

Pixii Pere et Fils Rue De Grenelle St Germain 18 Paris

BP 219x219x4; MiHs 265x120x9. 1835-1861. R.

Incomplete; brass; base plate with ring; another turns inside; hinged rectangular black glass plate.

The revolving inner circle is turned with a knurled knob; the black glass is in a brass housing secured at its narrow side; another knurled knob alters the angle of the glass; base plate has four holes at corners; optics are missing from the inner circle.; both movements use rack and pinion, the turning ring having a cogged edge, and the glass housing having a milled disc at its base.

Dates from Anderson 1990,64 and Payen 1986,159.

0775 UDP042 MICROSCOPE - TRAVELLING

ELLIOTT BROS LONDON

BW 100; L 218; W 176; C 252x212x151 Late 19 C. CT.

Two; heavy iron base rising to arch; attached brass frame for brass microscope travelling in groove.

Linear scale 0-8-1-8-2; at one side drum micrometer with silvered scale 0-19; boxwood case.

Illustrated in Elliott 1895,117 - called "reading micrometer".

2252 UDP330 MICROSCOPE - TRAVELLING

Unsigned

B 225x190x34; MnH 270; TuD 22. Early 20 C. G.

Wood base; open iron vertical support; brass; bracket for tube housing; rack and pinion focus; scale 0-70cm.

Double brass knurled knobs for focus; microscope moves in vertical direction up and down from the base.

2232 UDP310 MIRROR

Unsigned

BD 238; MnH 650; HsD 336. Mid to late 19 C. G.

Set of three; plain, concave, and convex; in blackened wood housing; turned base and pillar; oxidised brass mount.

Base weighted; on top of pillar is a brass sleeve with a wood tightening screw for a white-metal rod attached to the oxidised brass semicircular mount; the mirror housing can rotate in this mount.

2193 UDP279 MIRROR - ANAMORPHIC

Unsigned

BD 70; H 74; CBD 77, H 77. Mid 19 C. G.

Turned wood base; conical silver metal mirror; in tin pyramid case; mirror now detached from base; case has hinged lid.

0949 UDP217 MIRROR - CONCAVE

Unsigned

D 343&464; W 50&190. Mid to late 19 C. G.

Two; silvered metal; concave/parabolic; brass sleeve, knurled clamp and broken wood support behind smaller; support sleeve broken off in larger.

For experiments on reflection of sound - see Baird 1924,383.

2175 UDP261 MIRROR - CONCAVE & CONVEX

W.G. PYE & CO MAKERS CAMBRIDGE

Fr 218x213 & 157x156; MiD 145&98.

Late 19 early 20 C. G.

Boxwood eight-side frames for concave and smaller convex glass mirrors; black brass boss and screw for stand.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2174 UDP260 MIRROR - CONVEX

HARVEY & PEAK LONDON

FrD 197; MiD 144. 1884-1909. F.

Blackened mahogany frame and back for (now corroded) convex mirror.

Pencilled on back "Shenda(?) Maguire 1915-16".

Dates from Downing 1988,57.

0944 UDP212 MIRROR - ROTATING CUBIC

Unsigned

H 560; Mis 179x156x156. Late 19 C. G.

Black iron T-shape foot; pillar and supports for four-sided mirror; brass handle drives right-angled cog wheels.

Wood frame top and bottom to hold mirrors; brass knob on top to adjust pressure on cube's turning axis.

2125 UDP177 MIRRORS - ANGLED

Unsigned

R 225; MisHs 190x124. Mid 19 C. G.

Mahogany; quadrant base, boxwood scale 10-90°; fixed and moving housings, mirrors gone; brass sphere feet.

0857 UDP123 MIRRORS - ANGLED

Unsigned

D 409; MisHs 185x112. Mid to late 19 C. G.

Semi-circular mahogany base; brass scale 10-170°; rod at centre supports two rotating rectangular mirrors in oxidised brass housings.

2222 UDP300 MOMENTS DEMONSTRATION APPARATUS

Unsigned

B 189x77; PvsH 260,207&154. Mid 19 C. G.

Mahogany base; one of two arched feet; supports for three box-wood pivoted limbs with hooks and marked divisions.

One arm, at the side, has two hooks at its wide end, and six division marks for weights at the thin end beyond the pivot; second arm pivots from one of the supports, has no extension beyond the pivot, and can only move a little in a gap in the other support - however a hook at its end could attach to the small extension beyond the pivot of the top arm, which has six divisions beyond the pivot, and a hook at its end.

2220 UDP298 MOMENTS DEMONSTRATION APPARATUS

Unsigned

B 408x120x21; PvH 103. Mid to late 19 C. G.

Mahogany base; at sides turned brass pillars; one pivots weight and bar; other pivots right-angled limb and bar.

The weight has a hook below to add more weights - its bar (L200) tapers away from the pivot and has six knobs to support weights; the other bar (L178) also tapers and has five knobs - its right-angled limb has one knob and a hook for more weights; the centre of the base has a crude hole and evidence of an additional part of the instrument with BD75.

0827 UDP093 NEWTON RINGS APPARATUS

YEATES & SON Dublin.

D 80; MoD 103; & D 83; HsW 24. Mid to late 19 C. G.

Brass and oxidised brass housing; arc support; three screws behind; no stand; second with no support for stand.

First has a glass front and black back; it can be rotated on a cylindrical arm (L187,D11) designed to telescope into a (missing) stand.

In the second, a brass housing holds a black glass disc with a clear glass disc on top; it also has three tightening screws behind, and is unsigned.

0695 UDP023 OPTICAL DISC - HARTL

WELCH CHICAGO, U.S.A. ESTABLISHED 1880

H 455; HsD 342; SDiD 301; C 248x223x33.

After 1880. S.

Black-metal tripod foot and scale disc housing; white scale 0-90-0-90-0° clamps glass elements (in case).

Handle at back rotates scale disc; black housing around scale has seven parallel slits; the elements are all flat on two sides, with concave, convex, semicircular and straight sides; they are clamped in position on the scale disc corresponding to diagrams on it; there are red, green, and opaque shades for the light source.

Name from Baird 1924,327.

2171 UDP257 OPTICAL ELEMENT

S.C. TISLEY & CO.. London.

MxD 47; H 19; SIs 19x6; Ps 19x22. 1877-1888. F.

Two shallow brass cylinders fit together, each has a slit and holds a sloping glass plate.

Purpose unknown.

Dates from Downing 1988,134 and Anderson 1990,84.

2219 UDP297 OPTICAL ELEMENT

Yeates & Son Dublin

Ps 120x120; HsD 93; W 135. Mid 19 C. G.

Brass; two plates held 23mm apart; on one side, housing for biconvex lens; on the other, housing with nine apertures (D1-23) in disc which revolves over hole (D23) in housing; plates held apart with four rods.

2210 UDP288 OPTICAL ELEMENT

Unsigned

D 53; W 14-21. Mid to late 19 C. G.

Three; mahogany disk housings for glass disc, ellipse, and cube.

Also non-matching diamond and heptagon; diamond has no housing; heptagon has mahogany housing plate (112x56).

2209 UDP287 OPTICAL ELEMENT

Unsigned

83x63; L 292; SrD 38. Late 19 early 20 C. G.

Glass plate, plain one side, five curved grooves on other; on metal bar with sphere counterweight; stand sleeve.

Purpose unknown.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2143 UDP232 OPTICAL STAND

E. DUCRETET & CIE A PARIS

BD99; MnH 381. c1880. F.

Brass and oxidised brass; weighted base; hollow pillar with screw clamp; inner tube; pivot and right-angled bracket.

The oxidised brass bracket ends in a brass sleeve (D12) with slits lengthwise on both sides for an unknown, though presumably optical, element.

Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0798 UDP064 ORGAN PIPE - BLOCK

HARVEY & PEAK LONDON B, C, C, G, B, A, F, E, G, C, D, C

From 690x78x66 to 320x42x36. 1884-1909. F.

Twelve; wood; some of them have stops.

Plus about 10 unsigned similar block pipes.

Dates from Downing 1988,57.

0960 UDP219 ORGAN PIPE - BLOCK

Unsigned

L 84-262. Late 19 C. G.

Eight boxes; all with air intakes below and closed tops; one is triangular; one has a horizontal limb.

Dimensions 275x156x52; 168x77x75, 130x109x108, 123x 120x106, 116x106x102, 84x64x61; of triangular L200, Sis107; of one with horizontal limb, vertical part 132x100x93, horizontal part 262x94x92.

2131 UDP222 ORGAN PIPE - REED

Unsigned

L 513. Se 54x55. Mid to late 19 C. G.

Boxwood upper housing tapers at its lower third to a turned wood boss; below this is a brass tube and reed.

0797 UDP063 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN C3 C3 E3 G3 C4

L 640 & 330; Pis 607x71x65 to 299x50x46.

Mid/late 19 C. G.

Five; wood block-type pipes; wood manometric capsule near centre; larger two have sliding shutter on top.

One of the C3 pipes is missing two of its sides on its bottom half, and has a sliding stop.

2130 UDP221 ORGAN PIPE WITH MANOMETRIC CAPSULES

GRIFFIN SARDINIA ST. LONDON

L 952; Pi 836x81x80. 1899-1905. A.

Wood block-type; mahogany stem, lip and side input tube cover; three manometric capsules; one input three output tube of brass with three output stop-cocks in mahogany cover in front of the pipe.

Dates from Anderson 1990,34.

0796 UDP062 ORGAN PIPE WITH MANOMETRIC CAPSULES

E. Leybold's Nachfolger A.G. Köln, - Rhein

L 847; Pi 800x77x75. Early 20 C. G.

Boxwood block-type pipe; glass windows front and back; three manometric flame capsules at one side; open top.

2129 UDP209 ORGAN PIPE WITH MANOMETRIC CAPSULES

YEATES & SON OPTICIANS DUBLIN

L 734; Pi 700x76x76. Mid to late 19 C. G.

Boxwood; block-type; mahogany stem and lip; three manometric capsules; at front, single input, triple output tube.

0895 UDP161 OSCILLATOR - HERTZ

Unsigned

BD 120; H 595; P 400x400; SrD 33.

Late 19 early 20 C. G.

Two; metal base; brass sleeve; ebonite pillar; square metal plate; brass rod from side to copper(?) sphere.

An illustration in O'Hara 1987,148 shows two such oscillators, joined together by a frame, together described as: "Hert's oscillator with square capacitive plates", located in the Deutsches Museum, Munich.

Also copper wire bent in circle on turned wood base with two contacts - which could be a circular resonator, a simpler form of that illustrated in O'Hara 1987,144.

2235 UDP313 PENDULUM - GRIDIRON

Unsigned

DiD 125; L 285. Mid to late 19 C. G.

Hollow brass disc housing, removable lid; white-metal central bar, two brass and two white metal bars outside it.

2268 UDP346 PHONIC WHEEL

Unsigned

Sp 158; DiD 222; H 247. Patented 3:10:1899. SI.

"Raleigh Synchronous Motor or Phonic Wheel"; two iron tripod feet; cog and motor drive to rotate slotted disk.

Tripod feet at right-angles to position disc vertical or horizontal; brass cog-wheel and endless screw mechanism with electric motor drive to rotate disc; bell.

Instrument used to determine absolute pitch of tuning forks - Pye 1914,34.

0823 UDP089 PHOSPHOROSCOPE

MADE BY YEATES AND SON, Opticians to the University, 2 GRAFTON STREET, DUBLIN

241x220x16. 1859-1864. G.

Mahogany frame for phosphorescent butterfly.

Butterfly held between two glass plates (one cracked).

A card on the back reads: "THE PHOSPHOROSCOPE. Many bodies, such as the Sulphurets of Calcium, Strontium, and Barium, possess the singular property of remaining Phosphorescent after being exposed to the light of the sun, or that of Magnesium wire. This Case contains some of the most beautiful specimens of these substances. All that is necessary to render the phenomenon visible, is to expose it for a few seconds to either of these lights, and to withdraw it immediately to a dark place. The more rapid the transition, the brighter and more vivid the colours will appear." Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son, Opticians to the University from 1859.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0848 UDP114 PHOTOMETER - BUNSEN

Unsigned

B 75x75x24; H 275; PrD 10; DiD 101. Late 19 C. G.

Mahogany base; expanding brass pillar; oxidised brass ring housing for paper and grease spot; stand.

Clamping nut on stand for housing; base has groove below for optical bench; base repaired.

0817 UDP083 PHOTOMETER - JOLY

YEATES & SON DUBLIN

159x88x91. Mid to late 19 C. G.

Mahogany sheet top and bottom joined on sides with plates each with a rectangular window for two wax solids.

Angled sides from windows lead to rectangular wax solids side by side such that one is lit by source on right window side, and one on left; glass plates at sides allow wax solids to be seen together and compared.

Also non-matching pair of wax solids with white-metal ends and contained in "KEEN'S MUSTARD" tin box.

Joly wrote "If...a prism be cut from a translucent body, and so exposed to a source of light that one only of its faces be illuminated, the light diffused through the substance and reflected out through the unilluminated faces of the prism gives it an appearance as if lighted up internally. The effect, in fact, is as if the prism itself was a source of light. Two such prisms laid together on smooth faces, and receiving light from separate sources (placed so as to be at opposite sides of the plane of division), appear as if each was emitting light proportional in intensity to the source of its supply....When the supply to each prism is brought to equality, they appear as if emitting equal quantities of light. In fact it is hard to detect any longer that two prisms are being observed, so completely does all trace of the plane of division disappear....The sensitiveness of the arrangement is still further increased by interposing a silver leaf between the prisms, thus stopping all passage of light from one prism to the other." - Scientific Proceedings of the Royal Dublin Society, 4, 1885, 345-6.

2135 UDP227 POLARIMETER

F.E. BECKER & CO HATTON WALL LONDON NO 709 T.H. MASON 5 & 6 DAME ST DUBLIN

Sp 222; TH 295; L 387; SHsD 132.

Supplier post 1917. A.

Black iron tripod base; brass pillar to sample table.

Stand screws into black horizontal table, which has two V-shaped brackets for the sample tube (missing); at one end of the table is a silver scale 0-90-0-90-0° with a vernier 10-0-10 in a black housing, with a nicol prism system, having a screw-in and a push cap at its sides; at the other end is a longer lens system with a silvered drum scale 15-0-15, and a hinge flap to mask the small hole on the sample side; boxwood case.

Morrison-Low 1989, 131 lists Masons at 5 & 6 Dame Street from 1917.

0955 UDP223 POLARISCOPE

CAMBRIDGE SCIENTIFIC INSTRUMENT COMPANY 1889

Sp 292; H 279; L 721; Hs 627x161x85. 1889. S.

Red painted iron tripod foot; brass pillar to black wood housing; inside, nicol prism, lens and mirror systems.

Housing has a sliding panel at each end with a nicol prism in a brass sleeve; one has a brass disc scale 0-360°; observing tube in brass at side also; housing has a hinged lid with, inside, a lens, nicol prism, cylinder prism system and another lens; opposite the side tube is another lens and a rectangular mirror to half the height of the rest of the optics; the angle of this can be moved by a lever at the scale end.

0821 UDP087 POLARISCOPE

Yeates & Son Dublin

H 362; HsDs 99&44; MoD 109; ApDs 10&13.

Mid to late 19 C. G.

Expanding brass stand; semicircular mount for nicol prism housing; second smaller housing rotates in this.

Crystals (22x16 & 16x11) are contained in ceramic discs; the small oxidised brass prism housing fits into the centre of the larger housing and can be revolved with respect to the other; slits for slide at side of mounting; base for stand missing.

0882 UDP148 POLARISCOPE

Unsigned

L 160; HssL 30, D 18. Mid to late 19 C. G.

Pair of nicol prism pincettes; brass; handle with clip holds two cylinder housings for nicol prisms.

Brass is painted black; one nicol prism missing from one of the pincettes.

0764 UDP033 POLARISCOPE

Unsigned

L 430; Bn 368x52x11; H 448; PvH 313.

Mid to late 19 C. G.

Iron tripod foot; expanding pillar to pivot; mahogany bench - nicol prism; sample holder and mirror mount.

The nicol prism, at one end, is in a brass housing with circular scale 0-360°; towards other end is a circular black metal sleeve on knuckle joints clamped to a small brass pillar; at other end is an angled mahogany mount for mirror or glass plate - latter has three frame edges missing.

0818 UDP084 POLARISCOPE - NORREMBERG

NEGRETTE & ZAMBRA LONDON

BD111; H320; ToDiH216, D102. Late 19 early 20 C. G.

Brass base; two pillars; glass plate at bottom then transparent disc, brass circle, and finally glass plate.

Both glass plates (top and bottom) are in oxidised brass housings and both rotate about centre (one plate cracked); the disc has a brass and oxidised brass housing (stuck) with scale 0-180-0°; brass circle is on top of pillars with scale 0-45-45-0-45-45-0°; two shorter pillars on top of this hold the upper glass plate housing.

0860 UDP126 POLARISCOPE - TOURMALINE

Unsigned E/-/- (in pencil)

H 74; Ps 21x6&18x6; HsD 48&90. Mid to late 19 C. G.

Brass cylinder holds green tourmaline plate in glass disc; revolving larger cylinder holds similar plate.

Slits at sides of smaller brass cylinder would allow a slide to be inserted between plates.

When tourmaline plates are parallel, they can be seen through, and when at right-angles they cannot.

Green tourmaline is a Brazilian crystal - Ganot 1890, 635.

0849 UDP115 POLARISCOPE - TOURMALINE PINCETTES

Unsigned

L 160; HsD 35. Mid to late 19 C. G.

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Two; wire frame holds two revolving oxidised brass housings for green and brown tourmaline crystals; the latter housing incorporates an enlarging lens.

Green Brazil tourmaline, brown Ceylon tourmaline - Ganot 1890,635.

0850 UDP116 PRISM

BAIRD & TATLOCK * LONDON

PmL 50, Sis 25; C 159x68x42. Late 19 early 20 C. G.

Three equilateral glass prisms in boxwood case with space for three thinner prisms (missing).

2150 UDP239 PRISM

Unsigned

Sis 35x35x35x38; H 45; HID 22. Mid to late 19 C. G.

Frosted glass; a large hole runs through, parallel to one side; holding knob on top; purpose unknown.

The box from which this came has a variety of small glass prisms, and other glass cells or elements.

0676 UDP004 PRISM - ADJUSTABLE

Pixii Père et Fils Rue De Grenelle St Germain 18

L 167; W 89; H 88. 1835-1861. R.

Brass and glass; stand missing; plate with two elongated arc sides; two moving framed glass plates; angle scales 0-50 on each side of centre on one arc.

Dates from Anderson 1990,64 and Payen 1986,159.

0830 UDP096 PRISM - HOLLOW

Yeates & Son Dublin.

H 140; HsH 98; Se 93x93. Mid to late 19 C. G.

Rectangular glass vessel, square section; glass diagonal; brass frame top and bottom; three level screws.

Presumably the different halves of the double prism can be filled with different liquids.

0829 UDP095 PRISM - HOLLOW

Yeates & Son Dublin

H 117; H-Pm 96; Sis 83. Mid to late 19 C. G.

Blackened brass housing, three panels of glass glued on; cylinder brass neck, cap stuck; contains brown liquid.

0856 UDP122 PRISM - HOLLOW

Unsigned

H 70; PmH 85, Sis 61; CH 92, Sis 74.

Mid to late 19 C. G.

Glass; turned glass stopper (seized); in black paper-covered triangular section cardboard case.

Case is green inside; prism is half full of pale pink liquid.

0688 UDP016 PRISM - HOUSED

J. DUBOSCQ A PARIS

PmTo 40x25, Bo 23x25; HsD 120. 1849-1883. F.

Metal disc shields brass mount with pivot; prism is a cube of glass elongated top and bottom; inclined edge; pivot attaches to stand (missing).

Dates from Brenni 1988,3-4.

0822 UDP088 PRISM - HOUSED

NEWTON'S PATENT

BD 78; BP 88x86; H 107; Late 19 early 20 C. G.

Adjustable housing for projection lantern; to show reflection or erection; actual silvered prism missing.

Oxidised brass with brass knurled knobs; ring base holds square plate on which is mounted three-sided support; J-shaped grooves on each side hold prism housing; by moving the housing with the knobs as allowed by the J grooves, the prism can be brought into use for reflecting or erecting.

Illustrated in Baird 1924,368.

0862 UDP128 PRISM - HOUSED

Unsigned

B 218x64&214x63; H 65&64. Late 19 early 20 C. G.

Two prism systems in wood housings; liquid filled prism at each end; for direct vision spectra(?).

Not possible to see what is in between end prisms, although there is space for one or two more prisms; liquid seems transparent though no light can be seen through either system; second system has a sweet smell, and has a typed label on the side which is indecipherable - it also is missing most of the framing at the ends of the housing.

0851 UDP117 PRISM - HOUSED

Unsigned

B 48x27; H 44; Pms [49x44x23]x27. Mid to late 19 C. G.

Oxidised brass base and upper plate hold two matching right-angle glass prisms clamped by screws on pillars.

The pillars (H31D3) are at the corners outside the base; threaded hole below base plate for missing stand.

0861 UDP127 PRISM - NICOL

Unsigned

31x28x47; 22x18x38; 20x15x18. Mid to late 19 C. G.

Three; in cork surrounds contained in brass cylinder housings.

0854 UDP120 PRISM ON STAND

ELLIOTT BROS LONDON

BD 98; H 296; PvH 155; PmSis 23, H 113. Late 19 C. G.

Oxidised brass base and pillar to universal ball joint; rod from this to housing for long equilateral prism.

0863 UDP129 PRISM ON STAND

Unsigned

BD 109; PvH 318; PmH 84, Sis 32. Mid to late 19 C. G.

Expanding brass stand to pivot; rotating L-shaped bracket for revolving equilateral prism in mounting; pivot, bracket and mounting in oxidised brass; prism chipped.

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2151 UDP240 PRISM STAND

A. HILGER LONDON.

BDiD 133; DiSD 59; H 95. Late 19 early 20 C. G.

Brass and oxidised brass; base disc on three level screws; on this, two smaller discs with right-angle prism clamps above.

2247 UDP325 PULSE GLASS(?)

E. DUCRETET & Cie Instruments pour les sciences 75, Rue des Feuillantines . PARIS .

L 278; D 7; C 317x27x27. c1880. F.

Straight sealed glass tube; colourless liquid; case.

When held, hand heat "causes brisk ebullition"; wood case covered in black paper and lined with indigo velvet.

The pulse glass illustrated and described in Griffin 1910,460 has bent ends leading to spheres, which this does not, but the action is the same.

Anderson 1990,25 gives this name and address for the firm in 1879 and 1880.

2248 UDP326 PULSE GLASS(?)

E. Leybold's Nachf. Köln a. Rh. 38588

L 245; D 8; C 271x35x23. Early 20 C. G.

Straight sealed glass tube containing a colourless liquid; heat currents can be seen when held; case.

Very similar to 2247 UDP325, but "ebullition" not nearly so marked; black paper-covered case with green velvet lining.

0886 UDP152 RADIOMETER - CROOKES

Unsigned

BD 80; H 226; D 64. Late 19 C. G.

Black wood base; glass sphere on glass stem; inside, glass tube supports cross with four black/silver vanes.

2217 UDP295 RECTIFIER(?)

N V V/H P.J. KIPP & ZONEN DELFT UTRECHT HOLLAND

B 65x65; H 31; CyD 24, H 15. Late 19 early 20 C. G.

Ebonite base with four brass contacts; brass cylinder over frame for four-arch wire element between two rods.

0784 UDP051 REFLECTORS - PARABOLIC, HERTZ

Ferdinand Ernecke Berlin, S.W. 46 (only one signed)

FtFr 455x298; D 186; Mi 502x455. Late 19 early 20 C. G.

Two; wood frame; parabolic sides for metal reflector; connectors for radiator and coherer (gone); iron feet.

To demonstrate Hertz wave experiments "The primary mirror contains the radiator, the secondary a new constructed coherer, the poles of which are to be connected with a battery and a vertical galvanometer"; O'Hara 1987,148 illustrates: "Hertz's large parabolic mirrors; one contained an oscillator, the other a resonator", now in the Deutsches Museum, Munich.

Illustrated in Baird 1924,546; workshop founded in 1859, Brachner 1985,139.

0677 UDP005 REFRACTOMETER - FERY

Refractomètre Féry Ph. Pellin Paris No. 77.

Sa 113x66; ApD 26. Post 1886. R.

Brass and oxidised brass; moving black glass stage; collimator; aperture for missing telescope; no stand.

On top of the threaded aperture for the missing telescope is an ivory scale 0-80 connected to a bracket with an ivory vernier to read the scale; on the opposite side of the aperture is the collimator (it was not with the instrument, but it seems to belong) with a slit adjusting in position, not in size; on a revolving pillar at the stage end of the collimator is a spring clamp.

Ducretet 1906,213 describes this as follows: "Le principe sur lequel repose cet appareil est le suivant: annuler, par un prisme solide d'angle variable et d'indice constant, la déviation imprimée à un rayon lumineux par un prisme creux, d'angle fixe, rempli du liquide dont on veut déterminer l'indice..."

Date from Payen 1985,176.

2188 UDP274 RESISTANCE - STANDARD

Robt. W. Paul. London. N. T. Mason 5, DAME ST.. DUBLIN

B 125x46x15; CoD 17. 1900-1916. A.

Oak base; four brass contacts; coiled resistance wire; "0.1 OHM 5 AMPS POTENTIAL".

Mason dates from Morrison-Low 1909,131.

2265 UDP343 RESISTANCE - STANDARD

W.G. PYE & CO CAMBRIDGE ENGLAND 10 OHM 20 AMP MAX 1970

B 308x150x19. Late 19 early 20 C. G.

Mahogany base; four brass contacts; metal resistance ribbon (W10) in eight parallel strips - 7x180° turns.

0787 UDP053 RESISTANCE - STANDARD

YEATES & SON DUBLIN

H 220; AsW 220&205 Pre 1891. D.

Mahogany cross-shaped arms with 18 windings of wire around; five brass contacts on side, four marked ½, 3, 2, 1.

Circular knob on top; copper strips to contacts; paper label gives resistances 1.02, 1.02, 1.04 and .53 ohms; "Mean of 3 obs. Sunday May 31. 1891".

0893 UDP159 RESISTANCE BOX

GRIFFIN, LONDON

B 212x122; H 158. Late 19 early 20 C. G.

Mahogany housing; ebonite top; two brass contacts; brass U-bar divided for nine ebonite and brass keys; 1-100 ohms.

Keys 1, 2, 2, 5, 10, 20, 20, 50, 100 ohms.

2274 UDP352 RESISTANCE BOX

W.G. PYE & CO CAMBRIDGE ENG. NO 3037 & 3038 [3904 & 5596 have T. MASON 5, DAME ST., DUBLIN]

B 213x103; Hs 197x89x74. Early 20 C. A.

Four; mahogany housing; ebonite top; brass U-bar

Three with smaller serial numbers are the same size; 5596 is longer and thinner; 3037, 3038 and 5596 are labelled "CONSTANTIN COILS"; 3904 is labelled "MANGANIN"; three with earlier numbers have eight holes for eight ebonite and brass keys (total 23 keys remain); 5596 has thirteen holes and ten keys.

Morrison-Low 1989,131 gives Mason address 1900-1916; Nos 3174-3536 have 1912-14 certificates, Pye 1914, 1926.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0945 UDP213 RESONATOR - HELMHOLTZ

Unsigned

D 130.102 & 87; H 151, 124 & 108. Mid to late 19 C. G.

Three hollow brass spherical resonators with hole at one side and ear projection at other.

0959 UDP218 RHEOSTAT

PHILIP HARRIS & CO LTD BIRMINGHAM

B 307x141x23; H 96; CoD 45. Late 19 early 20 C. G.

Mahogany base; brass support for wood cylinder wound with a coil; brass support on top for sliding contact with boxwood scale 0-19; four feet and two contacts on base.

2266 UDP344 RHEOSTAT

W.G. PYE & CO ENG. CAMBRIDGE NO 8342 TOTAL RES.= 2000 OHMS MAX VOLTS = 220

T. MASON 5, DAME ST., DUBLIN

Hs 146x146x102. Early 20 C. G.

Two (second numbered 8337); mahogany housing; pointer OFF-19.

Ebonite top has two contacts labelled "MAINS" and two labelled "POTENTIAL"; vertical resistance coils below the 19 contact points for the revolving pointer; metal grills at sides of housing.

Also two more-recent instruments without the T. Mason ivory signature disc.

0902 UDP168 ROD - ELECTROSTATIC

Unsigned

L 519; D 8; HaD 14-17. Mid 19 C. G.

Brass; tapering somewhat at end, ebonite handle.

Also ebonite rod (L475,D20), foil-covered.

Also turned glass handle (L182MxD33).

2233 UDP311 ROTATING BOARD

Unsigned

B 445x354x35; H 464; Fr 344x344. Late 19 early 20 C. G.

Open mahogany base, supports, and frame; latter revolves and, within this, a square board (280x280) also revolves.

Brass fittings; the two vertical supports from the base have brass fittings, one with a knurled tightening screw, to hold the square frame; at the top and bottom of the frame are brass fittings, again with a knurled tightening screw to allow a board to turn; the board is a modern plywood replacement; it has graph paper on one side 1-24, 2-27, 1-23, 27-1; on the other is a brass pin to read a modern protractor.

Purpose unknown.

0948 UDP216 SAVART DISC

Unsigned

D 96; W 105. Mid to late 19 C. G.

Oxidised brass; spindle holds cylinder; central perforated disc with toothed edge; no spindle support; hole on axis probably for string to wind around to drive disc.

0947 UDP215 SAVART DISC

Unsigned

B 408x304x35; DisD 307. Mid to late 19 C. G.

Mahogany base; oxidised brass frame and four toothed discs; oxidised brass and wood handle.

0946 UDP214 SAVART DISC

Unsigned

B 162x112x24; DisD 198 & 99. Mid to late 19 C. G.

Mahogany base; oxidised brass support for axis; four toothed discs; one large perforated disc; three disc drives.

Toothed and perforated discs of oxidised brass; pulley disc drives of wood; double brass knob to adjust tension on axis.

2182 UDP268 SCREEN

NEWTON & CO [sic] 3 FLEET ST. LONDON

BD 112; MnH 375; FrD 153&188. Late 19 C. G.

Iron foot; brass and oxidised brass; expanding stand to frame for plate glass and (missing) paper discs.

The glass disc is in a housing which slots into three knobs on the main frame; a ring on the latter can be unscrewed and was clearly used to clamp a disc of paper over the frame.

Judging from the Newton signature, this was presumably used with a magic lantern, and could have acted as a screen.

0846 UDP112 SEEBECK RECTANGLE

GRIFFIN & TATLOCK LTD

H 185; W 153; PrD 11. Post 1929. R.

Black painted iron tripod foot; brass pillar, insulated top; copper bar; bismuth rectangular arch; needle missing.

Instrument illustrated in Griffin 1910,798; firm traded under this name from 1929, Clarke 1989,290.

2198 UDP284 SEEBECK RECTANGLE

Yeates & Son, Dublin.

Sp 110; H 228; PrD 10. Mid to late 19 C. G.

Green painted iron base; brass pillar to ebonite block for missing rectangle; brass disc and pin for needle (gone).

0795 UDP061 SINGING FLAMES APPARATUS

Yeates & Son Dublin

H 452; PrD 9. 1865-1878. SI.

Green iron tripod foot; oxidised brass gas input below; two gas jets; iron pillar with clamps for tubes; gas jets tapering; glass tubes missing.

Similar instrument dated 1865-1878 1476 UGP056.

2213 UDP291 SINGING FLAMES APPARATUS

Unsigned

BD 100; CyD 44; H 233; PisD 14&11.

Late 19 early 20 C. G.

Iron base unscrews from cylinder metal housing; in this, two pipes with clips; below, brass stop-cock.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

0801 UDP067 SIREN

Unsigned

B 151x127x18; H 96; DiD 53. Mid to late 19 C. G.

Mahogany base; brass; air input to ring with inclined holes which drives axis and worm screw for disc scale.

The white-metal axis and screw turn a double cog wheel to rotate hands on the silvered disc, scale 0-90; base, made up of two sheets of mahogany, has four feet.

0802 UDP068 SIREN - CAGNIARD

HARVEY & PEAK LONDON W [On stand] YEATES & SON, Dublin

H 290; CyD 73; SHs 100x66x11; BD 122. Late 19 C. G.

Brass; hollow tube below cylinder, revolving perforated disc on top; two turned pillars to scale housing.

Latter is rectangular with one side curved and with knobs at side and top; on this, two circular scales with watch-hands; the Yeates signature is on a non-matching brass expanding stand (presumably originally belonging to an optical element).

Instrument type introduced by Charles Cagniard de la Tour (1777-1859) in 1819 - Turner 1983,136; firm founded in 1884, Downing 1988,57.

0696 UDP024 SIREN - CAGNIARD

J. ROBINSON & SONS 65 GRAFTON ST. DUBLIN

BD 138; H 268l HsD 77. 1885-1903. F.

Mahogany base; brass; pillar with air input; cylinder housing; two thin turned pillars to scale housing.

Latter is rectangular with one side curved and with knobs at side and top; on this, two circular scales with watch-hands - 500-2000 and 25-100; disc in centre of housing turns white metal rod to move scales; knob on side of scale housing sets scale.

Instrument - Turner 1983,136; dates Morrison-Low 1989,133.

0683 UDP011 SIREN - HELMHOLTZ DOUBLE

RUDOLPH KOENIG A PARIS

B 447x242x43; H 470; CyD 99&95. 1858-1901. F.

Mahogany base; turned mahogany pillar for metal tube divider; open square iron base holds siren cylinders.

Black metal inputs to cylinders top and bottom; double silvered scale 0-100 and 5-25 with watch hands to two circular dials; three mahogany feet and one brass level screw.

Dates from Payen 1985,177; Turner 1983,137 illustrates a variation of this siren by Sauerwald, Berlin.

0820 UDP086 SLIDE - GRANITE FILM

YEATES & SON DUBLIN Granite

102x56; DiD 42. Mid to late 19 C. G.

Mahogany housing holds a glass disc to which is stuck a thin film of granite.

2229 UDP307 SLIDES

NEWTON 3 FLEET ST LONDON

Hs 102x56x6-7; DiD 38. Mid to late 19 C. G.

Three; mahogany housings hold glass discs with illustrations of tulip, pansy, and buttercups(?).

Only two of three are signed.

2195 UDP281 SLIDING FRAME

Unsigned

P 248x181; Fr 164x159; Wd 135x25.

Late 19 early 20 C. G.

Metal plate has central window; frame on screw thread moves over this; originally clamped to circular table.

Frame edge divided - but without numbers; plate sits on a base plate with an elongated side to hold a brass knurled knob; from the remaining markings it seems clear that this knob clamped the base plate to a circular table and there is a screw thread at the circle centre.

Suspect apparatus was used to look at photographed spectra.

2187 UDP273 SOLENOID

Unsigned

220&230; MxD 24&25. Mid to late 19 C. G.

Two; copper wire wound in a spiral with straight wire through the centre ending in two brass contacts.

A small ebonite plate separates the wires as they emerge from the spiral towards the contacts; wires bent in right-angles before the contacts.

2269 UDP347 SONOMETER

J. ROBINSON & SONS 65 GRAFTON ST DUBLIN

1131x146x76. 1885-1903. F.

Wood sound box; four shamrocks/circle decoration; one fixed wire; one brass pulley for wire and weight; scale 5-59.

Dates from Morrison-Low 1989,133.

0762 UDP031 SOUND CYLINDERS

YEATES & SON [sic] DUBLIN

B 330x125x18; CysH 366,300,259,204.

Mid to late 19 C. G.

Mahogany base on four feet; four narrow brass cylinders (D20) with inserts closed on bottom and open on top.

When the inserts are pulled out they make notes of different pitch, depending on the length of the cylinder; similar instrument 1569 MAY058.

2261 UDP339 SOUND TUBE

Unsigned

394x75x73; MnL 412. Mid to late 19 C. G.

Variable resonance box; boxwood; square section tube, one end open; plunger pushes internal leathered block.

2176 UDP262 SOUND TUBE

Unsigned

D 407; TuD 16. Mid to late 19 C. G.

Brass; pipe bent in semicircle; another can revolve in this; side arm to wood conical ellipse aperture.

The latter is on the inner revolving pipe; there is another aperture from half way along the fixed pipe, at right-angles to it.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

2196 UDP282 SOUND TUBE - HOPKIN'S FORK

HARVEY & PEAK LONDON

H 39; Se 34x36. 1884-1909. F.

Boxwood tube with square section in shape of Y, rounded between arms; for use with Chladni plate.

John Reid (PC 1990) notes that a membrane is stretched across the top of the stem; when the fork ends are placed above in-phase nodes on the plate, sand on the membrane will hop, while if the nodes are out-of-phase, the sand will stay still.

Dates from Downing 1988,57.

2254 UDP332 SPARK GAP

Max Kohl A.G. Chemnitz. Made in Germany

Sp 138,103&98; MnH 129. Early 20 C. G.

Four-legged stand holds one arm of iron tweezers; moving upper arm separates two brass points with contacts.

0888 UDP154 SPARK GAP

Unsigned

B 107x73x13; H 40; CysD 13. Late 19 early 20 C. G.

Ebonite base; supports for two brass plates; attached to these are copper cylinders with rounded ends; one moves.

0899 UDP165 SPARK GENERATOR

CLARKE'S PATENTS 5992-6313

HsD 44; H 405. Patents 1830-1832. R.

Two; cylinder ebonite housing; inner tin foil lining; central ebonite cylinder, foil strips; spark gap.

Cogwheel mechanism spins inner cylinder; spark gap at top of long probe (D11) is connected to the two ebonite cylinders; metal base, top of housing and probe; second of pair has signature "CLARKE'S PATENT 5992 300.000 43797"; and is missing its probe.

Patent dates Crawforth 1984,104: could correspond to E. Clarke & Co. of Dublin 1823-1832.

2212 UDP290 SPECIFIC GRAVITY APPARATUS

100 Septems

FIH 108, MxD 45; CH 173, MxW 60. Mid to late 19 C. G.

Glass round-bottom flask, ground stopper; in green tin case, with upper chamber for brass weight (D26,H23).

The weight is hollow, its holding boss screws off, and it contains small lead shot.

Also cardboard box containing six glass "Sp. gr plummets displacing 1 cc water at 15.5°C" - small glass rods with glass rings on top for suspension.

0773 UDP041 SPECTROSCOPE - DIRECT VISION

A. HILGER. LONDON.

Sp 440; P 988x63x8; TeL 511, D 66&33. Early 20 C. G.

Iron tripod foot; curved mount for plate which has clamp brackets for telescope and missing collimator.

Foot is blue painted with three brass level screws; the curved mount sits on a disc on the foot and can revolve; in the centre of the plate is an oxidised brass platform which can rotate about 20°; another on top of this revolves another 10° or so using a knurled knob; a compound prism system of square cross-section and rectangular sides, containing liquid, fits on this; telescope optics missing.

2169 UDP255 SPECTROSCOPE - PROJECTION

Unsigned

MnL 282&237; FrsD 73,66&65. Mid to late 19 C. G.

Parts of at least two; brass and oxidised brass; two arms with rack and pinion extensions; three frames, two with lenses.

Each of the two arms has a square section insert expanded by the rack and pinion system; one ends in a ring frame with an internal screw thread; the other also has a ring frame, but the screw thread holds a plano-convex lens; a separate frame holds a second plano-convex lens.

0777 UDP044 SPECTROSCOPE - TABLE

A. HILGER LONDON [reported on scale - now missing]

Sp 288; H 366; CID 39&34. Early 20 C. G.

Iron tripod foot and tapered pillar; fixed collimator and reference telescope, brass mounts; telescope gone.

Also gone are the telescope scale (on which was the Hilger signature), the collimator slit, and some of the optics of the reference telescope; the prism table is in the form of an oxidised brass disc on a small brass pillar; metal ring (D115) above prism clamp.

2267 UDP345 SPINNER

Unsigned

L 538; H 162. Mid to late 19 C. G.

Cast iron; Y-shape base with decorative support struts between arms; on top, three-spoke wheel - groove and handle.

Black painted instrument with gold highlights; the groove is around the circumference of the wheel to which a leather thong would be attached to drive the element to be spun; a clamp allows the pivot for the wheel to be moved to tension the thong; at the end of the central limb are holes for missing elements - which would probably be a Watt's governor, ball and spring, glass bowl, etc - see 2314 QBP080.

2240 UDP318 SPINNER

Unsigned

B 301x182x39; H 504; WhD 413. Mid to late 19 C. G.

Wood base; iron; tapering pillar to axis of grooved wheel; five curved spokes; turned mahogany handle.

A leather thong connects the groove at the circumference of the wheel to the instrument to be spun; a clamp on the axis support allows the wheel to be moved about 42mm to tension thong.

2168 UDP254 SPINNER

Unsigned

WhD 118; L 171. Late 19 C. G.

Ivory handle on oxidised brass six-spoke wheel, drives, via two pulleys on frame, brass sleeve in brass tube.

Purpose unknown; clearly incomplete, since there is a screw thread at one end of the tube, and the other end is expanded to a fixed wider sleeve; suspect it has an optical purpose; but the optics are gone.

0697 UDP025 SPOUTING VESSEL

Unsigned

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H 1062; Hs 892x222x222; Sp 457&420.

Second ½ 19 C. G.

Brass and black metal; four curved feet; tall tank with one glass side and five brass stop-cocks - different apertures.

Three circular apertures, one square, one rectangle; holes with brass slides opposite; brass stop-cock inlet below.

Clearly derived from the "Grand Vase de Charles" at the Conservatoire des Arts et Metiers in Paris "pour les expériences sur l'écoulement des liquides"; this is of brass and was received in 1814; the apparatus demonstrates that the pressure exerted by a fluid varies as the depth of immersion changes.

Deschanel 1891,227 shows such an apparatus used to verify Torricelli's theorem.

2197 UDP283 STAND

BROWN BROS. PATENT

B 233x130; H 188. Late 19 C. G.

Cast iron shaped open base has two turned pillars at sides leading to U-shaped supports for missing part.

Signature cast into base, which has a circular hole in its centre; nature of missing part unknown.

0840 UDP106 STAND - ADJUSTABLE

Unsigned

BD 134; H 170; TD 136; PrSe 13x13. Mid to late 19 C. G.

Iron base; square section brass pillar between brass discs; rack and pinion adjust; mahogany table on top.

Brass hinged hook connects with a cog wheel to prevent table falling, but allowing it to rise.

0897 UDP163 STAND - INSULATING

HARVEY & PEAK LONDON

BD 148; H 286; TD 125. 1884-1909. F.

Four conical glass flasks; ground glass sleeve fused to bottom; glass rod rises via cork to mahogany table; one table missing.

Dates from Downing 1988,57.

0956 UDP224 STAND - INSULATING

YEATES & SON DUBLIN.

BD 111&116; H 284; PrD 12. Mid to late 19 C. G.

Two; turned mahogany base; brass sleeve; glass pillar with red painted metal sleeve on top of one of them.

2238 UDP316 STAND - INSULATING

Unsigned

BD 130; H 263; TD 78. Mid to late 19 C. G.

Cast iron base holds brass sleeve for white insulating pillar; on top, brass sleeve, rod, and brass disc table.

Base, bottom sleeve, the insulating pillar match those on conductors 2237 UDP315, but the rest of this seems to be original, while the wood conductors are probably not.

2155 UDP244 STAND - INSULATING

Unsigned

BD 121; H 755; P623x203. Late 19 early 20 C. G.

Iron base; brass sleeves for glass pillar and supports for ebonite plate; matches oscillators 0895 UDP161.

The vertical ebonite plate is held between brass brackets front and back, and top and bottom; the upper bracket is attached to a brass spherical conductor (D40) on the glass pillar and the lower to a brass ring around it and so to another spherical conductor (D31); both of these have screw threads for missing parts; the front of the plate has a sand-like substance on it.

Presumably used for Hertz radio wave work.

0896 UDP162 STAND - INSULATING

Unsigned

BD 158; H 344; RdD 16. Late 19 C. G.

Two Mascart's insulators; glass; hemispherical base; rod in centre, hemispherical sleeve on neck.

The glass base has a concave bottom; the central rod ends in an ebonite sleeve with screw thread for table (missing); its bottom is fused to the bottom of the base, which has a side aperture for supplying sulphuric acid.

Name from Ganot 1890,708.

0911 UDP176 STANDARD CELL - ZINC/MERCURY

MUIRHEAD & CO WESTMINSTER STANDARD CELL

BD 68; H 102; HsD 53. 1894-1900. W.

Cylinder brass housing; ebonite top; two contacts; thermometer shaft 10-30°: "M.F.1.454 B.A. VOLTS AT 15°C."

Muirhead & Co. listed from 1895-1910, Crawforth 1988, 18 and Anderson 1990,55.

0847 UDP113 STANDARD VOLUMES - METRIC

Unsigned

H 50-265; D 43-246. Late 19 C. G.

Oak; stapled cylinders; black iron ring on top and oak ring below; eight; from deca to demi deci litre.

Decalitre, demi decalitre, double litre, litre, demi litre; double decilitre; decilitre; demi decilitre.

0903 UDP169 STOOL - INSULATED

HARVEY & PEAK LONDON

H 153; T 307x231x21; LgMxD 42. 1884-1909. F.

Mahogany stool on heavy tapering circular-section glass legs.

Dates from Downing 1988,57.

2153 UDP242 STOPPER

Spencer & Son 19 Grafton St. Dublin.

L 280; MxD 65; DiD 36. 1869-1883. A.

Turned brass bung has white metal wire through centre leading to disc 2/3rds way down; purpose unknown.

The central wire can be moved up or down, and is clamped by a knurled knob which screws down on top of the bung; on top of the wire is a small screw which holds a right-angled arm (L63MxW13) having a hole in its far end for some missing part.

It seems likely that the stopper fits into some sort of flask, and perhaps an electric charge can be transferred to the disc within the flask.

Dates from Morrison-Low 1989,136.

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0920 UDP185 SWITCH

ELLIOTT BROS LONDON

B 150x101x13; H 119. Late 19 early 20 C. G.

Short-circuiting reversing key; ebonite base; six conical ebonite pillars; two push keys; ebonite lozenges.

Two of the ebonite pillars have contacts; at other side of base two more hold the push keys; centre two have contacts and support drop-shaped ebonite lozenges, turned by brass T-shaped levers to vary pressure on key springs; one of centre contacts connects with contacts below keys; other has bracket to support screwed pieces to contact key springs when they are not depressed.

Illustrated in Baird 1924,424.

0843 UDP109 TELEGRAPH - ALPHABETICAL

Unsigned

B 139x138x25; H 55; DiD 79. Mid to late 19 C. G.

Mahogany base has two brass contacts; brass housing for white disc alphabet dial; handle; contact at back.

The ivory handle is attached to a brass arm which slots into cogs on the dial housing; at the back is a brass cogged wheel which makes and breaks contact with a spring as the handle is turned.

0790 UDP056 TELEGRAPH - MORSE

YEATES & SON, DUBLIN

B 247x154x24; H 195. Mid to late 19 C. G.

Mahogany base; pointed wood backing for green code chart; front needle and two keys; back coil and four contacts.

Base has four feet; brass mounting for coil; keys have ivory buttons and brass springs; two-point brass switch with ivory handle; brass housing behind for missing part (bell?); front gives alphabet with sequence of /s (for dots) and /s (for dashes); with "CH-----/lll/" "Understood---/" and "Repeat----".

0939 UDP204 TESLA COIL APPARATUS

Ferdinand Ernecke Berlin S.W. 46.

B 621x309x49; CyL 67, D 57. Late 19 early 20 C. G.

Mahogany base; disc for leyden jar; ebonite cylinder on two pillars for two spherical conductors; incomplete.

Coil set up missing from side of base opposite Leyden jar base disc (Leyden jar missing); spark gap cylinder on two tapering turned pillars has small (9x6) window.

Workshop founded in 1859, Brachner 1985,139; more modern version illustrated in Baird 1924,543.

0816 UDP082 THERMAL CONDUCTIVITY APPARATUS

YEATES & SON. DUBLIN.

H 291; RiD 196; Brs 148x18. Mid to late 19 C. CT.

Green painted tripod foot; iron pillar; brass clamp for mahogany ring; four metal bars sit cross-shaped on this.

Circular indentation at outside of each bar for phosphorus; ends of bars at centre of wooden ring are pointed and heat is applied to each at the same time; the time at which the phosphorus ignites depends on the conductivity of the material of the bar; point of one bar broken.

Illustrated in Yeates 1883,19.

2258 UDP336 THERMAL CONDUCTIVITY APPTS - INGENHOUSZ

PHILIP HARRIS & CO LIMITED BIRMINGHAM & DUBLIN

Ty 311x111x93; L 430. 1902-1911. F.

Black tin tray has turned wood handle at one side and, at the other, six sleeves for corks and metal rods.

Name from Griffin 1910,477; dates from Morrison-Low 1989,126.

2257 UDP335 THERMAL CONDUCTIVITY APPTS - INGENHOUSZ

Unsigned

Bx(+Ld) 270x130x100; H 266; RdsL 200.

Mid to late 19 C. G.

Brass box and lid on four bent wire legs and with chimney (D37) has five of eight bars of various metals sticking out sides.

Labelled: "ARGENT CUIVRE LATTON ACIER FER ETAIN ZINC" - eighth bar without name.

Name from Griffin 1910,477.

0831 UDP097 THERMO-ELECTROMAGNET

E. Leybold's Nachfolger A.G. Köln-Rhein 5 kg

BD 93; H 278; WiD 10. Early 20 C. G.

Iron 5Kg weight; nickel block on top split in two; bent thick copper wire in two grooves in block; hook on top.

"Thermo-Electromagnet..comprising one copper-nickel thermocouple the current of which is sufficient to saturate the electromagnet to such an extent as to enable it to carry 5 kg with one turn of copper wire." - Kohl List 100, Vol.3,1926,1044.

2160 UDP249 THERMOMETER

Unsigned

Rs 83x56x47; H 581; BuD 58. Late 19 C. G.

Glass bulb with capillary tube turned 180° and straight tube into iron mercury reservoir; height scale 1-50cm.

The reservoir has a brass knurled knob at its side, presumably to adjust the mercury level; at present there is mercury in the glass bulb, but presumably this should be in the reservoir, and the mercury should rise in the straight vertical open tube; between the sleeves for the tubes is a pillar to which clamps a sleeve holding the boxwood scale.

2200 UDP286 THERMOMETER - BECKMANN

Unsigned Centigrade 1/100°.

L 568; MxD 17. Mid to late 19 C. G.

Glass; mercury rises in capillary tube; white glazed scale 1-0-6; brass cap.

Divisions on scale numbered 1, 2, 3...9 between larger numbers 6, 5, 4, 3, 2, 1, 0, 1.

Also smaller thermometer (L298;TuD8) with internal capillary tube for mercury and paper scale 32-580°F.

2246 UDP324 THERMOMETER - GLASS MERCURY

Centigrade Normalglas. F.O.R. Götze, Leipzig.

L 402; MxD 10. 1876-1910. W.

Central capillary tube; wider outer protecting tube; white glazed scale 120-160°.

Brachner 1985,140 gives foundation of Robert Götze, Leipzig, workshop 1876; exhibited Brussels 1910.

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0811 UDP077 THERMOMETER - GLASS MERCURY

T.H. MASON DUBLIN MADE IN ENGLAND No 144

D 8; P 371x32x3½; C 390x50x23. Early 20 C. R.

Metal scale plate and silvered scale 0-50°; same scale on thermometer; in case lined with green silk and velvet.

Most of thermometer missing; case covered in red paper; monograph with signature NPL(?) 27 (presumably National Physical Laboratory).

Thomas Holmes Mason took over the firm in 1913, Mason 1980,12.

0681 UDP009 THERMOMETER - LESLIE DIFFERENTIAL

E. Ducretet et Cie 21 Rue des Ursulines à Paris

H 515; BusD 44. c1875. F.

Turned wooden base and pillar support U-shaped scales; damaged pear shaped bulbs on top of capillary limbs.

Scales 20-0-30° and 15-35° on each side; indicating liquid (red sulphuric acid, see reference) is missing; no stop-cock between bulbs.

Name from Deschanel 1891,275; Anderson 1990,25 gives this address for E. Ducretet (no & Cie) in 1870.

2244 UDP322 THERMOMETER - MAXIMUM

14566 CASELLA LONDON MAXIMUM T. MASON 5, DAME ST. DUBLIN

L 350; W(-Ha) 65. 1900-1916. A.

Oak base; white ceramic scale 10-0-60°; mercury indicator; oxidised brass double-arch bulb protection.

Two supports to mount thermometer horizontally; mounted with matching minimum thermometer 2245 UDP323.

2245 UDP323 THERMOMETER - MINIMUM

14568 CASELLA LONDON MINIMUM T. MASON 5, DAME ST. DUBLIN

L 350; W(-Ha) 65. 1900-1916. A.

Oak base; white ceramic scale -30-0-40; mercury indicator; oxidised brass double-arch bulb protection.

Thermometer bulb broken; two supports to mount thermometer horizontally; mounted with matching maximum thermometer 2244 UDP322.

0809 UDP075 THERMOMETER - SOLAR RADIATION

J. Hicks, 8 Hatton Garden, London No 35 Patent 3647

L 423; PrH 172; SrD 61; TuD 21. 1864-1884. A.

Brass stand; horizontal glass protective thermometer tube with sphere at bulb (blackened) end; 50-0-170°; thermometer mercury column broken.

Dates from Downing 1988,59.

0810 UDP076 THERMOMETER - SOLAR RADIATION

Yeates & Son Dublin.

L 444; SrD 55; TuD 23. Mid to late 19 C. G.

Protective glass tube with sphere at bulb (blackened) end; inner thermometer 10-200°; mercury column broken.

0839 UDP105 THERMOMETER - WEIGHT

Unsigned

CysL 73&83, D 15&14; H 98&112. Late 19 C. G.

Two; glass cylinder closed at bottom and with open capillary tube bent in two right-angles on top.

Name from Preston 1894,121.

2227 UDP305 THERMOPILE

Unsigned

BD 99; MnH 248; PrD 19. Early 20 C. G.

Brass; base holds expanding pillar; ring clamp screw; vertical cylinder housing; rectangular section funnel.

The funnel revolves so that it can either lead to the element or be shut off; the element is in an ivory frame with copper surround and can be removed from its housing by freeing two holding screws; two copper(?) contacts on top; funnel can slide out of its groove; No "6" on inside of element housing.

0865 UDP131 THERMOPILE

Unsigned

BD 75; H 173; HsD 16, L 27; MxD 39. Late 19 C. G.

Expanding brass stand; horizontal cylinder housing; ebonite plate and two contacts at back; cone in front; cone is black on the outside and silvered on the inside.

2156 UDP245 TRADE LABEL

THOMAS MASON, OPTICIAN, 5 DAME STREET, (LATE 21 PARLIAMENT STREET), NEAR THE CASTLE DUBLIN. ESTABLISHED 1780.

C 198x78x26. 1900-1914. A.

Printed on cardboard spectacle case with illustration.

"Registered No..... Every particular of this Pair of Spectacles is registered in my Book; and in case of loss or accident, another pair exactly similar, can be sent by post, by forwarding the above number and a Post Office Order, for the amount to" (here follows the "THOMAS MASON..." details given above); case, now missing its right-side panels contains cotton wool and paper packing, with some glass elements.

The illustration is of eyes and spectacles; this illustration is known also from a photocopy of a Trade card for the 11 Essex Bridge address (1878-1883): "ESTD. A.D. 1780 SPECTACLES MADE ON SCIENTIFIC PRINCIPLES AND ADAPTED TO EVERY CONDITION OF SIGHT. Every particular of this pair of Spectacles...[as above]..Order for the amount to THOMAS MASON, OPTICIAN, 11, ESSEX BRIDGE, DUBLIN, Mathematical & Philosophical Instrument Maker TO HIS EXCELLENCY The Lord Lieutenant and the Irish Court."

Dates from Morrison-Low 1989,131, and Mason 1980,12.

0682 UDP010 TUNING FORK

RK monogram (Rudolph Koenig, Paris)

L 266-451; W 40; C 509x359x99. 1858-1901. F.

Oak case with seven white-metal forks (eighth missing); screw thread bottoms with brass knurled knobs.

Most have screw holes at top for accessories; four have brass electrical contacts at bottom of fork; case also contains two unmatched and unsigned forks (L444&332, W40& 38) 50UD and 100UD with screw thread bases, one has lead weight to one side and T-shaped brass pieces on top of the limbs, smaller has neither but has screw holes on top of the limbs; top of case

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detached and broken.
Dates from Payen 1986,160.

2226 UDP304 TUNING FORK ON RESONANCE BOX

RK (Rudolph Koenig monogram) UT4 1024 VS
Bx 159x86x47; H 211; FoW 30. Late 19 C. G.
Mahogany-veneered resonance box with open end and recent plywood top; turned wood boss for dark metal fork.
Contrasts in size with 0685 UDP013.
Firm dates 1858-1901, Payen 1986,160.

0685 UDP013 TUNING FORK ON RESONANCE BOX

RUDOLPH KOENIG A PARIS [on box] RK [monogram on fork]
Bx 590x279x152; FoH(-B) 337, W 56. 1858-1901. F.
White metal fork on mahogany-veneered resonance box; second identical instrument; both inscribed UT2 256VS.
Dates from Payen 1986,160.

0800 UDP066 TUNING FORK ON RESONANCE BOX

YEATES & SON RUDOLPH KOENIG A PARIS HARVEY & PEAK
Bx 199X96X54; H 480; FoW 59. Mid to late 19 C. G.
White metal Harvey & Peak fork, now mounted on veneered resonance box SOL3 with Yeates & Koenig signatures.
Box is missing its turned wood boss - it presumably originally had a smaller fork, the instrument corresponds to, though is smaller than, 0799 UDP065.

0799 UDP065 TUNING FORK ON RESONANCE BOX

YEATES & SON OPTICIANS DUBLIN RUDOLPH KOENIG A PARIS
Bx 240x106x59; H 241; FoH 131, W 33.
Mid to late 19 C. G.
On mahogany veneered boxwood resonance box.
Also two unsigned forks on boxwood boxes, one has clamps on ends.
Measurements of unsigned pair: (Bx312x118x63;FoH155, W34); Koenig signature indistinct within Yeates & Son elliptical stamp on signed instrument, but can be deciphered with reference to 0800 UDP066; "Y MI3" also inscribed on box.

0690 UDP018 VERNIER MODEL

E. DUCRETET & CIE A PARIS
R 561; AcL 474. c1880. F.
Boxwood; arc with scale 0-45° is supported by two radii; clamped to this is a smaller arc vernier 0-15.
Anderson 1990,25 gives this name for the firm in 1879 and 1880.

0805 UDP071 VIBRATING ROD

W. LADD 11 & 12 BEAK STREET REGENT STREET. W
Sp 190; BH 232; DiD 22. 1861-1872. A.
Curved triangular iron base; central brass pillar; three oxidised brass supporting strips to disc for rod.
The brass disc has a knurled knob at side to clamp the rod (at present stuck), which presumably should be able to move up and down inside the pillar; the instrument is very similar to the rod for Lissajous figures (0806 UDP072), but the vibrating rod is not in two parts and may just be to demonstrate the relationship between frequency and length of the rod.
Dates from Crawforth 1988,11.

0806 UDP072 VIBRATING ROD FOR LISSAJOUS FIGURES

HARVEY & PEAK SUCCESSORS TO W. LADD & CO BEAK ST LONDON
Sp 190; BH 253; DiD 33; PrD 10. Late 19 C. F.
Curved triangular base; central brass pillar; three oxidised brass supports to brass disc for two-part rod.
The parts of rod at right-angles; the upper part tapers and ends in a silver disc (D5); the rod moves up and down in the pillar; see also the entry for the Kaleidophone, 0803 UDP069.
Firm founded in 1884, Downing 1988,57.

0804 UDP070 VIBRATING ROD FOR LISSAJOUS FIGURES

YEATES & SON DUBLIN
BD 126; PrH 135; RdL 310. Mid to late 19 C. G.
Cast iron fluted base; tapering brass pillar to clamp for rod - in two parts at right-angles, now detached.
See also the entry for the Kaleidophone, 0803 UDP069.

2260 UDP338 VOLTMETER

MODEL 45. NO 10126 MADE BY THE WESTON ELECTRICAL INSTRUMENT CO. NEWARK.. N.J. U.S.A. PATENTED
Hs 198x198x110. Early 20 C. G.
Oak housing; white metal arc frame; white scale 0-150; parallax mirror under needle; two white-metal contacts;
Patents noted from 6:11:1888 to 16:7:1901.
Last Patent 1901.

0918 UDP183 VOLTMETER

WESTON ELECTRICAL INSTRUMENT CO. NEWARK, N.J. U.S.A. PATENTED NOV.6th 1888 No 11803
ELLIOTT BROTHERS LONDON
B 169X151X34; H 66. Patented 6:11:1888.
Direct reading milli-voltmeter; wood base; red metal fan shaped housing; moving coil; scale 100-0-100.
Second scale 0-10-0; needle connected to moving coil; ebonite-covered brass contacts and plug switch (plug missing); glass cracked.

2170 UDP256 VOLTMETER - UNIPIVOT

ROBT. W. PAUL. LONDON. MILLIVOLTS NO K.812. PATENTED
Hs 178x171x59. 1891-1919. F.
Mahogany housing; white arc scale 0-120 with parallax mirror; "RES 500&1000 OHMS AT 20°C CU 14.1"
Dates from Cattermole 1987,98-104.

2241 UDP319 WAVE DEMONSTRATION APPARATUS

Unsigned
B 677x194x24; H 937; SrsD. Mid to late 19 C. G.

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Powell; mahogany base and supports; turning brass rod for 21 brass rings; rods from these to white spheres. The turned mahogany and metal handle turns the rod, on which the rings are mounted off-centre - thus the top spheres move up and down demonstrating the movement of a sound wave.
"Powell" from Clongowes 1854,5 - "Powels wave appara-tus" acquired in 1855.

0958 UDP225 WIND CHEST

Signature plate missing

B 258x162x41; Hs 204x100x64. Mid to late 19 C. G.

Iron base; mahogany housing with two input brass pipes and stop for each pipe; on top, sleeves (D43) for pipes; base has four feet.

0842 UDP108 WORM SCREW & COG WHEEL

Unsigned

B 255x158x18; H 383; WhD 85. Mid 19 C. G.

Wood T-shaped base with three pillars to table holding axis of brass cog wheel and mounts for brass worm screw; part of handle missing.

0314 UDP137 X-RAY TUBE

X Ray "Focus" Tube SOLD BY NEWTON & CO.,

3, FLEET STREET, LONDON.

GREEN & BAUER LICENSEE No 20882 1897

H 485; D 150. Patent 23:11:1897.

Spherical glass; four arms; disc, rectangle electrodes.

Disc electrode is concave and of white metal; angled rectangle electrode at centre of glass sphere joined by coil to side arm with disc electrode; fourth arm has contact and contains asbestos-like material.

Other more recent X-ray tubes include "Coolidge Tube", patents 1911-1935; "Solus" tube, patent apparently 30:12:1913 (evidence now gone); and "COX'S RECORD TUBE"; also another unsigned - similar to Newton tube.

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ULSTER FOLK AND TRANSPORT MUSEUM - UFM

Cultra

Co. Down

Telephone 01232-428428

4099 UFM016 AIR PUMP - SYRINGE

NEWTON & CO OPTICIANS 3 FLEET STREET LONDON

B 261x203x48; H 308; PuD 38; PD 153. Late 19 C. G.

Mahogany base with four feet; brass; angled syringe pump; air pump plate with glass bell jar stuck on top.

An oxidised brass tube joins the bottom of the pump to a pipe under the plate, this pipe being equipped with a stop-cock; a knurled knob on a vertical rod sits on the bracket holding the pump and the tube; a turned wood handle and iron rod work the piston in the pump.

Frederick Newton & Co were at 3 Fleet Street from 1858-1910, Anderson 1990,59-60.

4116 UFM031 ARTIFICIAL HORIZON

[Label] G. WHITBREAD 2 Grenada Terrace, Commercial Road, East, London.

PyB 157x84, H 113; C 190x142x123. 1842-1874. R.

Mahogany case and base; oxidised brass pyramid; vial.

The base tray holds mercury from the turned boxwood vial (D55,H96), which has a turned ivory cap; the pyramid cover has two sloping rectangular glazed sides, and two triangular oxidised brass sides.

Inside the lid is a trade label: "G. WHITBREAD, Manufacturer of Surveying Instruments, & ALL SORTS OF Sextants, Quadrants, Telescopes, Compafses, &c. 2 Grenada Terrace, Commercial Road, East, London."

Dates from Downing 1988,141.

4125 UFM040 BALANCE - PRECISION

W.B. NICOLSON, GLASGOW

BmL 245; C 468x411x249. Early 20 C. G.

Glazed mahogany case; mahogany base; turned green pillar; solid brass beam, one side divided 1-9.

The base has two brass level screws and one other foot; a knob at the centre raises the beam from its supports; hooked suspension brackets on the ends of the beam hold the supports for the brass pans.

4107 UFM022 BAROMETER - ANEROID

W. GERARD, LIVERPOOL.

H 602; MxW 193; SHd 193. Early 20 C. G.

Shaped mahogany backing with scroll top and onion-shaped bottom; thermometer plate; silvered dial 25-31".

The actual thermometer is gone, but the brass scale plate 10-120° remains; the dial has two hands, and is inscribed: "STORMY RAIN CHANGE FAIR VERY-DRY"; its position has been rotated clockwise with respect to the backing board.

Firm not recorded in Banfield 1991 or Clifton 1995.

4104 UFM021 BAROMETER - BANJO

G. GIACCOMELLI BELFAST

H 995; MxW 263; DID 202 (8"). Mid 19 C. G.

Mahogany with light wood stringing; scroll top; hygrometer, thermometer, mirror, dial, spirit level.

There is a small brass finial between the wings of the scroll top; the glazed hygrometer reads 20-0-20 "DRY" or "DAMP"; the glazed broken thermometer has scale 20-100°; the (dislodged) convex mirror is framed with a fluted mahogany ring; the silvered dial plate, 28-31", is labelled "MUCH RAIN RAIN Change FAIR SETFAIR Very Dry"; the brass hand remains in place but the blued steel hand is detached; the glazing in front of the yellow spirit level, around which is the signature, is gone; the bottom of the barometer is flat.

Giaccomelli is not listed in Burnett & Morrison-Low 1989, nor Banfield 1991.

4097 UFM014 BAROMETER - MARINE

NEGRETTI & ZAMBRA LONDON MARK IV MO 2863/45/52 BT 818

L 891; TuD 26; C 926x93x91. c1916. D.

Kew pattern; black-enamelled brass; gimbal mount; white-metal cylinder scale 88-108 and 26-32; thermometer.

Hinged bracket to pivot for gimbal mount; sealed iron cistern below; glass cylinder cover on scale, which has vernier sliders 2-10 and 1-5, moved by a knurled knob below; on the shaft is a glass-mercury thermometer 260-320°, with height above water scale 0-100 "FEET", Latitude scale 0-90 "LAT", and "CORRECTION TO BAROMETER" scale -7-0-8; a brass plaque on the shaft reads: "MO [monogram] 818 STANDARD TEMPER-ATURE FOR 1000 MB 284°.6 A C[?]16"; contained in a boxwood case with a broken tube, the cistern of a broken thermometer, and some loose mercury.

Inside the lid is a Certificate: "KEW OBSERVATORY RICHMOND SURREY THE NATIONAL PHYSICAL LABORATORY, TEDDINGTON, MIDDLESEX, KEW CERTIFICATE OF EXAMINATION" for barometer No. "BT. 818", dated "4th February, 1916".

4101 UFM018 BAROMETER - STICK

R COLLINS Fecit. PAISLEY

H 935; MxW 152. 1810-1850. R.

Mahogany with light wood stringing and marquetry; flat top; tube exposed; glazed register plates; thermometer.

A hinged glazed frame covers the register plates, which have coloured leaves and flowers, scale 28-31", and a sliding brass plate to mark the previous mercury level; the scale is marked "V Dry S.Fair FAIR CHANGE RAIN M.Rain Stormy"; at the other side of the tube is a red spirit thermometer 0-100° with markings for "Blood heat Sumr=heat Temp=erate, Free=zing"; the rectangular cistern cover has a foliate marquetry design on top.

Banfield 1991,56 gives estimated working dates for Robert Collins of Paisley - 1810-1850.

4102 UFM019 BAROMETER - STICK

J.L. Polti LEEDS

H 946; MxW 186. 1822-1834. WR.

Mahogany with some striped stringing; broken pedestal top; tube exposed; glazed register plates with slider.

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A hinged glazed frame covers the paper register plates, scales 28-31" for "Summer Very Dry Settled Fair FAIR Change RAIN Much Rain Stormy" and "Winter Hard Frost Settled Frost FROST Change SNOW Much Snow Stormy"; a wire above the left-hand plate has a sliding axe head and pointer; the cistern is covered by a turned mahogany disc. Banfield 1991,173 gives working dates for Joseph Polti of Leeds, 1822-1834.

4103 UFM020 BAROMETER - STICK

Troughton London

H 1008; MxW 138. Late 18 early 19 C. G.

Mahogany; scroll top; tube behind arc-fronted housing; arc glazing over register plates; thermometer.

There is a ivory boss between the scrolls on top (one of which is damaged); the silvered plate has scale 27- 32" - "FAIR Changeable RAIN", with a slider 2-10 operated by a brass and winged ivory key in a slot below the plates; on the left side of the register plates is a broken mercury thermometer, with scales -5-115° and 0-120°; the cistern cover is gone; below the cistern is a brass knurled adjusting knob.

The firm of Troughton worked from 1756-1826, Porter 1985,34-5.

4121 UFM036 COMPASS - MARINE

SIMPSON LAWRENCE & CO GLASGOW

C 227x223x162; CpHsD 162. Early 20 C. G.

Mahogany case with slide-in top; brass gimbal mount for wet-card compass, with black and white card.

The card has a fleur-de-lys for North and black triangles for the other seven major compass points; some of the paint in the centre is missing, showing the central copper mound on the card.

4111 UFM026 DIAL - HORIZONTAL PEDESTAL

BY J.C 1855. JOSEPH MAXWELL Latd 54.16.N

613x611; DisD 401,237,179. 1855. S.

Square slate; central dial, and four corner dials for London, St Petersburg, New York, and Jerusalem.

The central dial has a compass design in the centre, then "AFTERNOON Van Diemens Land time Lat 42.S. Long 150 E" with divisions for hours, halves, and quarters; its hours are from 2-10-6, where hour 10 is at the same point as hour 12 on the larger surrounding dial; the latter is the main central dial, divided into quarter hours 4-12-8; the four corner dials are for: London time, Lat 51.31N Long 0, longest day 15; St Petersburg time, Lat 60N Long 32E, longest day 18½; New York time, Lat 41N Long 70W, longest day 15; Jerusalem time, Lat 32N Long 40E, longest day 14; all of the longest days are given in "Houers"; the dial has a heavily-incised leaf design; a corner had been broken, but has been repaired; no gnomons remain.

4108 UFM023 DIAL - HORIZONTAL PEDESTAL

Unsigned 1908 BLACK Hd. LIGHT Hs. Lat. 54°-46'-0" Long. 5-41-25 Time 2 mins fast by Dublin Time.

457x457. 1908. S.

Square slate; hours IIII-XII-VIII; heavy brass gnomon.

The hours are around the outside, divided into five minute lines, with longer lines for quarter and half hours; panels beside the large solid gnomon give details of "Clock faster" and "Clock slower" minutes for the days of the months; the measured angle of the gnomon is c51°; the dial is secured to its backing by four brass hexagonal bolts; and it has a green-painted edge.

4117 UFM032 DRAWING INSTRUMENTS - SET

Unsigned

C 174x108x46. Mid to late 19 C. G.

Mahogany case contains a purple velvet-lined tray for a pen, pair of compasses, and dividers, with fittings.

The tray has ten items in all, seven of them inserts into the changing arm of the pair of compasses, the others a set of dividers, and a pen with a turned ivory handle; under this tray is a compartment which now contains modern set squares and protractors; the lid of the tray is hinged with, underneath, a blue paper-covered pocket.

4124 UFM039 ELECTRIC MOTOR

MOTEUR A. CLEMENT TYPE B - NO 1004 BTÉ S.G. V[?] 6.

B 292x236; H 474. Early to mid 20 C. G.

Cast-iron; base holds frame for armature with eight coils at side and central commutator; flywheel; fan; piston.

A handle to turn the armature does not now revolve; gauze brushes tap the commutator; at the top is a four-vane fan, which was connected to a fly wheel on the axis of the armature; beyond this is a vertical cylinder housing, with external cooling rings; it has screw-threaded holes on top, and a pivot for a vertical arm with a spring into the cylinder, and a long vertical arm to a rocker below.

4086 UFM004 ELECTRICAL MACHINE - CLARKE

FANNIN & Co. 41, Grafton-street Dublin.

C 250x114x110. c1860. G.

Mahogany case; horizontal U-shaped magnet; brass frame with mechanism to revolve two coils at poles of magnet.

A wood and brass handle fits into a slot on the front of the case, and this drives a large cog-wheel; in turn this drives a small cogwheel at the axis of a large pulley wheel; a (missing) thong from this turns a small pulley wheel at the axis of a frame holding two blue-velvet-covered coils at the poles of the magnet, which has a keeper, whose position can be adjusted via a rod to a knob on the side of the case; two insulated wires carry the electric shock to two (missing) hand-held electrodes.

A label on the inside of the lid reads: NEWLY INVENTED IMPROVED MAGNETO-ELECTRIC MACHINE. FOR NERVOUS DISEASES DIRECTIONS. - Connect two metallic cords or wires with the Sockets in the ends of the Box, and apply the handles connected with the other ends of the metallic cords or wires to any part of the person through which it is desired to pass the current of Electricity. Then turn the Crank, regulating the strength of the current by the speed, and by the Knob at the end of the Box; it being desirable to increase the strength only to that degree most agreeable to the patient. It is less unpleasant to the patient if wet sponges are placed in the ends of the Handles, and these applied to the skin, as they prevent the prickling sensation. The sponges should never be put inside of the Box while wet, as they rust the machinery. In applying it for the Toothache, Tic-Doloureux, or Neuralgia, the operator takes one Handle and places his fingers or sponge over the part affected, while the patient holds the other Handle. In applying it to the foot, place one of the Handles in the water with the foot, and hold the other in the hand, or apply it to any other part of the person. The Bearings and Spring must be oiled occasionally."

This instrument was supplied by Fannin & Co, whose label on the instrument reads: "FANNIN & CO. Medical Booksellers and SURGICAL INSTRUMENT MAKERS, 41 Grafton-street Dublin" - a Firm which still exists in Dublin.

Essentially identical coils, noting the award of an 1862 prize medal, indicate a date just before this.

4088 UFM006 ELECTRICAL MACHINE - CLARKE

JOSEPH GRAY & SON TRUSS WORKS SHEFFIELD

C 263x119x113. Post 1878. D.

Mahogany case; horizontal U-shaped magnet; brass frame with mechanism to revolve two coils at poles of magnet.

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This machine is similar to 4086 UFM004, with the differences that it does have its hand-held brass cylinder electrodes, and the thong between the pulley wheels.

The label inside the lid differs also in illustrating two prize medals "FIRST PRIZE MEDAL, LONDON, 1862" and "SILVER MEDAL AT PARIS EXHIBITION, 1878", and calling the instrument "IMPROVED PATENT MAGNETO-ELECTRIC MACHINE".

4089 UFM007 ELECTRICAL MACHINE - CLARKE

PAWSON & BRAILSFORD, LITH. SHEFFIELD.

C 221x119x109. Post 1878. S.

Mahogany case; horizontal U-shaped magnet; brass frame with mechanism to revolve two coils at poles of magnet.

This "IMPROVED PATENT MAGNETO-ELECTRIC MACHINE" is a smaller version of those listed above, and it retains its brass cylinder electrodes, and the thong between the pulley wheels; it differs in having no cog-wheel mechanism, the handle directly driving a decorated pulley wheel.

The label inside the lid illustrates "FIRST PRIZE MEDAL LONDON 1862" AND "SILVER MEDAL PARIS 1878".

4087 UFM005 ELECTRICAL MACHINE - CLARKE

J. ROBINSON & SONS OPTICIANS 65, GRAFTON ST. DUBLIN

C 263x123x114. 1862-1878. D.

Mahogany case; horizontal U-shaped magnet; brass frame with mechanism to revolve two coils at poles of magnet.

This machine is similar to 4086 UFM004, with the differences that it does have its hand-held brass cylinder electrodes, the coil covers are of purple velvet, and it retains the thong between the pulley wheels for the driving mechanism.

The label inside the lid differs also in illustrating a prize medal "1862 LONDINI HONORIS CAUSA", and calling the machine "IMPROVED PATENT MAGNETO-ELECTRIC MACHINE".

Later models (see 4088 UFM006) illustrate an 1878 medal, giving for this instrument a range of dates 1862-1878. The label for Robinson & Sons would date from 1885 (Morrison-Low 1989,133), which suggests they may have supplied it second hand.

4090 UFM008 ELECTRICAL MACHINE - CLARKE

Unsigned

C 254x125x117. c1860. G.

Mahogany case; horizontal U-shaped magnet; brass frame for (broken) pulley wheel to revolve (missing) coils.

This "MAGNETO-ELECTRIC MACHINE FOR NERVOUS DISEASES", is a version, in distressed state, of the Pawson & Brailsford instrument (4089 UFM007), in that there is no cog-wheel mechanism, but the handle drives a decorated wheel; it differs in being left-handed, with the magnet the other way round, and the handle on the left side; it is also an earlier instrument, with no prize medals listed; the electrodes are missing.

4110 UFM025 HYDROMETER - SIKES

[On case] SIKES'S HYDROMETER BUSS 33 Hatton Garden LONDON Maker to the REVENUE of the UNITED KINGDOM (plus coat of arms)

No measurements available. c1895. A.

Gilt brass; scale 0-10; thermometer; seven weights.

There remain six of the original nine disc weights, plus the cap weight; the ivory-backed mercury thermometer has scale 30-100°, and is signed: "BUSS 48 HATTON GARDEN LONDON"; the instrument is signed: "BUSS, 33 Hatton Garden LONDON No 20768 SIKES P51°"; it is contained in a mahogany case, lined with purple silk and velvet, and with an ivory signature plaque on top of the lid, which has pale wood stringing.

Crawforth 1988,5 gives the No.33 Hatton Garden address from 1866-95, and the No.48 from 1896-1914.

4109 UFM024 HYDROMETER - SIKES

[On case] SIKES'S HYDROMETER BY JOSEPH LONG, 43 EASTCHEAP LONDON.

L 175; D 40; C 206x98x54. Late 19 early 20 C. G.

Gilt brass; scale 10-0; ivory-backed mercury thermometer; nine disc weights plus a cap weight; mahogany case.

The thermometer is signed: "J LONG 43 EASTCHEAP LONDON" and its scale is 30-100°; the instrument is signed: "J. LONG. LONDON 23800 SIKES P51°"; it is contained in a mahogany case, lined with purple silk and velvet, and with an ivory signature plaque on the top of the lid, which has pale wood stringing.

Joseph Long was at this address from 1885-1936, Crawforth 1988,11.

4123 UFM038 LANTERN - UNIAL

Unsigned

L 420; H 290. Late 19 early 20 C. G.

Russian iron and brass; housing with rounded top, cowl above, and three doors; brass-housed lens system.

The two doors at the sides have brass-framed blue glass disc windows, with hinged brass flaps; the front part of the lens system, beyond where the slides would have been inserted, is moved by means of a knob on the front centre above the base; focus is by (broken) rack and pinion at the objective lens.

4122 UFM037 MARINE AZIMUTH INSTRUMENT

Unsigned PATT.996 No 228.K. (Panel "PATT.920 Z.3.")

BD 234; H 152; C 260x260x168. Patented 1915[?]. P.

Black enamelled brass; ring base; Y-shaped span on it; supports for rotating prism; two hinged shades; case.

At the sides of the base ring are two small brass bosses; there is a bubble level on the stem of the Y- span; the supports from this span hold an angled semi-circular tube with a lens in the centre, above a pointer at the bottom; on top of the tube are double knobs to turn the rotating prism, and there are two black glass shades in U-shaped hinged supports; the instrument is housed in a boxwood case, which also contains an arced metal panel labelled "PATT.920 Z.3."

These Marine Azimuth Instruments were used over a compass card in ship navigation: this one is a variation on those patented in 1883 and 1890 by Lord Kelvin, and made by James White of Glasgow (see Clarke 1989,271).

The "PATT. 996", without a year, may refer to a 1915 Patent, or could be a Pattern number.

4091 UFM009 OCTANT

[On scale] BERGE LONDON

L 295; W 245; AR 265. 1800-1819. R.

Ebony, ivory, and brass; curved T-insert in frame; scale 0-90; index mirror missing; presented 1824.

The instrument is in distressed condition, with no index mirror, only a mount for the horizon mirror, no shades, and no peep hole, with a piece cut out of the cracked frame, and the signature plaque gone; the brass index arm has a window vernier at the bottom, with the vernier scale gone, reading the signed ivory scale; under the frame is a handle, and a clamping bracket to adjust the horizon mirror.

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The index arm has the inscription: "Token of Affection From Captain Plumridge Royal Navy. To Wm Crawford Midshipman 10th May 1824."

Matthew Berge succeeded Jesse Ramsden on his death in 1800, and himself died 1819; Historical Technology 133,1990,186.

4092 UFM010 OCTANT

Troughton London

L 305; W 246; AR 276; CL 310, W 280.

Mid to late 18 C. G.

Ebony, ivory, and brass; curved T-insert in frame; scale 0-100; index and horizon mirrors; three shades.

The brass index arm has a window vernier at the end reading the scale, and it has tangent and clamping screws; the shades are green and two reds in square frames; there is a peep-sight with two holes, and a flap to close one; underneath are three feet, and a clamping bracket to adjust the horizon mirror; the octant is housed in a shaped oak case; it is in beautiful condition, though the scale is detached.

Presented by the School of Maritime Studies, Ulster Polytechnic.

The Troughton firm was set up in 1756, and became Troughton & Simms in 1826, Porter 1985,34-5.

4096 UFM013 SEXTANT

Crichton Bros.. London 4816

L 235; W 269; AR 205; C 329x266x122. 1871-1877. WR.

Oxidised brass; T-insert frame; scale 0-160; reinforced index arm with magnifier; seven shades; shaped case.

The index arm has a window vernier 0-10 with tangent and clamping screws, and a pivoted magnifier, to read the silver scale, in which every set of five points is divided into 30; there are index and horizon mirrors, a set of four shades in square frames (green and three reds), plus a set of three shades in circular frames (green and two reds); there are three brass telescopes; underneath is an ebony handle, three feet, and a knob to adjust the telescope.

The instrument is in a triangular mahogany case, with a green trade label pasted inside: "CRICHTON BROTHERS, MANUFACTURERS OF Mathematical, Optical & Nautical Instruments, TO THE INDIA BOARD & TO THE HONS: CORPN. OF THE TRINITY HOUSE, 11 Billiter Street, LONDON, E.C."; there is also a green paper illustration of a medal: "GREAT EXHIBITION OF 1851. PRIZE MEDAL FOR SEXTANTS & DRAWING INSTRUMENTS".

Dates from Banfield 1991,61.

4095 UFM012 SEXTANT

Henry Hughes & Son Ltd, 59 Fenchurch St., London 6123

L 235; W 254; AR 207; C 270x253x125. Early 20 C. R.

Oxidised brass; triple circle insert; scale (-5)-0-(155); reinforced index arm, magnifier; seven shades; case.

The index arm has a window vernier 0-10 with tangent and clamping screws, and a pivoted magnifier to read the silver scale, with a frosted-glass angled shade; every set of five points on the scale is divided into 30; there are index and horizon mirrors, and a set of four shades in square frames (with one rounded corner), plus a set of three in circular frames, all in shades of grey; there are three brass telescopes; underneath is a black mahogany handle, three feet, and a knob to adjust the telescope; the instrument is in a square mahogany case; as well as the signature, the instrument is marked with the initials "B.O.T."

The firm was called Henry Hughes & Son Ltd at this address in 1905, Anderson 1990,42.

4094 UFM011 SEXTANT

Troughton London 463

L 301; W 332; AR 277; C 360x335x142. c1800. R.

Brass; T-insert double frame; scale -5-0-140; reinforced index arm with magnifier; six shades; case.

The index arm has a window vernier 0-10 with tangent (damaged) and clamping screws, and a pivoted magnifier to read the silver scale, in which every set of five points is divided into 30; there are index and horizon mirrors, and two sets of three shades, green, red and red, in square or circular frames; there is a long and a short telescope; underneath is an ebony handle, three feet, and a knob to adjust the telescope; the instrument is in a damaged square mahogany case.

Edward Troughton patented this type of sextant c1784, and had made nearly 500 by 1802, Porter 1985,34-5.

4115 UFM030 SHIP'S LOG

[J.P.] CUTTS, SUTTON & SONS, PATENT DOLPHIN SHIP LOG No.2. London

L 492; W 103. 1845-1869. R.

Brass; tube with four fins at back and conical front.

A sliding sleeve covers the white enamelled scale, which is read with three watch hands: ¼-1, 1-10, and 10-100 miles; the first part of the signature is chipped off, but this was presumably the initials "J.P.", since Banfield 1991 lists J.P.

Cutts, Sutton & Son [sic], a partnership between John P. Cutts and George Sutton, who worked in Sheffield and London from 1845-1869.

4112 UFM027 SLIDE RULE - POWER & SPEED SCALE

Unsigned POWER & SPEED SCALE

L 348; W 70; SdW 26. Late 19 C. G.

Mahogany; scales "KNOTS" 4-16, "COEFS" 50-100 & 200-400, "I.M.P." 40-2000 & 5-13, "DISPL" 3-1000 and 2-2000.

The paper scale gives the conversions: "ONE MILE = .87 KNOTS" and "ONE KNOT = 1.15 MILES"; the knots and coefs scales are above and below the slide, while the IMP and displ scales are on the slide; a conversion equation is inscribed: $C = (D \frac{2}{3} V \frac{3}{4}) / - \text{the } 2/3 \text{ and } 3 \text{ being powers}$.

A note with the rule reports that it was used by the donor's father, who was a draughtsman at Harland & Wolffs.

4100 UFM017 STATION POINTER

Unsigned

L 429; DID 150; C 496x188x54. Early to mid 20 C. G.

Yellow perspex disc 0-180°(x2); three oxidised brass arms, one fixed at 0°, the others pivoted; case.

A hole in the centre of the disc is surrounded by an oxidised brass pivot ring for the two revolving arms, each of which has a screw clamp; the pointer is housed in a boxwood case with a broken hinge.

4098 UFM015 STEAM ENGINE INDICATOR

[On chart] BRITISH ENGINE, BOILER & ELECTRICAL INSURANCE CO LTD HEAD OFFICE: 24 LENNER STREET MANCHESTER.

C 271x243x101. Early 20 C. G.

No 8755; brass piston with spring mechanism; oak case.

Brass cylinder housing for internal spring mechanism; silver-metal cylinder chart-holder; five springs; in fitted oak case with accessories, including four boxwood scales, two unsigned, No2 10-0-12(x2) and No5 10-0-50(x2); two signed, "No6 ELLIOTT BROS LONDON 10-0-80(X2) 30 TO THE INCH", and "No6 CASARTELLI MANCHESTER 10-0-80(x2) 30 TO THE INCH"; one chart is dated 21/3/30.

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4120 UFM035 STEREO VIEWER

Unsigned

L 320; MxW 177. Mid to late 19 C. G.

Mahogany; a shaped housing to cover the eyes has two square lenses; a central rod ends in mounts for cards.

The horizontal shaped rod from the eye cover to the card mount has a vertical panel between the eye lenses; at its end is a cross bar with wire frames for the cards to be viewed; below the bar is a brass pivot for a turned wood handle.

This is one of about ten such viewers, all similar in design.

4118 UFM033 STEREO VIEWER - BREWSTER

Unsigned

B 186x109; H 160. Mid to late 19 C. G.

Walnut housing has a frosted glass panel below, and two eyepieces above in turned black mounts.

Focus is by a wood knob on the side of the housing, and extending the eyepieces shows the copper tubes holding them; there is a flap at one long side of the housing.

4119 UFM034 STEREO VIEWER - BREWSTER

Unsigned

B 191x114; H 153. Mid to late 19 C. G.

Rosewood housing, with a wavy profile, has a frosted glass panel below, and two eyepieces above.

The eyepieces are in turned wood mounts, and focus uses a knob between them, showing the copper tubes on which they are set; there is a flap at one long side the housing.

4084 UFM002 WAYWISER

ADAMS, LONDON

H 1280; WhD 806. 1793-1821. G.

Mahogany; six-spoke wheel with iron rim; brass dial reads yards, poles, furlongs and miles; curved handle.

Two supports rise from the axis of the wheel to the dial, which is not glazed, and which has two hands to read yards 11-220, poles 2-40, miles I-X, with each mile divided into eight furlongs; most of the curved handle is missing, and the instrument is in distressed condition.

Assumed to be by Dudley Adams (1788-1817 - Clifton 1995,2), though it could be by his father or brother.

1434 UFM001 WAYWISER

Richard Spear DUBLIN.

H 1608; WhD 1012; DIHsD 275. 1791-1837. F.

Mahogany; six-spoke wheel with iron rim; brass dial reads yards, poles, furlongs and miles; curved handle.

Two supports rise from the axle of the wheel to the dial housing, which is glazed; two brass hands read yards 10-280, poles 1-40, furlongs 2,4,6,8 repeated, and miles 1-12.

Dates from Morrison-Low 1989,135.

4085 UFM003 WAYWISER

Unsigned

H 1054; WhD 587. Mid to late 19 C. G.

Six-spoke iron wheel; Y-shaped axle to brass sleeve for T-shaped turned mahogany handle.

No counting device remains, but there is a hole on one axle bracket which may have held a counter, clicked as the wheel turned.

4113 UFM028 YARN TESTER

THE MULHOLLAND YARN TESTER PORTER BROTHERS MAKERS BELFAST

[On balance] SALTERS SPRING BALANCE PATENT

L 2360; W 135. Early 20 C. G.

Wood base; brass; spring balance on top; piston below.

The black wood base holds the Salters spring balance on top "lbs BY ¼ oz", with a rod below having catches and ratchets, and a side scale 0-5, each section being divided 1-15; below is the piston with a central rod, also held by ratchets; the yarn would have been placed between the two arms.

A second tester is similar, with a wider mahogany base, but missing its maker's plaque.

4114 UFM029 YARN TESTER

MULHOLLAND STANDARD YARN TESTER PORTER BROS. MAKERS BELFAST

[On balance] SALTERS IMPROVED DYNAMOMETER

H 1880; W 200. Early 20 C. G.

Wood base; brass; dynamometer above; piston below.

The wood base holds the disc scale of the Salters Dynamometer on top "10lb BY 1oz"; at the bottom is the piston, with a central rod; a pivoted arm at the side, ending in a cylinder weight, appears to have been used to tension the yarn, and there are no ratchets; the tester is in distressed condition.

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UNIVERSITY COLLEGE GALWAY ENGINEERING - UGE

Galway

Telephone 091-24411

Note: This collection is particularly rich in instruments signed by the firm set up by Patrick Adie (1821-1886), the youngest son of Alexander Adie of Edinburgh.

Patrick worked in London from 1848 until his death, but instruments continued to be signed by the firm until 1942 - see Clifton 1995,4.

0210 UGE021 ALIDADE - TELESCOPIC

STANLEY, LONDON

509x59; TeL 290, H 230. Late 19 early 20 C. G.

Brass alidade with oxidised brass level above; full circle scale with two vernier magnifiers.

Rack and pinion focusing of objective; spirit level on top; two additional spirit levels on base.

0193 UGE004 ARTIFICIAL HORIZON

ELLIOTT BROTHERS OPTICIANS 30. STRAND LONDON

D 81; Sp 97; H 40; CL 129, W 111. 1858-1863. A.

Oxidised brass frame; three brass level screws; disc of black glass; in heart-shaped case covered in red leather with blue lining; space in case for missing spirit level.

Dates from Crawforth 1988,8.

0211 UGE022 CALCULATOR

J. HALDEN & CO., Ltd., 8, ALBERT SQUARE, MANCHESTER

156x156x8; C 174x174x43. Patent No. 17334 1908.

"Twelvetreets"; mahogany, ivory and brass; in black case; for calculations on concrete beams.

Gives compressive stress for reinforced concrete beams in 100lb units; paper-covered case has blue lining; addresses given for other cities.

0192 UGE003 CIRCUMFERENTOR

Adie & Son EDINBURGH

D 162; W 223; H 164. 1835-1880. F.

Brass; silvered scale; two spirit levels; folding sights - one with slit and one with crosswire.

Dates from Bryden 1972,43.

0198 UGE009 CLINOMETER

T. BENNETT. MAKER. CORK.

L 211; W 21; H 127; C 240x162x85. 1810-1867. F.

Brass; reads 4/1 to 200/1; sleeve below rectangle base for stand, spirit level on top; in hardwood case.

Cylindrical sleeve to fit on top of stand (with clamping screw) holds narrow rectangular base with a spirit level; a right-angled support on one side has a hinged member the same size as the base with a right-angled cross wire and sighting hole at each end; the free end moves along a scale from 4 in 1 to 200 in 1; walnut/rosewood? case.

Dates from Burnett & Morrison-Low 1989,144.

0202 UGE013 COMPASS - BEAM

Unsigned

L 308; PL 160, W 89; C 316x94x24. Late 19 C. G.

Steel beam with pencil and two wheels which move in grooves in kite-shaped brass plate; fitted mahogany case.

Plate has one groove connecting closer corners and three grooves at right-angles to this; beam has moving brass bracket with pencil and two with wheels to run in the grooves.

0209 UGE020 LEVEL - TELESCOPIC

Adie London No 222

L 315 (stuck at 332); H 164. Mid 19 C. G.

Brass and oxidised brass; two disc three screw base; compass on four pillars above spirit level over telescope; rack and pinion objective focus.

0207 UGE018 LEVEL - TELESCOPIC

Adie, London No 432

L 312; H 156; CpD 90. Mid 19 C. G.

Oxidised brass; tribach base; compass under telescope, spirit level on top; bubble level at eyepiece end; lens flap at objective end.

0206 UGE017 LEVEL - TELESCOPIC

Adie London No 333

L 302; H 158; CpD 90. Mid 19 C. G.

Oxidised brass; two disc three screw base; compass below telescope; spirit level above; eyepiece bubble level.

0201 UGE012 LEVEL - TELESCOPIC

Troughton & Simms. LONDON

L 274; H 158; CpD 90; C 371x123x115. Mid 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Brass; two spirit levels at right-angles on top; compass under telescope; in mahogany case with accessories. Long spirit level on top with shorter one at right angles; focused by rack and pinion; accessories include scale reading glass, angled mirror on bracket with clips to larger spirit level; eyepiece cover.

0197 UGE008 LEVEL - Y

Watkins & Hill, London

L 248; H 152. 1822-1856. F.

Brass; rack and pinion focus; objective lens missing; spirit level below telescope; fitting for stand.

Dates from Clifton 1995,291.

0200 UGE011 PANTOGRAPH

W. & S. Jones Holborn London

L 656; CL 669, W 65-132 H 87. 1791-1859. A.

Brass; ivory wheels; only one pointer; in damaged mahogany case with the owner's name on printed card: "RICHARD C. MERSON, CHIEFLOMAN HOUSE, TIVERTON".

Dates from Clifton 1995,155.

0208 UGE019 PARALLEL RULE

Adie London

615x64. Second ½ 19 C. G.

Brass; moved using two knurled knobs joined by a bar; two handles at ends to hold instrument.

0212 UGE023 PLANIMETER - AMSLER

Elliott Bros. London

L 223; Se 5x5; C 265x64x31. Late 19 C. CT.

Brass; silver scales; in black paper-covered case with purple lining.

This instrument was invented by Jacob Amsler (1823-1912), Professor of Mathematics at Schaffhausen, Switzerland, about 1854 (see Bull SIS,35,27). It is the Model No.3, made by Amsler (Dr Joachim Fischer, personal communication).

Illustrated in Elliott 1895,111.

0194 UGE005 PROTRACTOR - CIRCULAR

Yeates, 2 Grafton St. Dublin

D 152; W 299; C 173x171x35. 1840-1864. G.

Brass with oxidised brass folding point brackets; in mahogany case with inscription "M Roberts 1888".

Dates from Morrison-Low 1989,139 - assumed to be George Yeates & Son.

0190 UGE001 SEXTANT

Adie, London.

D 199; L 240; Sp 265; CL 352, W 273.

Second ½ 19 C. G.

Brass crosswork frame; silver scale; index arm with window vernier and tangent clamp; reading lens above; four square shades; three circular; screw-in eyepiece; leg missing; mahogany fitted case.

0195 UGE006 SEXTANT - BOX

Adie, London

D 78; H 45. Second ½ 19 C. G.

Brass; silver scale has magnifier; red and green shades released by trap-door below; telescope inside.

0196 UGE007 SEXTANT - BOX

Unsigned

D 78; H 41. Mid to late 19 C. G.

Brass and oxidised brass; knob moves vernier over silver scale; magnifier; two shades released by trap-door; red and green shades.

0199 UGE010 STATION POINTER

ADIE & SON EDINBURGH

L 665; CrD 106. 1835-1880. F.

Brass; one fixed central leg; two moving legs with silvered verniers and scale; scale magnifier.

Historical Technology 133,1990,200 notes that a station pointer is used for locating a ship's position on a chart or map by setting in two landmark-landmark relative bearing angles between three landmarks and moving the instrument on the chart until the edges of the three arms each intersect one of the landmarks - the two angles can be measured with a peloris, sextant, or azimuth compass.

Dates from Bryden 1972,43.

0204 UGE015 THEODOLITE - EVEREST

Adie, London

L 245; H 179; CrD 142. Second ½ 19 C. G.

Brass and oxidised brass; rectangular compass box on top; two lenses for arcs; silver scales with verniers; three level screws.

0191 UGE002 THEODOLITE - PLAIN

Wallace Limerick

L 273; H 259. 1856-1881. FL.

Brass; two disc four screw base; horizontal circle below compass; Y telescope brackets on vertical semicircle.

Horizontal silvered scale, two spirit levels, vernier and compass on top; trunnions to axis of vertical semi-circle; another spirit level on this with telescope above, focus by rack and pinion; engraved "Diff. of Hypo. & Base".

Dates from Burnett & Morrison-Low 1989,156.

0205 UGE016 THEODOLITE - TRANSIT

Adie, London No 196

L 303; H 353; CrsD 170&155; CpD 85. Mid 19 C. G.

Brass and oxidised brass; full vertical circle; compass above horizontal circle between trunnions.

Tribach base on frame; spirit level on top of horizontal circle and at side of vertical circle; vernier to read horizontal circle; two lens brackets and one lens to read silver vertical circle.

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0203 UGE014 THEODOLITE - TRANSIT

L. Casella. Maker to the Admiralty & Ordnance London

No 3244

L 150; H 192; C 250x109x98. Late 19 C. G.

Brass and oxidised brass; horizontal and vertical circles.

Elegant compact instrument; three spirit levels; rack and pinion focusing; three eyepieces, one right-angled; tortoise-shell reading glass, etc.; with accessories in fitted mahogany case.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

UNIVERSITY COLLEGE GALWAY GEOLOGY - UGG

Galway

Telephone 091-24411

4039 UGG001 GONIOMETER - CRYSTAL, WOLLASTON

ELLIOTT BROS LONDON.

BD 126; H 157; SD 113. Late 19 early 20 C. G.

Brass; circular base; pillar to axis of disc and crystal clamp, turned by double knobs; disc scale 0-350°.

The silvered scale on the edge of the disc is read by a vernier on top, on a limb from the axis support for the disc.

4043 UGG005 GONIOMETER - CRYSTAL, WOLLASTON

R. FUESS STEGLITZ-BERLIN

B c160x160; H c196. Turn 19/20 C. R.

Black rectangular metal base; brass; vertical disc, divided edge 0-360°; crystal clamp; mirror; telescope.

On the base is a plate with inclined sides on which a bracket can slide adjusting the position of the telescope on a vertical support above; a small mirror is on a pivoted mount on the other side of the base; in between is the trunnion to the axis of the vertical disc and clamp, which can be revolved with double knurled knobs; a small magnifier reads a vernier to the scale.

Workshop founded in 1876, Brachner 1985, 139; had moved to Steglitz by 1899, Leiss 1899, iv.

4041 UGG003 LANTERN - TRIUNIAL

(NEWTON & CO FLEET ST. LONDON)

No measurements available. 1894-1899. R.

Mahogany base; four brass pillars to base for oxidised brass revolving drum; three ports; fluted cowl.

For more details of this state-of-the-art type of lantern, see 0439 RDS002.

Not mentioned in British Journal of Photography in 1894, but mentioned Irish Naturalists' Journal, 1899, 125-131.

4040 UGG002 MICROSCOPE - COMPOUND

NACHET Opticien rue Serpente 16, Paris

Sp 217; PrH 183; TuL 171. 1839-1863. R.

Green painted iron tripod base; brass; pillar; limb to focus tube and plate for angled tube and three power lens.

No stage arrangement; the horizontal limb leads to a vertical sleeve which allows coarse push focus of a cylinder joined by a horizontal plate to an angled vertical bracket for the tube; below this is the objective, which consists of three lenses whose circular housings screw into each other to allow viewing at low or high power; fine focus is by rack and pinion at the vertical sleeve.

Turner 1983 records that Nachet started his own firm in 1939 and moved to 17 rue St Séverin in 1863.

4044 UGG006 MICROSCOPE - COMPOUND

(W. Watson & Sons, Ltd., 313 High Holborn, London, W-C. No. 20143)

No measurements available. c1916. N.

Brass and oxidised brass; Y-foot; pillar to pivot; above this, stage and limb to tube; two objectives.

The vertical support above the foot holds a sliding bracket for the revolving double mirror, which sits below a condensing lens under the stage; this is circular and calibrated around the edge; a brass pillar above the pivot has a fine-focus knurled knob on top above the limb to the tube; course focus is by double knob rack and pinion on the tube; there is a double nose-piece.

A case has a certificate for microscope No 19381, dated March 4, 1915; this guarantees the instrument for five years.

4042 UGG004 MICROSCOPE - PROJECTING

(NEWTON & CO, 3 Fleet Stt, London)

No measurements available. 1894-1899. R.

Brass and oxidised brass; back plate; cylindrical cell; housing for nicol prism system; sample clamp; lenses.

Mounted on base support attached to the plate, which is screwed to the lantern mount using four knurled nuts; for use with Lantern 4041 UGG003.

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UNIVERSITY COLLEGE GALWAY PHYSICS - UGP

Galway

Telephone 091-24411

Note: Two catalogue lists of the instruments in the collection of the Galway Physics Department have survived - see Bibliography under Curtis 1861 and Galway 1902.

2849 UGP269 ADJUSTABLE GAP WITH ELECTRIC CONTACT

Max Kohl Chemnitz JNo 4498

Sp 114; MnH 260; Fr 100x79x10; Ps 60x43.

Early 20 C. G.

Iron tripod base; brass expanding stand; ebonite frame for two sliding ebonite plates and six brass contacts.

The frame is held by a white metal bar which fits into the brass pillar, and is secured by a brass clamping screw; the sliding plates allow a gap of varying size to be formed in the frame; the brass contacts on the latter are marked "B B W" above and "G G W" below; a U-shaped brass bar at the other side seems to connect B and W; a straight bar connects G and W, and other bars contact the remaining B and G.

Purpose unknown.

2884 UGP292 AIR PUMP - DOUBLE BARREL, FLEUSS

Unsigned

B 565x240x83; PvH 645; WhD 457. Early 20 C. G.

Cast iron base and trunnion supports to pivot for beam; pistons into two brass barrels.

Heavy iron four-spoke wheel, with turned wood handle, revolves a disc with a bar at its edge connected to one arm of the beam so that it is raised or lowered, driving the pistons.

Illustrated in Griffin 1910,323: "Fleuss' Duplex Pump, with rotary motion. This pump has 2-in. cylinders by 5-in. stroke, and is specially adapted for continual use where rapid exhaustion is necessary. The power required is about ½ H.P.".

2901 UGP309 AIR PUMP - SYRINGE

F.E. BECKER & CO, LONDON

MnL 555; MnH 275; TuL 395, D 35; PD177.

Early 20 C. G.

Brass; G-clamp to rectangular block with syringe tube on both sides; above, stop-cock with air pump plate.

Wood piston handle; above the block, and below the stop-cock, is a screw-out tap; above the stop-cock, below the plate, is a side arm boss, shut off by a square-section plug.

Also two simpler unsigned brass syringes.

2893 UGP301 AIR PUMP PLATE

BAIRD & TATLOCK LONDON

Sp 250; PH 176, D 249; DiD 38. Early 20 C. G.

Iron tripod foot; brass sleeve with stop-cock to brass plate; side arm below plate with stop-cock to disc.

2892 UGP300 AIR PUMP PLATE

YEATES & SON DUBLIN

Sp 240; PH 197, D 245. Mid to late 19 C. G.

Three curved iron legs hold iron disc with red resin under glass disc plate; brass stop-cock below centre.

Iron disc strengthened by five radial struts below; a cylinder bell jar is now stuck on the plate (see 2894 UGP302).

0161 UGP040 AIR PUMP PLATE

Unsigned

BD 143; PsH 187; H 275; PsD 101. Pre 1861. R.

Turned mahogany base; brass; pillar with stop-cock divides into two limbs each with stop-cock and disc plate.

Limbs in two right-angles; thin turned plug screws into hole in centre of either plate; with glass receivers on the plates.

This "illustrates the expansibility of air. When the air has been exhausted from one receiver and a communication opened with the other, both receivers are held down with equal force on their respective plates" - Curtis 1861,51.

0001 UGP001 AMMETER - MAGNETO STATIC

LORD KELVIN'S PATENTS MAGNETO STATIC CURRENT METER Nos 42 & 44 JAMES WHITE GLASGOW.

H 175; ToD 186. 1892-1900. R.

Two; brass housing; with circular blue and red magnets.

Three level screws; two brass contacts on ebonite strip at bottom; top glazed with thick glass; silvered scale around part of edge of white face 50-0-50 (logarithmic); ebonite knob at side raises and lowers brass ring to raise or lower needle; bubble level on face.

Instrument described in White 1898,28.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972, 59.

2934 UGP342 AMMETER & VOLTMETER

PATENT PORTABLE COMBINED AMMETER & VOLTMETER

KELVIN & JAMES WHITE LTD GLASGOW & LONDON No.576

Hs 252x213x123. 1900-1910. R.

Mahogany hinged-lid housing; ebonite top; white scale.

The white arc scale 0-150 has a parallax mirror; there are two pairs of contacts for "VOLTS" or "AMPS", a dial "VOLTS OFF AMPS", six plug holes "300 2 600 4 15 1 150 1 15 001 1.5 01", and 1.5, 15, 150 amp shunts in the lid, with a 750 amp shunt in a separate hinged case (206x93x78).

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The lid has a certificate dated "21st Dec 1910" "LORD KELVIN'S STANDARDISING LABORATORY" with the firm's address "16, 18, & 20 CAMBRIDGE STREET, GLASGOW."
Firm took this name in 1900, Bryden 1972,59.

0054 UGP017 AMPERE APPARATUS

Made by Yeates & Son Dublin
B 361x192x35; H 470. Mid to late 19 C. CT.
Mahogany base; two parallel right-angled brass pillars to two mercury cups for suspended coils (missing); two brass contacts connected to pillars with copper plates.
"Amperes stand, with five wire frames, two solenoids, and spiral 3:13:6 NOTE.-With this apparatus all the laws of mutual attraction and repulsion of parallel, angular, and sinuous currents can be illustrated." - Yeates 1877,29.
Illustrated in Griffin 1910,787.

2531 UGP237 AMPERE GAUGE

LORD KELVIN'S PATENTS AMPERE GAUGE No.563 JAMES WHITE GLASGOW
B 231x147; H 340; Hs 195x175x72. 1892-1900. R.
Shaped mahogany base and vertical support; brass glazed housing below coil; counterweighted damped needle 0-5.
Two brass contacts connect through wires to the coil (unseen) in an oxidised brass housing (H64;W38); a rod from the centre of this is attached to a rectangular frame which also holds the reading needle and an arm for the brass cylinder counterweight; the rod continues down, with a cylinder brass weight, ending in a square-section damping chamber containing oil; scale is not linear nor logarithmic; two (of three) level screws.
Date between Thomson's peerage in 1892 and firm name Kelvin & James White in 1900, Bryden 1972,59.

1899 UGP168 AMPERE TROUGH

Unsigned
B 204x166x23; H 44. Mid 19 C. G.
Mahogany base; hollow for circular glass dish divided into two; brass and copper contacts to each compartment.
Matches rotating magnet apparatus 1898 UGP167.

1527 UGP114 ANEMOMETER - ROBINSON

L. CASELLA LONDON 351
Shs 165x118x51; H 351; CusD 76. Late 19 C. G.
Oxidised brass housing for two silver-metal disc scales 0-4&25-505 & 50-505; worm screw from four copper cups.
Latter on cross limbs on top of tapering brass pillar rising from the top centre of the housing, which has a glass front; present crude wood base not included in measurements.

0057 UGP016 ARAGO DISC APPARATUS

Made by Yeates & Son Dublin No 326
B 625x202; Sp 267; WhD 282; DisD 181. Acquired 1876.
Mahogany and brass; large wheel with handle to turn spindle; two copper discs, one in quadrants; no top plate.
Base on cross-bar foot at one end and smaller foot on other; three turned pillars to support plate (missing).
Acquired November 1876, Curtis 1861,104; instrument illustrated in Yeates 1877,30.

0171 UGP050 ATWOOD MACHINE

Unsigned
B 245x212x48; H 218. Pre 1861. R.
Low friction pulley system only; mahogany base; brass support and wheels; iron axle; one foot missing.
Presumably remainder of "Atwood's machine with 27 weights & block" in Curtis 1861,32.
Stored under the lecture theatre is a large mahogany stand (Sp740,H2000;D86-77), with cross bar feet having three wood level screws, and a sliding horizontal T-bracket on top; this may also be part of the original Atwood machine.

1532 UGP123 BALANCE - EQUAL ARM

Unsigned
B 759x224x47; H 533; PasD 152. Mid 19 C. G.
Mahogany base and beam (brass bound); oxidised brass trunnions; pivot; arc scales above and at one end of beam.
Two of four feet missing from base; plumb-bob weight on rod below centre of beam; pointer (gone) to brass fan shaped scale 45-0-45 above centre of beam; long arc brass scale 50-0-50 on turned brass pillar from base at one side to read position of beam; adjusting screws at both ends of beam, with flat brass pans hanging from each.
This is an unusual balance, not least because of its wooden beam.

1474 UGP121 BALANCE - EQUAL ARM

Unsigned
B 276x155x53; H 361; BmL 202. Pre 1861. R.
Mahogany drawer base; brass pillar and lifting device; silver-metal beam with shears and pointer; brass pans.
Beam has elliptical box ends holding pivots for hooks; one pan is a crude replacement; drawer has six brass rectangular weights 20-400.
Illustrated in Curtis 1861,47.
Another beam balance on mahogany drawer base (B 279x138x54, BmL167) has pointer reading arc brass scale on top 10-0-10, swan neck ends, and one brass pan.
Referred to in Curtis 1861 as hydrostatic balances with steel or brass beams.

1536 UGP134 BALANCE - PRECISION

MANUFACTURED IN GERMANY ESPECIALLY FOR F.E. BECKER & CO 33, 36 & 37 HATTON WALL LONDON
Hs 345x340x174; BmL 185; PasD 67. 1884-1900. A.
Glazed mahogany drawer housing; front rises; brass.
Beam, on knife edge, has "30" and "G" marks on arms; unnumbered ivory scale at bottom of pillar with pointer from beam which sits on top of the pillar and is raised by a knob in front; rather similar in size and design to 1533 UGP124, "BECKER'S SONS ROTTERDAM", but this one has a less solid housing, and is probably a little later in date.
Dates from Anderson 1990,10.

1533 UGP124 BALANCE - PRECISION

BECKER'S SONS ROTTERDAM
Hs 350x288x152; BmL 205. Third ¼ 19 C. G.
Glazed mahogany drawer housing; front rises; brass; beam on top of pillar, raised by knob on front.

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Beam, on knife edge; has "30" & "G" marks on arms; unnumbered ivory scale at bottom of pillar with pointer from beam; similar in size and design to 1536 UGP 134 "MANUFACTURED IN GERMANY ESPECIALLY FOR F.E. BECKER & CO 33,36&37 HATTON WALL LONDON" but this one has a more solid housing, and appears to be a little earlier in date.

Was Becker in the Netherlands before coming to London in 1882?

Diana Crawford-Hitchins (personal communication) notes that there were many Beckers, all quarrelsome with each other and with authority; they had many moves and many family combinations!

1531 UGP120 BALANCE - PRECISION

J. ROBINSON & SONS 65 GRAFTON STREET DUBLIN.

Hs 454x411x179; BmL 320. 1885-1903. A.

Mahogany glazed, two-drawer housing; two doors in front and two at sides; brass open beam; side arm to add riders.

Knob in front of housing to raise beam, divided 10-1 and 1-10; beam and pans on knife edges; base has two level screws and two spirit levels at right-angles at base of tapering brass pillar; latter has ivory unnumbered scale at its bottom; pans silvered.

Dates from Morrison-Low 1989,133.

0162 UGP041 BARLOW STELLAR WHEEL

ELLIOTT BRS. 30 STRAND LONDON

B 354x151x35; H 178; WbsD 146. 1858-1861. F.

Mahogany base; turned brass pillar with two arms each holding a spiked wheel dipping into a mercury trough; two brass contacts on base.

"Apparatus to illustrate the contrary rotatory motion communicated to electrified stellar wheels when under the influence of horse-shoe magnets. When the electric current is established through the apparatus and magnets properly arranged, the wheel nearest [sic] the minus extremity revolves in one direction, and the wheel nearest the plus extremity revolves in a contrary direction - £1.4s." - Elliott 1856b,9.

Listed in Curtis 1861,96; firm moved to 30 Strand in 1858, Crawford 1988,8.

1894 UGP163 BARLOW STELLAR WHEEL

Unsigned

B 165x100x17; H 87. Mid 19 C. G.

Mahogany base; turned brass pillar, cup on top; two horizontal arms for missing star; mercury trough at base of star connected to another brass cup at end of base away from pillar.

1880 UGP149 BAROMETER - ANEROID

E. BOURDON AND RICHARDS PATENT METALLIC BAROMETER

D 132; H 54. Third ¼ 19 C. G.

Brass cylinder housing; cracked glass top; white scale 28-31"; "GOLD MEDAL 1849 COUNCIL MEDAL LONDON 1851".

"VERY DRY SET FAIR FAIR CHANGE RAIN MUCH RAIN STORMY"; incomplete brass circle with mechanism at break to drive comb on frame which turns a cog wheel at the needle axis.

2529 UGP235 BAROMETER - STICK

NEGRETTE & ZAMBRA Scientific Instrument Makers No.3128

B 1120x142x25; L 962; TuD 25. Mid to late 19 C. G.

Oak baseboard; blackened brass; silvered scale 26-32"; ring adjust 0-90x2; thermometer scale on stem 10-120°.

Barometer tube, mercury, and thermometer gone; cistern secured to base board by ring with three clamping screws; white glass panel behind scale; "FAHRENHEIT" on brass thermometer scale.

Presumably "Stationary [barometer] with closed reservoir and thermometer" of Galway 1902,9(B41).

2944 UGP352 BATTERY

Unsigned

BD 115; VH 177. Mid to late 19 C. G.

Cylinder glass vessel; ebonite disc top with two brass terminals leading to two concentric metal spirals, now in decomposed dark red liquid.

Also another cell in a cylinder glass vessel (BD89,H114) made up of a wood bar with two brass terminals leading to a copper and a zinc plate.

2943 UGP351 BATTERY - BICHROMATE

Unsigned

VH 137-260; MxD 77-152. Mid to late 19 C. G.

Five bulbous glass flasks, all different sizes; four with brass sleeve tops; largest two only retain electrodes.

The electrodes are on ebonite discs; the largest flask has three carbon and two zinc plates; the next has two carbon and one zinc plate; both have two brass contacts, and each zinc plate has a clamped brass height adjuster.

1912 UGP181 BELL

Unsigned

BD 71; H 121; BeMxD 73. Mid 19 C. G.

Brass; goblet type bell for bowing; lead weighted base (damaged) supports pillar to base of goblet cup.

1910 UGP179 BELL

Unsigned

BD 85; H 184; BeMxD 47. Second ½ 19 C. G.

Mahogany base; turned brass pillar to brass ring; knob on top of this secures brass bell within ring below.

1909 UGP178 BELL

Unsigned

H 205; BeMxD 53; DiD 73. Mid 19 C. G.

Brass; disc to fit on vacuum vessel has ball joint on top and (broken) leather thongs to bell below.

1498 UGP069 BELL - ELECTRIC

ELLIOTT BROS. 30 STRAND LONDON

B 371x113x40; HRm 619. 1858-1861. AR.

Atmospheric warning bell; mahogany base and open roof arch above two brass bells on glass pillars; incomplete.

"Open mahogany frame, through the roof of which projects an insulated lightning rod (now gone). One of the two bells communicates with the floor, the other with the rod, and is insulated. A silken thread sustains the clapper (also gone) which

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rings the bells when a lightning cloud passes over the point of the rod."; works when apparatus placed near prime conductor of an active electrical machine - Elliott 1856a,9.
Listed in Curtis 1861,89.

0179 UGP059 BELL - ELECTRIC

Unsigned - attributed to Elliott Brothers

BD 152; H 137. 1856-1861. FR.

Central bell on turned mahogany base; above this a glass pillar; brass top cross from which hang four bells on chains; clanging balls gone.

"Set of Five Electrical Bells, with insulated stand, and two brass arms crossing at right-angles. When the apparatus is connected with the prime conductor the electricity is communicated to the bells, the suspended balls alternately strike and cause them to ring, the electricity passing through the central bell into the earth." - Elliott 1856a,8.

Curtis 1861,89/Elliott 1856a,8 give same illustration; firm founded in 1856, Chaldecott 1989,161.

0053 UGP025 BELL - ELECTRIC

Unsigned - attributed to Elliott Brothers

B 206x113x24; H 395; JaH 171. 1856-1861. FR.

Mahogany base and moving turned pillar; leyden jar with brass bell on top on base; bell with crook on pillar.

"French arrangement for illustrating the chiming of bells by electrical action...one of the bells being in connection with the interior coating of a Leyden jar, while the other bell communicates with the outer coating."; when the jar is moderately charged, a little ball suspended between the bells produces the chiming, more or less rapid as the distance between the bells is varied - Elliott 1856a,9.

Curtis 1861,86/Elliott 1856a,9 give same illustration; firm founded in 1856, Chaldecott 1989,161.

2533 UGP239 BELL - ELECTRIC

MILLER & WOODS, 2, GRAYS INN ROAD, LONDON. PATENT [18]97

Hs 232x156x144; BeD 60.

"PATENT APP. FOR 12859.97" S.

Mahogany glazed housing, hinged front and top; coil mechanism in front, bell mechanism, white-metal, on top.

Leather handle; the bell mechanism is on an ebonite plate on top; and has two wood spools for green-covered wire coils.

Crawforth 1988,18 lists the firm at this address in 1895.

0173 UGP052 BELL - ELECTRIC, "THE GAMUT"

Unsigned - attributed to Elliott Brothers

BD 175; H 420; TD 300. 1856-1861. FR.

Eight brass bells on a mahogany table; glass central pillar; revolving bent and pointed spokes above; clapper balls gone.

"Set of Eight Bells, or the Gamut. In this apparatus a single clapper is suspended from a movable fly or whirl. Electricity causes the fly to revolve on its axis, and the clapper is carried round, striking each bell in succession." - Elliott 1856a,9.

Curtis 1861,89/Elliott 1856a,9 give same illustration, firm founded in 1856, Chaldecott 1989,161.

2955 UGP363 BENDING ELASTICITY APPARATUS

MAX KOHL Werkstatte für Präzisionsmechanik CHEMNITZ

PrsB 281x209x19, H 560, ToSe 79x83. Early 20 C. G.

Pair of heavy mahogany pillars with tapering bottoms; brass bars and nuts above for missing elasticity bar.

Kohl 1911,304 describes this: "Apparatus for determining elasticity in bending...The apparatus consists of two wood blocks fixed on boards, those blocks being fitted with clamps for screwing down the wires; the blocks can be weighted by means of weights. In addition the following pertain to the apparatus: one vertical scale on base, one pointer for sliding along the rod to be tested, three steel rods and one copper rod."

2506 UGP212 BOILING POINT APPARATUS

PHILIP HARRIS & CO LIMITED BIRMINGHAM & DUBLIN

H 343; MxD 140. 1902-1911. F.

Copper; cylinder water bath below; on top, concentric open cylinders; lid with brass sleeve for thermometer.

Bent side tube at bottom of open cylinders to drain condensed steam.

Dates from Morrison-Low 1989,126.

1914 UGP183 BOW

Unsigned

L 694. Mid 19 C. G.

Mahogany, ebony, and ivory; cracked ivory knob to tighten horse hair; ivory plate at other end also.

2949 UGP357 BRIDGE - POGGENDORF

Unsigned

B 1209x295x29. Pre 1902. R.

Mahogany base; boxwood metre rule and sliding pointer with brass contact; two bosses with copper half cylinders.

Five wires missing; three other contacts on one side of the base and one on the other side; one end of base is missing.

Galway 1902,22 describes this: "Poggendorf's metre bridge, with five wires."

2885 UGP293 BRIDGE - WHEATSTONE

HARVEY & PEAK LATE W. LADD & CO. 56, CHARING CROSS RD. LONDON, W.C

B 1120x153x41. Late 19 C. G.

Mahogany base and two raised bars for two boxwood metre scales; slider has two brass ebonite bars to each wire.

Four and two brass contacts on the base, and four more on the bridge and slider.

Possibly "Thomson's modified Wheatstone's bridge" in Galway 1902,20.

Also bridges by Gallenkamp, Pye, and Griffin (the latter a half-metre bridge - see Griffin 1910,771).

Firm founded in 1884, Downing 1988,57.

3725 UGP377 BRIDGE - WHEATSTONE

NALDER BROS. & Co. WESTMINSTER No.26,443

C 228x218x135. Certificate 25:4:1911.

Post office box; mahogany hinged case; two proportional arms; coils from 1 to 4000 ohms; two taper keys.

Ebonite top for six segmented brass bars and two brass and ebonite taper keys; the first bar has two screw electric contacts

"B" and "L"; the second bar has one contact "G"; the sixth bar has one contact "L"; each taper key has a contact "G" and

"B"; there are 24 holes in the bars, with 23 brass and ebonite keys: Bar 1 - 1 10 100 1000; Bar 2 - 1 10 100 1000; Bar 3 -

1000 2000 3000 4000; Bar 4 - 100 200 300 400; Bar 5 - 10 20 30 40; Bar 6 - 1 2 3 4.

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In the lid of the instrument is a paper certificate: "CERTIFICATE OF Wheatstone Bridge No.26443 We hereby Certify that this has been compared with our Standards and that its value is as engraved +/- 0.02% at 16.5° Cent. Temperature coefficient +0.0029 per cent. per one degree Cent. [signed] V.F. Wilkins[?] Date 25th April 1911. NALDER BROS. & CO., PRINCES MEWS, GREAT GEORGE STREET, WESTMINSTER, S.W. [struck out with a red line] (Late 16, Red Lion Street, Clerkenwell.)

2950 UGP358 BRIDGE - WHEATSTONE

J. RABONE & SONS MAKERS BIRMINGHAM

B 1183x162x42; SiP 255x173. Pre 1902. R.

Hardwood base; boxwood metre rule and rails for missing slide; side panel; stout copper wire and mercury cups.

Seven brass contacts; four large and eight small cups on panel for mercury; the stout copper wire goes from the panel to the ends of the base, one end of which has more cups - two large and one small.

Galway 1902, 20 describes this: "Wheatstone's bridge, fitted with mercury cups suitable for Casey Foster's method of calibrating wires, and two slide wires (one of high resistance and one of low)."

2928 UGP336 BURNER

Unsigned

BD 112; H 378; RiD 52. Late 19 C. G.

Iron base; brass expanding pillar to boss with side arm and stop-cock; burner regulator; top six-spoke ring.

The regulator (now stuck) is in the form of a revolving ring with four holes; the burner pipe goes through the six-spoke wheel; inside the top of the pipe is a rod with small discs at each end with a bar, having a knurled end, through the top one; a horizontal bracket above the regulator holds a vertical rod (H134,D4) rising above the top of the pipe.

Possibly for use in demonstrating sensitive flames?

1919 UGP188 BURNER

Unsigned

Sp 191; H 317; W 413. Late 19 C. G.

Iron tripod base, gas inlet; brass pillar, horizontal pipe for four burners; adjustable Y-brackets at sides.

Pipe and burners of oxidised brass; each burner has a stop-cock at the bottom, and two have flattened tapering attachments on top; the Y-brackets can be moved up and down by means of brass clamping screws, and presumably were used to hold something to be heated.

2866 UGP286 CALORIMETER - JOLY STEAM

W.G. PYE & CO. MAKERS CAMBRIDGE

B 459x281x30; H 588; CyH 160, D 105. Early 20 C. G.

Mahogany base and vertical support with upper table; brass and copper cylinder calorimeter with steam jacket.

The calorimeter screws into its cap, which has an input pipe; at the bottom of the calorimeter is a funnel leading to a central output tube; brass knob moves bar to place either a brass pipe or a wood stopper under the tube output below the calorimeter.

The Pye 1914,112 catalogue describes this: "...well made in every detail, in accordance with Prof. Joly's description and also provided with tubes for exhausting the air jackets, complete on stand... with silver and platinum specimen holder, platinum catch-water, platinum drying spiral, wood and copper cones, and suspension wire..£8.10.0".

0164 UGP043 CAMERA OBSCURA

Unsigned

Hs 356x210x164; L 375. Pre 1861. R.

Mahogany and boxwood; lens in centre of pull-out drawer; hinged wooden flap at back; 45° angled mirror in housing below hinged flap.

"Portable Camera Obscura, the arrangement of which is such that the images of external objects are represented on a rough ground glass plate. The image may be traced in outlines with facility by a black-lead pencil on the roughened surface; or if very thin white paper be placed upon the glass, the images are discernible and may be transferred to it in the same manner."

- Curtis 1861,73.

2929 UGP337 CAPILLARY PLATES

Unsigned

B 268x86x29; H 196; Ps 203x153x5. Mid to late 19 C. G.

Oak base, trough and two vertical supports for two glass

plates close together; brass tops to supports.

Turner 1973,218 describes a similar instrument: "A mahogany frame forms a shallow trough, and provides a support for two sheets of glass that are held together but with a coin inserted between them at one side. Thus a very small angle is formed, and the liquid in the trough rises most towards the closed side. A board with white paper behind the glass enables the hyperbolic line of the liquid surface to be seen."

1872 UGP141 CAPILLARY TUBES

Unsigned

L 109-111; HaL 148. Mid 19 C. R.

Six glass tubes with capillaries of different diameters fit into mahogany handle at right-angles.

Also two green tin stands with corks for six capillary tubes in trough; all tubes present for one and none with the other (StH74,W107).

Listed in Curtis 1861,43.

2897 UGP305 CARTESIAN DIVER

Unsigned

BD 90; H 463; TuD 55, H 260. Mid 19 C. G.

Glass cylinder with wider base disc has brass sleeve and syringe above; inside, liquid and glass globe with capillary tube arm.

Ganot 1877,93 describes this: "The quantity of water in the globe is such that very little more is required to make it sink. If the piston be slightly lowered, the air is compressed, and this pressure is transmitted to the water of the vessel and the air in the bulb. The consequence is, that a small quantity of water penetrates into the bulb, which therefore becomes heavier and sinks..."

3720 UGP372 CATHETOMETER

Unsigned

Sp 410; H 1833; PrD 35; TeMnL 261; CyH 86, D 86.

Late 19 C. G.

Cast-iron tripod base; iron pillar with silvered brass scale 0-100cm; brass telescope on two Y-brackets.

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The base has three level screws; an oxidised brass and brass cylinder slides up or down the pillar with clamping and adjusting brass knobs; above it is a sleeve with a silver vernier; at the side of the cylinder is a pivoted bridge, with an adjusting screw under one end, which has the Y-brackets holding the brass telescope; this has rack and pinion eyepiece focus, and a spirit level below the tube.

A cathetometer is listed in Galway 1902,6.

2900 UGP308 CHEMICAL FLASK - GAS CONTAINER

Unsigned

D 74; L 137; AD 9. Pre 1902. G.

Glass sphere with side arm; only remaining example of "Six electrodeless bulbs" containing different gases.

This was one of two containing air; the others contained Hydrogen, Bromine, Hydrogen Chloride gas, and Cyano-gen gas. Galway 1902,22, does not give their purpose, but perhaps they were used for spectroscopic studies?

2931 UGP339 CHEMICAL RETORTS

Unsigned

L 284,385,335; H 180,225,225. Early to mid 19 C. G.

Three; one iron, two glass; each has a rounded body, an input pipe on top, and a long side arm.

The iron retort has a widened end to its long arm; the arms of the others continue to reduce in diameter to their ends.

1922 UGP191 CHLADNI PLATE

YEATES & SON [sic] DUBLIN

321X316; H 150. Mid to late 19 C. G.

Black cast-iron fluted base and pillar to square brass plate; oxidised brass on back.

1923 UGP192 CHLADNI PLATE

Unsigned

H 215; W 200; PMxW 295. Late 19 C. G.

S-shaped bracket has clamping screws to attach bracket to table and plate to bracket; brass hexagonal plate.

1884 UGP153 CLOCK - STOP

W.G. PYE & CO. ENG. CAMBRIDGE

B 153x146; H 154; DiHsD 118. Early 20 C. G.

Two; mahogany frame, angled front for brass-bound glass cover over white paper scale, 10-60 minutes.

Smaller seconds scale 10-60; white metal push-bar to start (left to right) or stop (right to left); slow/fast adjust arc; hole for winding key.

Second example has cracked glass and is missing its seconds hand.

2936 UGP344 COHESION PLATES

Unsigned

D 78; H 57; Ha 73x32. Mid to late 19 C. G.

Two; brass discs with red resin on the same side as the elliptical brass ring handles.

Turner 1973,239 notes that: "Petrus van Musschenbroek (1692-1761) was particularly interested in the cohesive properties of bodies, and used planes of glass, brass, silver, etc. with thin films of wax, oils, water etc. between them."; when pressed together, one disc can be suspended, and weights attached to the other, by means of the handles, to discover the force needed to separate them.

1515 UGP093 COIL

YEATES & SON, DUBLIN.

B 89X45; H 114; RiD 53; CoHsD 31. Mid to late 19 C. G.

Brass base and two tapering pillars for ebonite ring; in this, ebonite housing with coil which can rotate 180°.

Brass contacts to the rotating coil above and below the ring; small brass pulley wheel on top of the ring allows coil to turn, but turning stopped by a peg after 180°; under the base is a scale 1-10 1 = .8065 & 10 = 1.0850 "Diameter of coils 80 in number 8 coils wide x 10 deep".

More complete instrument 2322 QBP088 has a wire spring below to oppose the turn of the coil and a string over the pulley wheel for a weight(?).

1507 UGP097 COIL

Yeates & Son. Dublin

BD 105; H 354; CoHs 76x76. Acquired 1886.

Expanding brass stand; on top, two ebonite squares with green-covered coil between; glass cell fits in centre.

Cell in oxidised brass frame; two contacts for coil on ebonite housing.

Possibly "Apparatus fitted to electro-magnet for showing rotation of plane of polarisation of light by glass in magnetic field", bought from Yeates & Son in May 1886 - Curtis 1861,107.

Similar instrument, missing its cell, 1574 MAY063.

2537 UGP243 COIL

Unsigned

OD 205; ID 99; W 48. Mid 19 C. G.

Ring covered in cloth, coil apparently made from wide copper strip (32x1); ends free and brought to points.

2530 UGP236 COIL - DU BOIS REYMOND

Unsigned

B 278x84x11; H 103. Late 19 early 20 C. G.

Mahogany base; actual coil gone; interruptor mechanism on brass pillar, two vertical coils; four brass contacts; scale plate also missing.

See Griffin 1910,931; Elliott 1895,143.

2494 UGP200 COIL - INDUCTION

HARVEY & PEAK, LATE W. LADD & CO, 56, CHARING CROSS RD.. LONDON, W.C.

B 203x174x24; H 220; CoHsMxD 111. 1891-1901. A.

Mahogany base and spools; inner and outer upright coils.

The primary coil, now with a replacement, broken top to hold the two brass contacts, has thick wire windings and can be lowered into or taken out of the centre of the secondary, which has thinner windings and is secured to the base; two brass contacts also on the base; written on base: "Tested with 1 Bichromate Bottle Battery 2 litre capacity and Astatic thermo

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Galvanometer".

Dates from Crawforth 1988,9 and Downing 1988,57.

1535 UGP128 COIL - INDUCTION

L. MILLER'S (PATENT) JOINTLESS-SECTION COIL 66 HATTON GARDEN LONDON.

B 684x354x94; CoL 630, D 114&180.

Late 19 early 20 C. G.

Oak base; ebonite housing for coil; brass contacts.

Oak brackets from base to support coil; ebonite arms from coil housing to brass couplings for ebonite and brass pointed conductors; no commutator on base.

2536 UGP242 COIL - INDUCTION

W.G. PYE & Co MAKERS CAMBRIDGE

OD 377; ID 286; W 44. Late 19 early 20 C. G.

Two; mahogany ring housing; two brass contacts on inner side; one labelled "500 ½".

2523 UGP229 COIL - INDUCTION

Unsigned PATENT NO. 61

Hs 279x160x151; H 244 Late 19 early 20 C. G.

Mahogany housing; horizontal top of coil ring appears from ebonite plate; two raised ebonite and brass contacts.

Brass plaque on edge of housing reads: "PRIMARY - 100 VOLTS. 100 [wavy line - s sideways] SECONDARY - 1..4 = 3000. VOLTS 2..4 = 5000. ... 3..4 = 7000. ..."; four more brass contacts for coil connections.

1539 UGP131 COIL - INDUCTION

Unsigned

CosHsD 69&28, H 148&127. Third ¼ 19 C. G.

Four primary coils on cylinder wood frames fit into centre of secondary also wound on wood frame.

Badly damaged second secondary; two brass contacts on top of intact secondary; contacts on the ends of some of the wires on the primaries (three remain out of possible eight).

0151 UGP014 COIL - INDUCTION, MEDICAL

Unsigned - attributed James Robinson, Dublin.

B 179x150x37; H 185; CoD 52. c1845. SI.

Mahogany base and two (of four) legs; four brass terminals and seven-point switch; upright coil with interruptor on top.

Identical instrument to 0309 CWC033 signed and dated; also to unsigned 1061 MAY037.

2527 UGP233 COIL - INDUCTION, MEDICAL

YOUNG Edinr.

Hs 119x117x112; CoHsL 70, D 26. Mid to late 19 C. G.

Mahogany housing, hinged lid; inside, coil, six brass contacts; interruptor, battery, and electrodes gone.

Lid has a brass handle on top; "P", "S" & "K" marked at or near contacts.

Maker not in Bryden 1972 nor Clarke 1989.

0160 UGP039 COIL - INDUCTION, MEDICAL

Unsigned

B 206x166x26; H 238. Pre 1861. R.

Mahogany housing holds blue velvet-covered coil and wheel-driven interruptor mechanism using spiked disc.

"Manual Electro-Magnetic Coil Machine, for medical purposes." - wooden reel and hollow axis, two helices of different diameter wire, battery connected to primary, supply interrupted by the multiplying wheel actuating the circular contact breaker to give electro-dynamic shocks, intensity varied by using primary or secondary coils, and by adding or taking away a bundle or faggot of soft iron wire in the centre - Elliott 1856b,14; Curtis 1861,98.

2956 UGP364 COIL - INDUCTION, RUHMKORFF

Griffin & Sons. 22. Garrick St. London. W.C.

B 243x154x41; DisD 91. 1868-1895. A.

Mahogany base; ebonite-covered coil, disc ends, and pillars; ebonite and brass commutator; brass contacts; brass and iron interruptor.

Dates from Anderson 1990,33-4 and Crawforth 1988,8.

1534 UGP127 COIL - INDUCTION, RUHMKORFF

HARVEY & PEAK LONDON W

B 716x425x121; CoHsD 168, L 455; CeDiD 70.

1884-1909. F.

Mahogany base; brass fittings; ebonite-housed coil (damaged); central ebony disc; conductors missing; mahogany, brass and ivory commutator.

Dates from Downing 1988,57.

0156 UGP035 COMMUNICATING VESSELS

ELLIOTT BROTHER(S) OPTICIANS 30(?) STRAND, LONDON

B 302x207; H 365. 1858-1861. AR.

Elliptical japanned hollow tin base; three glass vessels, S-bend, sphere centre, bent straight tube; brass bung.

"Apparatus to illustrate the disposition of fluids to seek and maintain the same level. It consists of three glass vessels of various forms, having a connection with the same water-trough." - Curtis 1861,46.

Firm moved to 30 Strand in 1858, Crawforth 1988,8.

1897 UGP166 COMMUTATOR

ELLIOTT BROS 30 STRAND LONDON

BD 151; H 64. 1858-1863. A.

Mahogany base, four contacts; two concentric brass rings, two ebonite interruptions in each; rotating contact bar.

Latter has a turned ivory handle and is bent in two right-angles; two ivory inserts on it hold two double contacts, in the form of curved brass pieces, to touch the rings.

Dates from Crawforth 1988,8.

0170 UGP049 COMPASS - MARINE

ELLIOTT BROTHERS, STRAND. LONDON.

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244x241x139; HsD 180. 1856-1861. AR.

Mahogany case (lid missing); compass in brass housing with gimbal mount; paper compass rose.

"Sea or Steering Compass, with the needle affixed to floating card, on the surface of which is engraved the points of the compass. The floating card is suspended upon a point fixed in the bowl which is itself hung in gimbals [sic] in a mahogany box," - Curtis 1861,94.

Elliott Brothers dates from Crawforth 1988,8.

2546 UGP252 COMPRESSED GLASS CUBE

Duboscq Soleil a Paris

L 240; Gl 25x23x23. Mid 19 C. G.

Cube held in centre of brass frame; one handle is fixed; the other turns a screw clamp to compress cube.

2935 UGP343 CONDENSER - STANDARD

1 INTERNATIONAL MFD. NALDER BROS & CO. WESTMINSTER No 30,297

C 295x174x141; Hss 114x108x21. 1890-1910. F.

Mahogany hinged case for ten ebonite housings ".1 MFD".

Each housing plate has two brass screw contacts on top; there are four copper contact pieces in the lid to join the plates together.

The firm issued catalogues from 1890-1910, Anderson 1990,57-8.

1500 UGP071 CONDUCTOR

Unsigned

BD 130; H 458; PrD 17; CnD 103; SrD 18. Mid 19 C. G.

Turned mahogany base; glass pillar; black metal hemi-sphere with brass rod to small brass sphere.

1502 UGP132 CONDUCTOR - CYLINDRICAL

ELLIOTT BROS. 30 STRAND LONDON

B 305x203x46; H 793; CnD 38. 1858-1861. AR.

Mahogany base; two glass pillars; revolving cylinder brass conductor for friction sheet; handle gone.

Elliott 1856a,16 illustrates this instrument with a sheet around the cylinder and a crook with a pair of pith balls suspended on the side opposite the handle; but, unusually, gives the very poor description "Apparatus for illustrating the difference of quantity and intensity of an electrical charge" - presumably by using different materials to generate the frictional charge.

Listed in Curtis 1861,91; Crawforth 1988,8 gives 30 Strand date from 1858.

2497 UGP203 CONDUCTOR - CYLINDRICAL

ELLIOTT BROS 30 STRAND LONDON

BD 235; H 457; CyD 104, L 409. 1858-1863. A.

Turned mahogany base and boss; glass pillar to hollow horizontal black metal cylinder with flat ends.

Dates from Crawforth 1988,8.

1499 UGP070 CONDUCTOR - CYLINDRICAL

Unsigned

BD 143; H 370; L 345; CnD 19. Mid 19 C. G.

Turned mahogany base; glass insulating pillar; brass sleeve; brass horizontal cylinder with rounded ends.

Probably one of four cylindrical brass conductors noted in Curtis 1861,91.

1501 UGP073 CONDUCTOR - SPHERICAL

Unsigned

BD 154; H 577; PrD 15; SrD 102. Mid 19 C. G.

Turned mahogany base; glass pillar between brass sleeves; copper sphere on top can screw off.

Perhaps part of Biot's apparatus noted in Curtis 1861,91

2502 UGP208 CONDUCTORS - CYLINDRICAL & SPHERICAL

Unsigned

L 200; D 11; H 233. Mid 19 C. G.

Turned mahogany handle and brass rod hold brass cylinder with flat ends; also spherical brass conductor (D33).

The latter, made up of two fused hemispheres, is on a brass rod which is now held in a square section hole in an iron boss attached to a turned wood handle; while the handle and rod clearly aren't original to the sphere, this conductor could be used in the same way as the cylinder conductor (which is original and complete) to contrast the properties of the two shapes.

Could also be for heat expansion experiments - see Griffin 1910,415.

1876 UGP145 CRYOPHORUS - WOLLASTON

Unsigned

L 487; BuD 48. Late 19 C. G.

Glass J-tube with sphere at short end and expanded cylinder bulb at other; contains water.

"Wollaston's cryophorus, two (in different shapes)" in Galway 1902,12.

See also Griffin 1910,458.

1900 UGP169 DIP CIRCLE

Elliott Bros., London.

Sp 142; H 253; CrD 190. Mid to late 19 C. G.

Brass; tribach base; table and spirit level; trunnions for needle and silvered vertical circle 0-90-0-90-0°.

Latter has six spokes sloping backwards so that the needle ends are close to the scale when set in its place.

1901 UGP170 DIP CIRCLE

Max Kohl, Chemnitz.

Sp 180; H 321; CrsD 150&190. Late 19 early 20 C. G.

Brass; tribach base; horizontal circle 0-350°; turned pillars to support vertical circle 0-90-0-90-0°.

Some parts oxidised brass; both circles silvered; spirit level on brass table above horizontal circle; two pillars at the sides of this; vernier from table to horizontal circle; needle, which would have been pivoted on two diagonals supported by the pillars, is now missing.

1903 UGP172 DISC SPINNER

ELLIOTT BROS. 30 STRAND LONDON

B 357x210x70; WhD 170; DiD 101. 1858-1863. A.

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Mahogany drawer base; brass five-spoke wheel with pulley drive for brass disc; various card discs in drawer.
Wood handle for wheel; wax in knurled cup at centre of brass disc to hold card discs; turned ivory handle on drawer.
Dates from Crawforth 1988,8.

1491 UGP118 DISC SPINNER

Unsigned

Sp 166; H 262. Third $\frac{1}{4}$ 19 C. G.

Iron tripod foot; brass; handle to turn two pulley wheels; support for axis on top; spindle and discs gone.

Wood and brass handle.

May be "Colour wheel with six screens, six discs - black, white, blue, green, yellow and red, three angled discs, graduated scales of red and green...." added to Curtis 1861,76.

0181 UGP061 DISCHARGE FRAME

Unsigned - attributed to Elliott Brothers

Fr 314x140; L 333; W(+Ha) 266. Mid 19 C. CT.

Mahogany frame with handle holds s-shaped band of metal strips and discs - not touching each other.

Small spherical brass disc at one end of band; small brass ring at other.

Elliott 1856a,11 illustrates very similar apparatus, but interestingly with the foil strips arranged to give the word "EIRE", "Names or Words arranged upon glass plates, with pieces of tin foil. These may be rendered luminous in the dark by the agency of electrical light."; not now in Curtis 1861, but suspect it was there originally.

2920 UGP328 DISCHARGE TUBE

Unsigned

W 125; MxD 72. Late 19 early 20 C. G.

Glass; pear shape; from narrow end, rod to disc electrode;

from side of widest part, rod to metal ring; latter co-central to disc, but with a larger diameter.

2917 UGP325 DISCHARGE TUBE

Unsigned

BD 69; H 222; MxD 68. Late 19 early 20 C. G.

Black turned wood base; glass; stem to sphere containing rotating four-arm white-metal vane; two point electrodes at the base of the stem and in an egg-shaped top above the main sphere; label reads: "OK 1927 1933".

2915 UGP323 DISCHARGE TUBE

Unsigned

L 420; SrD 130. Early 20 C. G.

Glass sphere with two electrode arms, one cylindrical with cylinder electrode and shield; one egg-shaped with disc.

Between the egg-shaped arm and the sphere is another cylinder electrode with one side open and one side closed except for a small hole.

Baird & Tatlock 1924,548 describe this: "Vacuum tube to show that Cathode rays carry a negative charge (exhausted)".

2913 UGP321 DISCHARGE TUBE

Unsigned

L 630,573,553; MxD 69,66 & (Srs) 49. Late 19 C. G.

Three; glass; point electrodes at ends; two are straight with three bulbs; one has seven spheres joined by curved tubes.

Largest has egg-shaped bulbs at its ends and a sphere in the middle; the next has three egg-shaped bulbs, that in the middle being largest; one end of the connecting tubes, which bend through 180°, in the third continues into the middle of the next sphere.

There is a further tube which is straight between two eggs, and has a green colour (L202,MxD35,TuD8).

2908 UGP316 DISCHARGE TUBE

Unsigned

BD 66; H 145; L 140; MxD 65. Late 19 early 20 C. G.

Black turned wood base; glass; stem to horizontal egg, containing white crystals; two disc electrodes on top; label reads: "O.K. 1927".

Griffin 1910,956 describes this: "Vacuum Tube, contain-ing a number of small pieces of various brilliantly phosphorescing minerals."; here there is a considerable quantity of crystals, and they all appear to be of the same substance.

2905 UGP313 DISCHARGE TUBE

Unsigned

BD 78; H 255; SrD 106. Late 19 early 20 C. G.

Black turned wood base; glass; stem to sphere; central white-metal star; two disc electrodes on sphere equator; written below base: "Double Star 25/-".

2891 UGP299 DISCHARGE TUBE

Unsigned

L 478; D 25; C 632x212x110. Pre 1902. R.

Five (of seven) glass tubes with brass caps and disc electrodes to show discharge at reducing pressures; case.

Black slide-lid case; tubes marked: "1 HIGH PRESSURE N2-colour Dark Space not visible - Glow; 2 DARK SPACE 2mms; 3 DARK SPACE 5 or 6mms STRIATED + column (only this one has a third disc electrode - in the centre of the tube); 4 DARK SPACE >2cms; 5 Very hard Green phosphor ball".

Listed in Galway 1902,21.

0080 UGP027 DISCHARGE TUBE - AURORA

Unsigned - attributed to Elliott Brothers

BD 180; H 590; HsD 41. 1856-1861. R.

Mahogany base, brass sleeves, glass tube; two spherical conductors inside; red top; contacts top and bottom.

"Luminous conductor, consisting of a long glass tube, with air-tight metal caps and an air-valve for showing the vivid effects of flashes of electrical light, which are more or less in perfect continuity and regularity in proportion to the degree of exhaustion within the tube - 18s., £1 8s., £2 2s." - Elliott 1856a,9; instrument also illustrated in Curtis 1861,90.

Firm founded in 1856, Chaldecott 1989,161.

2926 UGP334 DISCHARGE TUBE - CROOKES

Unsigned

L 315; TuD 46. Late 19 early 20 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

"Railway"; glass; horizontal tube with rails for eight-vane metal wheel; disc electrodes at ends; wood stand.
Griffin 1910,960 describes this: "Crookes Railway Tube, in which a light wheel with mica vanes [they are metal in this example] is mounted on glass rails. When a discharge passes through the tube the cathode rays strike the upper vanes and the wheel rotates and travels away from the cathode."

2925 UGP333 DISCHARGE TUBE - CROOKES

Unsigned

L 275; TuD 14&42. Late 19 early 20 C. G.

"Mill Wheel"; glass; horizontal tube; frame for fixed eight-vane wheel; spherical concave and point electrodes.

Small tube at one end holds crystals - presumably caustic potash to lower the vacuum; on wood stand.

Griffin 1910,961 describes this: "Crookes Mill Wheel Tube for demonstrating the deflection of the cathode rays by a magnet as well as the power of the rays to produce motion as in the railway tube [2926 UGP334]. If the rays are not deflected they impinge equally on the top and bottom vanes and the wheel will not rotate."

2918 UGP326 DISCHARGE TUBE - CROOKES

Unsigned

BD 73; H 170; W 184. Late 19 early 20 C. G.

Turned boxwood base; glass; stem to horizontal conical tube with disc electrode and hinged Maltese cross.

Griffin 1910,959 describes this: "Crookes Tube containing a hinged light metal cross. If the cross is allowed to stand across the cathode stream, a sharp shadow will be formed at the end of the tube. After a while, if the cross is shaken down, the part of the tube which was formerly in shadow will fluoresce more brilliantly than the surrounding parts. The glass gets fatigued with the bombardment and ceases to fluoresce as brilliantly as at first."

2912 UGP320 DISCHARGE TUBE - CROOKES

Unsigned

BD 69&62; H 288&245; TuD 37&37.

Late 19 early 20 C. G.

Two; black turned wood base; glass; stem to vertical tube; bent metal phosphorescent strip inside, with slit.

Point anode below; disc cathode above; label reads: "OK in 1927 1933"; written below base of larger tube: "No 7A".

Griffin 1910,960 describes this: "Crookes Tube for showing that the cathode stream is deflected by a magnet."; the slit in the metal strip is in front of the disc cathode; the strip is then bent and extends down into the tube at an angle; the white colour is a phosphorescent screen.

Baird & Tatlock 1924,581 note the phosphorescent screen.

2911 UGP319 DISCHARGE TUBE - CROOKES

Unsigned

BD 77; H 340; TuD 35. Late 19 early 20 C. G.

Black turned wood base; glass; bent arm to vertical tube; mid concave cylinder cathode and top disc anode.

Label reads: "OK 1927 1933"; written below base: "No 8".

Griffin 1910,959 describes this: "Crookes Tube with concave cylindrical cathode, showing that the cathode rays pass through a line focus."

2910 UGP318 DISCHARGE TUBE - CROOKES

Unsigned

BD 64; H 308; TuD 30. Late 19 early 20 C. G.

Black turned wood base; glass; bent arm to vertical tube; mid concave spherical cathode and top disc anode.

Label reads: "OK 1927"; written below base: "No 19".

Griffin 1910,962 describes this: "Crookes Tube with concave spherical cathode...By means of a magnet the focus can be deflected on to the walls of the tube. The heat produced by the bombardment is sufficient to melt wax on the outside of the tube.

2909 UGP317 DISCHARGE TUBE - CROOKES

Unsigned

B 200x123x16; H 270; TuD 28. Late 19 early 20 C. G.

Black wood base and vertical support for glass V-tube; disc electrodes at bottom and on tops of arms.

The bottom electrode points towards one of the upper electrodes, and not towards the other; there is a horizontal side arm on top of one of the arms, containing crystals.

Griffin 1910,958 describes this: "Crookes V-Tube for showing that the cathode stream proceeds in straight lines normal to the surface of the cathode, irrespective of the position of the anode. If the electrode at the bottom of the V is made the cathode, the rays will be confined to the one limb..., whichever of the top electrodes is made the anode."

2907 UGP315 DISCHARGE TUBE - CROOKES

Unsigned

BD 81; H 250; MxD 95. Late 19 early 20 C. G.

Turned black wood base; glass; bent tube to tear drop; concave spherical cathode at bottom; central platinum square; disc anode on top.

"OK 1927"; written below base: "No 21".

Griffin 1910,962 describes this: "Crookes Tube with a piece of platinum foil in the focus of the concave spherical cathode. The platinum is heated to a glowing point."

2906 UGP314 DISCHARGE TUBE - CROOKES

Unsigned

BD 67; H 256; SrD 110. Late 19 early 20 C. G.

Black turned wood base; glass; bent tube to sphere; concave cathode to one side; three points, below, top, side.

Torn label reads: "HIGH PRESSURE"; written below base: "No 70".

Griffin 1910,958 notes that this is a: "Crookes tube with concave spherical cathode...to give the luminous discharge required in so-called Geissler Tubes...the luminous discharge will pass from the cathode to whichever electrode is made the anode."

2914 UGP322 DISCHARGE TUBE - GEISSLER

Unsigned

L 590,278,340. Mid to late 19 C. G.

Three; triple egg with spiral into jug; double S-bend with three spirals; linear with three eggs and two spirals.

In the first a (broken) spiral goes into a green jug within the large central egg; the second has a linear spiral in the first straight limb, a circular spiral around a central green spiral in the spherical central limb, and a green circular spiral around a central

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spiral in the third spherical limb, with the rest broken off and missing; the third has linear spirals with a green egg between them.

2919 UGP327 DISCHARGE TUBE - GOLDSTEIN

Unsigned Chlor natrium

L 173; TuD 40&20. Late 19 early 20 C. G.

Two; glass; horizontal double-cylinder tube; three vertical arms; point and disc electrodes; contains crystals.

On wood stand; the third vertical arm has no electrode and is covered with black resin.

Griffin 1910,966 describes this: "Goldstein Tubes contain-ing powdered sodium chloride, potassium chloride, potassium iodide, or potassium bromide. These sub-stances change colour under the influence of the cathode rays."

2916 UGP324 DISCHARGE TUBE - GOLDSTEIN

Unsigned

BD 119; H 263; W 292. Early 20 C. G.

Turned boxwood base; glass; two parallel horizontal tubes, the upper with a perforated disc cathode.

The lower tube has a point anode; label reads: "OK 1927".

Griffin 1910,966 describes this: "Goldstein Tube for showing the existence of Canalstrahlen...the cathode is perforated and the Canalstrahlen are observed as luminous streams passing through the holes in the cathode on the side remote from the anode. These rays are only slightly deflected by a magnet and excite a slight phosphorescence, usually of a mauve colour, on the walls of the tube. The cathode rays will be observed as usual proceeding from the surface of the cathode towards the anode."

2924 UGP332 DISCHARGE TUBE - LENARD

Unsigned

BD 138; H 250; TuD 30. Early 20 C. G.

Turned boxwood base; glass; stem to horizontal tube; cylinder and disc electrodes; perforated brass cap at end; brown colour inside.

Griffin 1910,967 describes this: "Lenard Tube, unexhausted, with perforated brass cap for the reception of the aluminium foil...Lenard found that cathode rays will penetrate very thin layers of some solid bodies. On emerging the rays become rapidly adsorbed by the air, which they render conductive."

2921 UGP329 DISCHARGE TUBE - OSCILLOSCOPE

Unsigned

L 483; TuD 24. Late 19 early 20 C. G.

Glass cylinder tube; brass caps lead to long point electrodes, 68mm apart at points; green-brown colour.

Baird & Tatlock 1924,586 describe this: "Oscilloscope. This instrument is useful in the detection of inverse current and to indicate the direction of unidirectional current. In the latter case a glow appears on that wire connected to the negative pole of the generator... when no inverse is present, only the extreme tip of the other wire will show any glow..."; useful to ensure that a Coolidge tube is connected up the right way.

2923 UGP331 DISCHARGE TUBE - PERRIN

Unsigned

L 535; MxD 65; TuD 38,51&26. Early 20 C. G.

Glass; disc electrode and ring in open cylinder; bulb, then closed cylinder with pin-hole; disc electrode.

The tube has varying diameter with the bulb in the centre; the ring, and the end of the open cylinder, have circles of white material.

Appears to correspond to tube described in Griffin 1910,967: "Perrin Vacuum Tube for showing that the cathode rays carry a negative charge...The cathode rays pass through two earthed diaphragms and strike a small metallic cylinder, which can be connected to an electrometer. When the discharge passes, it is found that the electrometer has received a negative charge."

0180 UGP060 DISCHARGER - JOINTED

Unsigned - attributed to Elliott Brothers

L 533; SrsD 26; HaD 28. 1856-1861. FR.

Turned glass handle ends in brass sleeve for hinged pair of curved brass rods ending in brass spheres.

"This piece of apparatus is useful for discharging electrical jars and batteries, as the operator has little to fear of partaking of the shock; for the glass handle (when quite dry) forms a protection from all the effects which take place in the restoration of electrical equilibrium." - Elliott 1856a,12.

Curtis 1861,88 and Elliott 1856a,12 give same illustration; firm founded in 1856, Chaldecott 1989,161.

1905 UGP174 EAR TRUMPET

Unsigned

L 158; MxD 90. Mid to late 19 C. G.

Coated tin; in shape of tuba, with tube turning 180° twice as it expands in diameter to the wide end.

2951 UGP359 EARTH INDUCTOR

Max Kohl Chemnitz

MnL 560; WhD 235; CoHsOD 300, ID 238.

Early 20 C. G.

Black iron frame with G-clamp has five-spoke horizontal pulley wheel to turn wood ring coil with commutator.

Turned wood handle for pulley wheel, which has curved spokes; the commutator at the bottom of the coil housing is of brass with three and one spring contacts.

Illustrated in Kohl 1911,288.

0169 UGP048 EARTH INDUCTOR - BARLOW GLOBE

ELLIOTT BROTHERS 30 STRAND LONDON

B 396X261; H 313; GD 222. 1858-1861. AR.

Mahogany base and frame holds revolving globe labelled N and S with coil wound around equator.

Peter Barlow (1776-1862) presented such an instrument to the Royal Institution in 1824; "Apparatus to illustrate the probable electric origin of all the phaenomena of terrestrial magnetism."; when a magnetic needle is suspended above the globe, and a current is passed through the coil, the needle lies in a plane from pole to pole through the centre, its inclination varying with its position - Elliott 1856b,9&10.

Listed in Curtis 1861,97; firm to 30 Strand in 1858, Crawforth 1988,8; Barlow details in Bull SIS 8,1986,5.

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1504 UGP072 EARTH INDUCTOR - DELEZENNE CIRCLE

YEATES & SON DUBLIN

B 572x219x32; H 608; FrSi 422; CrD 349. c1877. CT.

Mahogany; supports to pivoted square frame; revolving coil in circular housing inside this; commutator.

Two electrical contacts on square frame; wood and brass handle to turn coil housing; green-covered copper coil; brass circular scale between supports and frame, partially divided 0-90°; split brass commutator on two springs between bottom of coil and frame.

Illustrated as "Delezenne's circle" in Ganot 1890,893 - it "serves for showing the currents produced by the inductive action of the earth."

Advertised but not illustrated in Yeates 1877,30.

0163 UGP042 ELECTRIC EGG

Unsigned

BD 101; H 540; D 143. Mid 19 C. CT.

Brass and glass; stop-cock above base; two spherical conductors inside; shepherd's crook conductor on top; stop-cock and crook each have screw electrical contacts.

"Egg shaped Glass Vessel, with brass balls and wires for showing light in vacuo, to be used with the Coil." - Elliott 1856b,17; Curtis 1861,101.

1907 UGP176 ELECTRIC MOTOR

Unsigned - attributed to Elliott Brothers.

B 334x200x40; H 485; WhD 270. Pre 1861. R.

"Magneto-Electric Inductive Machine"; mahogany wheel turns two coils at poles of five U-magnets; brass contacts; mahogany cover gone.

"...supplied with a rotating armature for 'quantity' effects and [another] for the effects of 'intensity'" [only one remains]; shows "electrical, chemical, physiological, and mechanical powers evolved by magnetism. With it electric light and heat are rendered apparent, chemical constituents separated, muscles of the body powerfully acted on, and rotary motion produced. £10 10s., £12 12s." - Elliott 1856b.

Listed in Curtis 1861,97.

0168 UGP047 ELECTRIC MOTOR

YEATES & SON DUBLIN

B 204x154x19; H 186. Acquired c1886.

Mahogany base; heavy cast iron frame to hold coil; armature between poles with contacts for AC and DC.

Probably "Small continuous and alternate current Dynamo (Yeates)" added to Curtis 1861,107 around 1886.

1497 UGP078 ELECTRIC PISTOL

Unsigned - attributed to Elliott Brothers

L 280&293; D 28½&22. 1856-1861. R.

Two; mahogany handles; brass barrels; small ivory inlet; one pistol shorter and fatter than the other; one of the ivory inlets is broken.

"Electrical Pistol. This is a simple, but at the same time striking experiment, for with it inflammable gases may (with ease) be exploded by the electric spark." - Elliott 1856a,13).

Curtis 1861,88 and Elliott 1856a,13 give same illustration, firm founded in 1856, Chaldecott 1989,161.

0079 UGP028 ELECTRICAL MACHINE - GRAMME

GRAMME. INV. BREVETE. S.G.D.C. BREGUET. FT. No157

H 575; W 353. Acquired 1876.

Heavy brass and oxidised brass; laminated horseshoe magnet; cog-wheel device to turn armature; no handle.

Acquired November 1876 - Curtis 1861,104.

2525 UGP231 ELECTROMAGNET

MAX KOHL Werkstätten für Präzisionsmechanik CHEMNITZ i.S.

B410x260x39;H740;MAsD54,L175.

Late 19 early 20 C. G.

Oak base and frame; on top, pendant U electromagnet; eight-point commutator; keeper attached to hanging tray.

Latter uses four chains, and could be used to test strength of magnet by adding weights; the commutator consists of a wood cylinder with two sets of eight knobs, and it can be turned so that either set touches eight brass springs connected by wires to the turnings of the coils.

2535 UGP241 ELECTROMAGNET

Unsigned

H 305; CoSD 63; BrD 38. Mid 19 C. G.

Iron U-shaped bar; each arm has four sets of windings; two brass contacts on ends of wires from coils.

2534 UGP240 ELECTROMAGNET

Unsigned

B 279x170x36; H 366; CoD 90. Late 19 early 20 C. G.

Broken boxwood base; metal plate on bottom; brass spools for coils, iron centres and movable pole-pieces.

Two brass plates, each with two contacts on base; very heavy instrument; some windings loose; tapering sides on pole-pieces can be revolved using a knob on a thick bar through the main element.

2902 UGP310 ELECTROMAGNETIC ROTATION APPARATUS

Unsigned

BD 93; H 200; W 90; MD 13. Pre 1861. R.

Brass base; red U-magnet; in centre, brass pillar to turned wood mercury cup; rotating Ritchie magnet gone.

The cup is cracked; in its centre is a support for the rotating magnet.

Described in Curtis 1861,96 as: "Ritchie's straight electro-magnet, to rotate between the poles of the permanent steel horse-shoe magnet; divided mercury chamber."

1896 UGP165 ELECTROMAGNETIC ROTATION APPARATUS

Unsigned

BD 82; H 113. Mid 19 C. G.

Mahogany base; central mercury reservoir with side cup; three turned pillars; support and rotating element missing.

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The mercury reservoir has a raised centre to support the bottom of the rotating element, part of which can dip into the mercury in the reservoir; the side cup, in the form of a small egg-cup, is attached to the reservoir by a wire.

2564 UGP264 ELECTROMETER - BRAUN

Unsigned

Sp 148; H 315; HsD 203. Late 19 early 20 C. G.

"Braun's absolute"; tripod base; cylinder metal glazed housing with tin sides; scale 0-30; "1 SC=100 VOLT".

One foot of the iron tripod has a brass electrical contact; another has a level screw; the tin front and back discs have an arc hole through which can be seen the white-metal scale; a small brass sphere conductor (D12) connects to the brass plate inside from which the scale needle rises.

"These electrometers can be used as a substitute for the aluminium leaf electroscopes. When a lamp is placed behind them, the readings are visible at a great distance."

Quote from Kohl List 100 Vol.3, 1926, 821; Leybold 1930, 240.

0014 UGP020 ELECTROMETER - CUTHBERTSON DISCHARGE

W & S JONES 30 HOLBORN LONDON

B 301x143; H 373. 1800-1860. A.

Elliptical mahogany base; two glass pillars ending in spheres; longer has spherical conductor arrangement.

Cuthbertson's compound universal discharging electrometer; longer pillar has brass dumb bell running through it together with another bent brass rod also ending in a sphere; "with this instrument the electric forces are said (by the inventor) to be estimated in grain weights." - Curtis 1861, 84, taken from Elliott 1856a, 5.

Dates from Clifton 1995, 155.

2954 UGP362 ELECTROMETER - GOLD LEAF

Unsigned

B 329x202x32; H 440; Hs 235x153x97. Late 19 C. G.

Mahogany base; brass slide for bent glass rod to disc; second disc attached to table above leaves in housing.

The slide has a brass sleeve into which fits the glass rod, which turns through 90° to a brass sleeve for the copper disc (D138); the latter can thus be moved closer to, or away from, its matching disc, which is attached to the brass disc table (D82); a brass sleeve below the table holds a white insulating pillar to the (missing) gold leaves, which extends through a brass sleeve on top of the glazed housing for the leaves.

0036 UGP019 ELECTROMETER - GOLD LEAF

Unsigned

BD 88; H 330; D 121; TD 79. Second ½ 19 C. G.

Glass sphere on turned glass base, with brass table on top connecting by rod to leaves within the sphere.

Sphere has ground glass joint on bottom and brass sleeve on top with ebonite plug, through which runs a brass rod with the circular table on top having a hook side arm; at the bottom of this, inside the sphere, the gold leaves (missing) would be attached.

0016 UGP021 ELECTROMETER - HARRIS DISCHARGE

ELLIOTT BROS. 30 STRAND LONDON

B 226x148x48; H 467. 1858-1861. AR.

Mahogany base; two glass pillars, one ending in sphere, other in arrangement of sphere-ended conductors.

Used for "discharging batteries or large jars through a given circuit, and in a uniform manner for successive experiments. It consists of an insulated ball connected with the charged side of the battery, and a similar ball placed at a distance over it in connection with the negative side."; the upper ball may be freed and allowed to fall on the ball beneath to discharge the battery - details from Elliott 1856a, 5.

Firm moved to 30 Strand in 1858, Crawforth 1988, 8; listed in Curtis 1861, 84.

0051 UGP030 ELECTROMETER - HARRIS UNIT JAR

Unsigned

BD 124; H 580. Pre 1861. R.

Mahogany base; tall glass pillar; on top, horizontal glass jar with brass sphere conductors system on rods.

"To measure the quantity of electricity actually conveyed into a battery or large jar. It consists of a small insulated glass jar, coated inside and outside. The inside is connected with the electrical machine, the outside with the battery...."; when the jar is charged to a certain height, a spark passes between the balls connected with the inner and outer coating; the amount needed can be varied - Elliott 1856a, 5.

Same illustration in Curtis 1861, 85 and Elliott 1856a, 6.

0047 UGP022 ELECTROMETER - HENLEY

NEEVES LONDON

H 192; SD 63; PrD 16. 1826-1856. R.

Brass sleeve with narrow bottom holds mahogany pillar supporting semicircular boxwood scale, 0-180°.

"This instrument is extremely useful in experiments with accumulated electricity. It does not determine with exactness the absolute quantity of electricity; still it will be found extremely useful in pointing out the relative strengths of electrical charges, in either batteries or single jar" - Elliott 1856a, 4.

In Curtis 1861, 85; Clifton 1995, 197 lists William and Richard Neeves between 1826 and 1856.

0085 UGP029 ELECTROMETER - QUADRANT

GRIFFIN GRAMME STANDARD LONDON

BD 302; H 507. Turn 19/20 C. R.

Mahogany base; three level screws; brass; quadrants on glass pillars; glass dome with brass squirrel cage.

Turner 1983, 200 illustrates identical instrument from Griffin catalogue, and dates it c1900.

2561 UGP261 ELECTROMETER - QUADRANT, DOLEZALEK

BAIRD & TATLOCK LONDON LTD

No measurements available. Late 19 early 20 C. G.

Brass and oxidised brass; tribach base; amber pillars for brass quadrants; cylinder housing, circular window.

Three of the four quadrants are detached; on top of the housing are two amber inserts for brass rods with screw contacts above; from the centre of the housing rises a brass cylinder (D21) with an ebonite and brass insert to suspend the missing vane; an endless screw and ring cog mechanism turns this fibre housing, read by a vernier on a scale 0-30.

2854 UGP274 ELECTROMETER - QUADRANT, DOLEZALEK

HARVEY & PEAK. LONDON.

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Sp 183; H 318; CyHsD 89, H 127. 1884-1909. F.

Brass and oxidised brass; three legs with level screws; quadrants on amber pillars; brass cylinder housing with a square window; suspended white-metal vane.

Dates from Downing 1988,57.

2853 UGP273 ELECTROMETER - QUADRANT, DOLEZALEK

Max Kohl Chemnitz

Sp 215; H 372; CyHsD 89, H 131. Early 20 C. G.

Brass, oxidised brass and glass; ivory torsion scale 10-100; indicator dumb-bell complete; paper scale around housing.

Rectangular window in housing; vane gone; horizontal sleeve at the back of the housing for missing part.

0174 UGP053 ELECTROMETER - TORSION, COULOMB

Elliott Bros. 5, Charing Cross. & 56, Strand. London

Sp 141; BD 118; H 407. 1856-1858. A.

Brass, oxidised brass and glass; ivory torsion scale 10-100; indicator dumb-bell complete; paper scale around housing.

"The Electrometer measures very small quantities of electricity, and with the requisite precautions it yields accurate estimates of the attractive and repulsive force of the free electricity, communicated to a mass of matter of given superficies." - Elliott 1856a,5.

Listed in Curtis 1861,85; dates from Chaldecott 1989, 161.

2865 UGP285 ELECTROMETER - TORSION, COULOMB

Max Kohl A.G. Chemnitz.

Sp 267; H 495; HsD 264, H 204. Early 20 C. G.

Oxidised brass and glass cylinder housing; brass-bound tube above for indicator support fibre; scale 0-330° on white cardboard around the housing.

White-metal ball and cylinder indicator; white-metal bead (D10) on white rod from turned wood top sits in one of three holes on top of the housing; ring scale above the fibre tube with scale 0-340°.

0032 UGP023 ELECTROSTATIC GENERATOR - CUTHBERTSON

W & S Jones, No.30 Holborn, London

B 470x225x22; PD 453 (18"). 1800-1860. A.

Single glass plate; mahogany base, supports and bridge; brass sphere on bridge; handle and conductors gone.

Illustration in Curtis 1861,83, taken from Elliott Brothers 1856a,2 "Cuthbertson's Circular Glass Plate Electrical Machines, mounted in mahogany frame with brass conductor."

Dates from Clifton 1995,155.

1496 UGP125 ELECTROSTATIC GENERATOR - HARRIS

ELLIOTT BROTHERS 30 STRAND LONDON

BT 1055x585x375; HAXSu 1195. 1858-1861. AR.

Incomplete; mahogany and brass; open base table; four pillars for axle supports; two for conductors.

Wood and brass handle to turn brass plate axis; plate gone; one conductor pillar has glass insulation and boss but no conductor, other stops at turned mahogany base.

"In this arrangement of apparatus the excitation of electricity is produced by friction on a circular disc of glass. The advantage consists in exposing a large surface to be rubbed by two pairs of cushions..." giving a steady supply without undulation - Elliott 1856a,1.

Listed in Curtis 1861,83; Elliott Brothers moved to 30 Strand in 1858, Crawforth 1988,8.

1503 UGP085 ELECTROSTATIC GENERATOR - VOSS

509te J.Robert Vofs. Agent F.E.Becker & Co London W.C.

L 905; W 420; PD 573. c1882. R.

Mahogany base; extension for wheel and handle; two ebonite pillars for brass and ebonite conductors; incomplete.

Broken glass plate still on machine, complete plate detached; conductors in form of brass rods ending in spheres (one gone) with ebonite handles through brass sphere and coupling to ebonite pillars; two small vertical brass pillar conductors on ebonite sleeves rise from long side of elliptical base.

"A very simple and efficient machine of this (Holtz) kind is made by Voss of Berlin" - 10" plate 4-5" sparks - Ganot 1890,729. Voss workshop founded 1874, Brachner 1985,151; added to Curtis 1861,92 after 1882.

0158 UGP037 ELECTROSTATIC GENERATOR - WIMSHURST

YEATES & SON Dublin.

B 395x240; H 393; PsD 270. Fourth ¼ 19 C. G.

Open mahogany base; mahogany pulley wheels; white insulation pillars; two ebonite disc plates.

Brass sleeves for insulation pillars; on top, spheres with ebonite-handled, sphere-ended, adjustable conductors attached to combs around the plates.

Machine invented in 1883, Van Camp 1988,63.

2947 UGP355 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned

Hs 652x608x346; DisD 354. Late 19 early 20 C. G.

Mahogany glazed housing, six doors; two discs with metal lozenges rotated with wood pulley wheels; conductors.

Two brass cylinder conductors on hollow glass tubes with chains to sleeves below; combs from conductors to discs; in distressed condition with detached parts.

0159 UGP038 ELECTROSTATIC GENERATOR - WIMSHURST

Unsigned

B 307x133; H 310; PsD 218. Late 19 early 20 C. G.

Solid mahogany base; metal pulley wheels; two ebonite disc plates; two leyden jars.

2520 UGP226 ELIHU THOMSON APPARATUS

MAX KOHL. Werkstätten für Präzisionsmechanik CHEMNITZ i.S.

B 240x240x27; H 282. Early 20 C. G.

Mahogany base; three ebonite pillars to ring; vertical coil from base; solid and hollow rings around coil.

To show the electro-magnetic repulsion between an alternating electro-magnet and a conducting ring; the light aluminium ring will be violently hurled off; the copper ring, held down by three threads from the base, will float near the top of the coil; a cork will be blown out of the hollow copper ring if water is put in it; heavy wire outer coil has straight wire bundle in centre.

Illustrated in Griffin 1910,794.

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2859 UGP279 EXPANSION APPARATUS - DULONG/PETIT

A. GALLENGAMP & CO LTD 19 & 21 SUN STREET FINSBURY E.C.

B 344x273x56; H 1015. Early 20 C. G.

Teak base and vertical support for two glass open tubes in jackets; to determine absolute expansion of liquids.

The inner tubes are joined at the base using rubber tubing and a T-joint with stop-cock; one of the glass cylinder jackets would have contained water or ice, the other has inlet and outlet pipes for steam.

Anderson 1990,31 indicates that the Company became Limited between 1900 and 1902.

2500 UGP206 EXPANSION APPARATUS - 'S GRAVESANDE

ELLIOTT BROS 30 STRAND LONDON

BD 165; RiOD 121; SrD 86. 1858-1863. A.

'S GRAVESANDE pyrometer; turned mahogany base; three brass pillars to brass ring; hollow copper sphere.

Latter has a small conical funnel (H11,MxD6), which looks as though it used to be able to unscrew, but is now stuck.

Also a more-modern green-painted brass support and ring on sleeves, with nuts for stand, and a brass ball (D38).

Dates from Crawforth 1988,8.

2512 UGP218 EXPANSION APPARATUS - 'S GRAVESANDE

W.B. NICOLSON GLASGOW

Sp 130; RiOD 120; RiH 130. Early 20 C. G.

'S GRAVESANDE pyrometer; ring stand only; black iron ring on three bent iron rod feet; heated sphere missing.

2861 UGP281 EXPANSION APPARATUS - RHEAM

GRIFFIN LONDON.

B 699x108x34; H 202. Early to mid 20 C. G.

Two; wood base and supports for (missing) rod in glass tube; angled glass plate and vertical scale 0-12 at end.

Griffin 1910,418 describes this as: "Rheam's apparatus for determining the coefficient of expansion of a metal rod, 50 cm.long.

The expansion is measured by means of a wedge faced with glass, which has a slope 1 in 10. A vernier on the wedge travels along a scale divided into millimetres so that the expansion of 1/100mm. is read off directly. Two thermometers should be tied on to the rod.."; what is probably the original glass jacket (L469,D40) is now equipped with two off-centre metal rods instead of one central rod, used on a stand with a spherometer to measure the expansion.

1525 UGP111 EYE MODEL

Unsigned

BD 77; H 180. 1901(?) ["2/01" on base]. S(?)

Turned black wood base; two painted plaster hemispheres; hinged hemispheres inside with biconvex lens.

Circular hole on hinged hemisphere opposite cornea lens; large hole for iris and cornea on one side of the outer hemispheres and smaller hole on other side; "61" written on bottom in white paint; "25/ FI/u 2/01" written in red pencil - last part perhaps February 1901 date.

2927 UGP335 FOUNTAIN

Unsigned

BD 82; H 141; SrD 80. Pre 1861. R.

Glass; disc base; neck to sphere; on top, brass sleeve with screw cap, central hole and glass tube into sphere.

Curtis 1861,51 describes this: "Artificial Fountain produced by the elasticity of air. It consists of a vessel to be partly filled with a tube reaching nearly to the bottom. When under the receiver, and the air exhausted, the spring of the confined air on the water forces it up in a pleasing jet."

1520 UGP102 FRESNEL BIPRISM

Unsigned

BD 149; H 230; Hs 110x81. Second ½ 19 C. G.

Wood base, pillar, and housing for glass biprism - one flat side; other side sloping to make shallow prism.

1493 UGP105 FRESNEL RHOMB

HARVEY & PEAK LONDON

HsD 82; H 27. 1884-1909. F.

Housed between two oxidised brass discs separated by three brass pillars.

Dates from Downing 1988,57.

1492 UGP106 FRESNEL RHOMB

Unsigned

HsD 65; H(Pair) 60. Third ¼ 19 C. G.

Two; housed between oxidised brass discs separated by four brass pillars; they fit together using lugs and holes.

Presumably "Pair of Fresnel's rhombs" added to Curtis 1861,76.

2948 UGP356 FRICTION HEATING APPARATUS - SEARLE

W.G. PYE & CO CAMBRIDGE

B 795x241x43; TH 325, D 250; WhD 440. Early 20 C. G.

Mahogany base; vertical six-spoke iron wheel with pulley system to revolve table with friction cone cups below; endless screw and cog wheel revolution counter.

Pye 1914,110 describes this: "Apparatus for determining the Mechanical Equivalent of Heat...designed by Dr. G.F.C. Searle, F.R.S...The work is expended in heat caused by the friction between two well-fitting cones, the lower or outer one of which is driven by a motor or hand wheel. The upper cone, in which water is placed to measure the heat generated, is prevented from rotating by means of a weight hanging over a pivoted pulley...this weight being applied tangentially to the disc which is fixed to the top cone...."

2868 UGP288 FUNNELS - GLASS

Unsigned

H 497, D 49-187; BD 78, H 405, MnD 25. Early 19 C. G.

One with straight sides, brass sleeve and screw thread; two with ground rim, curved to narrow open cylinder.

2568 UGP268 GALVANOMETER

GAMBRELL BROS LTD T. MASON 5, DAME ST., DUBLIN.

Sp 140&96; H 225; Hs 170x113x109. 1900-1916. A.

Mahogany housing; elliptical window in front; moving coil around metal cylinder; white arc scale 30-0-30; two level screws;

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vertical black magnet in shape of a hollow heart.
Mason at this address from 1900-1916, Morrison-Low 1989,131.

2550 UGP256 GALVANOMETER

HARTMANN & BRAUN A.-G. FRANKFURT A/M No 131473
B 303x224x43; H 310; HsD128,W69. Early 20 C. G.
Mahogany base and vertical frame; glazed brass cylinder housing; needle between two hair springs; scale 15-0-15.
Difficult to see mechanism, but it looks like a moving magnet within a coil; "D.R. PATENT" on white paper scale as well as signature and serial number; two level screws on base.

0165 UGP044 GALVANOMETER

Unsigned
B 216x158x30; RoD 133. Pre 1861. R.
Mahogany base with two contacts to coil around compass rose; magnetic needle in centre of coil.
"Magnetic Galvanometer for measuring feeble electric forces, consisting of a rectangular frame of coiled insulated wire, within which is suspended on a point a magnetic needle, surrounded by a graduated card in manner of the compass - On a mahogany base board, 7s.6d.,10s.6d." - Elliott 1856b,9; Curtis 1861,97.

2554 UGP259 GALVANOMETER - ASTATIC

THE WEST LONDON SCIENTIFIC APPARATUS CO PREMIER PLACE PUTNEY S.W.
BD 190; H 245. Early 20 C. G.
Mahogany base; split coil; suspended needle; globe.
A brass arch rises from the base outside the globe and has a clamping screw in the top centre to allow the positioning of a horizontal iron bar above the globe; a right-angled oxidised brass bracket has a small brass screw-in cup above the coils, from which is suspended the needle in the centre of the coil, and a wire pointer from above the coil to the white arc scale 40-0-40 on the base.

2552 UGP257 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS. LONDON No 259
B 114x60x24; H 240. Pre 1881. R.
Mahogany base and mount for brass cylinder coil housing, ebonite disc one side; pillar with curved magnet above.
Two brass contacts on ebonite disc; brass tube slides into centre of coil housing; green velvet lining on base.
No obvious place for mirror, but Elliott 1895,10 describes instrument: "Small Reflecting Galvanometer - For thermo-electric currents, &c, on heavy base without levelling screws; controlling magnet, and one dead beat plug....£4 15 0".
Turner 1983,201 gives date 1881 for No 539.

0046 UGP026 GALVANOMETER - ASTATIC MIRROR

ELLIOTT BROS. LONDON. No 368
H 533; HsD 117; Sp 195. 1856-1881. FN.
Brass; folding legs; cylinder coil housing with glass front; curved magnet on pillar on top; three level screws.
Turner 1983,201 gives date 1881 for No 539; firm founded in 1856, Crawforth 1988,8.

2857 UGP277 GALVANOMETER - ASTATIC MIRROR

NALDER BROS & CO LONDON No 2024
Sp 185; BD 158; H 257; CyHsD 114, H 179. c1891. R.
Ebonite base, double coil surround and four pillars; brass cylinder housing; magnet on horizontal rod at back.
Three level screws; circle window in brass housing; two brass screws to secure housing to base; two screw-in contacts at the sides of the housing.
Curtis 1861,107 records purchase of No.2040 in 1891.

2562 UGP262 GALVANOMETER - ASTATIC MIRROR

W.G. PYE & CO MAKERS CAMBRIDGE
Sp 180&167; H 388; Hs 151x126x34. Early 20 C. G.
"Kelvin reflecting"; mahogany base and vertical hinged coil housing; pillar above with horizontal bar magnet; three brass level screws and four brass contacts.
"An exceptionally serviceable instrument, having two coils in hinged cheeks, base on levelling screws, and control magnet. The mirror and magnets are suspended in a removable brass frame, which permits of easy access for re-suspending and cleaning. The suspension pin is so arranged that it is free to turn at any point..." - Pye 1914,77 and Pye 1926,80.

2852 UGP272 GALVANOMETER - ASTATIC MIRROR

PROFESSOR STUARTS WORKSHOP CAMBRIDGE UNIVERSITY
Sp 235&210; H 330; Hs 151x138x31.
Late 19 early 20 C. G.
"Kelvin reflecting"; mahogany base and vertical hinged coil housing; pillar above for horizontal bar magnet; three brass level screws and four brass contacts.
Very similar to Pye instrument 2562 UGP262.
Instrument type illustrated in Pye 1914,77; Pye 1926, 80.

2851 UGP271 GALVANOMETER - ASTATIC MIRROR

Unsigned
B 194x155x28; H 346; CoD 78, W 43. Late 19 C. G.
Mahogany base and two vertical supports for coil; rod on top for missing magnet; brass cylinder in coil centre; three brass contacts on base.
There is no obvious place for the mirror, but the instrument corresponds to 2552 UGP257; which is described in Elliott 1895,10 as a: "Small Reflecting Galvanometer - For thermo-electric currents, &c.."; this one has a wood insert in the brass slide-in cylinder in the centre of the coil - presumably the "dead beat plug".

0063 UGP024 GALVANOMETER - ASTATIC, NOBILI

Elliott Bros. 5 Charing Cross & 56 Strand London
BD 161; H 293. 1856-1858. A.
Circular mahogany base; chipped dome not original; three level screws; mirror added later to torsion fibre.
"Magnetic Galvanometer for estimating the force of feeble electric currents. It consists of rectangular frame, of many reduplications of very fine insulated wire, a silkworm thread suspension for the astatic needle, which plays within a graduated metallic ring, and a circular mahogany base fitted with three levelling screws. A glass shade covers the coiled frame, needle

ated in Curtis 1861.97: dates from Chaldecott 1989. 161.

Mahogany base; three brass level screws; brass arch to suspend double needle in and above coil; scale 90-0-90. Mirror on suspension fibre: copper disc and silver ring scale; glass dome.

Brass; disc base; three level screws; black circle magnet; two screws secure coil and mirror insert; bubble level (now empty); two contacts on base

This galvanometer is of the 'moving vertical magnet' type. The magnets consist of two steel wires placed vertically and each so magnetised that its two ends are of like polarity with a consequent pole in the middle. This form makes it possible to use comparatively powerful magnets while the moment of inertia of the suspended systems is kept small; and at the same time the arrangement is very astatic..." - Griffin 1910:732.

Three level screws; four brass contacts, two of which can be shorted by means of a brass bar; knob on top with the message: "TO RELEASE DEPRESS & ROTATE"; circular bubble level on base at front.

Top of housing not black, circular window near base; fibre missing; four contacts on base, two of which can be shorted.

The firm issued catalogues from 1890-1910, Anderson 1990,57-8.

Knob on top of pillar to adjust missing fibre; assumed there was originally a mirror in the glass cylinder below the pillar; there is now a hole drilled in one of the ebonite discs at the sides of the five-sided brass coil housing; the table is of ebonite; the two turned brass pillars below this each have two screw contacts; the pillars rise from an ebonite base disc. Perhaps Yeates & Son's "Ballistic galvanometer"? - Galway 1902,19.

Four electric contacts on ebonite arc on rotating mahogany plate on top of base disc; brass magnetometer with silvered scale 0-90-0-90-0°, glass cover and brass-bound glass tube for suspension fibre.
 Dates from Crawford 1988.8.

Scale 0-90-0-90-0°; arms hold coil to one side of instrument, not directly over the magnetometer; latter in squat brass cylinder with glass top; contacts on ends of coil after they have run through the base of the pillar.
 Dates from Crawforth 1988.8.

Three brass level screws and three brass contacts on the base; parallax mirror under the needle; signed on the magnetometer scale and on the base - the latter with the "GRAMME STANDARD"; stamped under base is: "DIA.OF.RING.14.7C/M " COIL.15.8 45.TURNS.OF 14 S. 285 " " 26 " " " "

The latter is glazed on top, has a paper ring scale $0-90-0-90-0^\circ$, with a central parallax mirror, and the shallow cylinder housing sits on a turned brass pillar on a bracket around the bottom of the coil housing; on the base are six brass screw

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electric contacts; below the base parameters are stamped: DIA.OF.RING. 148 ." " 1 COIL 152 1.TURN.OF.18 S.W.G. " " 2 COIL 172 50. " " 18 S.W.G. . 500. " " 36 S.W.G.

Clarke 1989,290 records that the firm of John J. Griffin & Sons Limited, a London firm with Glaswegian origins, merged with Baird & Tatlock Limited of Glasgow, trading as Griffin & Tatlock from 1929; this indicates a date of shortly before 1929 for this instrument, which is signed by the two firms but does not have the new Company name.

0182 UGP062 GALVANOMETER - UPRIGHT

YEATES & SON, DUBLIN.

B 216x140x32; H 250. Acquired 1876.

Mahogany base; brass coil housing; green-covered wire; moving magnet; yellow wooden fan-shaped scale.

Magnet in centre of coil attached to pointer to read scale; two contacts on base; two feet missing.

Assumed to be "Table Galvanometer (Jany 1876)" added to Curtis 1861,104; probably also "S.M. Yeates' Vertical Galvanometer, extra large, for lecture purposes, a most useful and effective form of apparatus, highly recommended £1 15" of Yeates 1877,27.

1522 UGP108 GALVANOMETER SCALE

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO. LTD. CAMBRIDGE, ENGLAND.

Hs 567x88x11. Late 19 early 20 C. G.

Mahogany frame; paper scale 0-500mm in glass plates.

Became a limited company in 1895, Cattermole 1987,xiv.

1523 UGP109 GALVANOMETER SCALE

NALDER BROS. WESTMINSTER.

464x190or133. 1890-1910. F.

Mahogany backing with hinged section for paper scale 350-0-350; this folds with two brass brackets on back.

Latter for attaching to missing stand which also holds the illuminating oil lamp behind a slit - the larger hinged portion acts as a screen between the lamp and the galvanometer - illustrated in Elliott 1895,25.

Nalder Brothers & Co. issued catalogues from 1890- 1910, Anderson 1990,57-8.

2501 UGP207 GAS PRESSURE REGULATOR

SUTER'S PATENT

L 97; MxD 67. Late 19 early 20 C. G.

Brass; disc housing on top; below, long screw thread for cylinder; side arm projects under disc housing.

2513 UGP219 GEOMETRICAL MODELS

Unsigned

420x103x103 & 344x108x108. Mid to late 19 C. G.

Two; mahogany parallelepipeds; one breaks into three parts with ends parallel; other has parabolic insert.

The three sections of the first are held together by four brass pins on each break, and corresponding holes; the sloped outside end appears to have had a leather cover, but only a strip remains; the insert in the second is held in place by a revolving brass clasp.

2894 UGP302 GLASS BELL JARS

Unsigned

BD 287, H 386, ToOD 110; BD 160, H 245. Mid 19 C. G.

One bell-shaped with ground lip below and ground open top; one cylinder-shaped with closed arch top and boss.

Plus a variety of smaller jars of various shapes, including a cylinder jar with a brass sleeve on top.

2945 UGP353 GLASS GLOBE

Unsigned

H 230; MxD 82. Mid 19 C. G.

Glass tear-drop shaped with long neck ending in a brass sleeve and a stop cock; probably for weighing air.

Curtis 1861,52 illustrates a sphere with stop-cock, which it calls a: "Globe for weighing air".

1514 UGP092 GLOBE - CELESTIAL

London Made & Sold by J. & W. Cary Strand March 1816.

H 1150; GD 450. 1816. S.

Mahogany twist legs (three) and circular surround; plaster globe; brass suspension circle and fittings.

Support bracket at base of legs gone; three spoke brass disc scale at top I-XII twice.

"CARY'S NEW CELESTIAL GLOBE on which are laid down THE WHOLE of the STARS NEBULAE &c Contained in the Aftronomical Works of the REVD. F. WOLLASTON F.R.S. De la Caille, Herschel, Hevelius, Mayer, Flamsted, Bradley &c."

1513 UGP091 GLOBE - TERRESTRIAL

CARY'S NEW TERRESTRIAL GLOBE 1818

H 1150; GD 450. 1818. S.

Mahogany twist legs (three) and circular surround; damaged plaster globe; brass suspension circle and fittings.

Damage particularly in the Pacific Ocean off China; disc scale with three spokes on top ± - XII twice.

"CARY'S NEW TERRESTRIAL GLOBE EXHIBITING The Tracks & Discoveries made by CAPTAIN COOK; Also those of CAPTAIN VANCOUVER on the NORTH WEST COAST OF AMERICA And M. DE LA PEROUSE, on the COAST of TARTARY TOGETHER With every other Improvement.....LONDON: WITH CORRECTIONS and ADDITIONS to 1818."

1529 UGP116 GLOBE - TERRESTRIAL

THOS. MALBY & SON HODGES & SMITH, AGENTS, DUBLIN

D 305 (12"); Sp 330; H 445. Jany.1858. S.

Turned boxwood legs and supports; plaster globe; brass fittings; agent's label stuck on to Malby signature.

"MALBY'S TERRESTRIAL GLOBE, Compiled from the latest & MOST AUTHENTIC SOURCES, Including all the recent Geographical Discoveries, Manufactured & Published under the superintendence of the SOCIETY FOR THE DIFFUSION OF USEFUL KNOWLEDGE BY THOS. MALBY & SON GLOBE & MAP SELLERS TO THE ADMIRALTY HODGES & SMITH, AGENTS, GRAFTON STREET DUBLIN Jany. 1858." - include Prof. P. Barlow's results in Trans. Roy. Soc. 1833.

0172 UGP051 GONIOMETER - CRYSTAL, WOLLASTON

ELLIOTT BROS. LONDON.

BD127; H155; C191x153x148. Late 19 early 20 C. G.

Circular brass base; black enamelled scale disc (D116) with silvered scale and vernier; in boxwood case.

Attachment for holding crystals at one side of disc; two knurled knobs for rotation at other.

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1888 UGP157 GONIOMETER - REFRACTION

GRIFFIN LONDON

B 249x179x23; H 249. Late 19 early 20 C. G.

Mahogany base and support for white paper scale 0-90-0-90-0; two turning metal arms; metal-bound centre mirror.

1510 UGP088 HALDAT APPARATUS

ELLIOTT BROS. 30 STRAND LONDON

B 473x252x48; HRm 247. 1858-1863. A.

Mahogany base and frame for glass U-tube; brass bracket to hold vessels at one end; broken limb at other.

Side brass tap on bracket; vessels gone; the tube would be filled with mercury; open-topped vessels of different shapes containing water would be placed in the bracket at one side; at the other side the tube would measure the pressure exerted, which would be found to be independent of the shape of the vessels.

Description from Ganot 1890,90; dates from Crawforth 1988,8.

2898 UGP306 HAND AND BLADDER GLASS

Unsigned

MxD 149; ToD 73&75; BD 115&118. Pre 1861. R.

Two; glass vessels with elliptical sides, open tops and (larger) bottoms; to demonstrate pressure effects.

One retains the remains of a rubber bladder which was stretched across the wider opening.

Described in Curtis 1861,49 as: "Combined Hand and Bladder Glass, adapted either for showing the pressure holding the hand down, or bursting the bladder."

0154 UGP033 HELIOSTAT

Unsigned - attributed to Potter

BL 254; H 439; MiD 150. Pre 1861. R.

"Potter's"; brass and oxidised brass; two mirrors; lower turned by simple clockwork mechanism.

"This instrument, so useful in many optical experiments where the sun's light is required to be reflected on a given spot for a length of time, is of a simple and convenient form, motion being given to the mirror by a watch movement. It is provided with levels, levelling screws, silvered glass double mirror, by which the pencil of light may be thrown in any desired direction." - Curtis 1861,74.

0155 UGP034 HELIOSTAT - STONEY

YEATES & SON DUBLIN

B 207x198; DrH 93, D 127. Third ¼ 19 C. G.

Irregular shaped mahogany base with two spirit levels and three level screws; brass drum; rectangular mirror.

This type of heliostat was designed by Stoney about 1875, based on an earlier form due to Foucault about 1862, according to the legend on one displayed at the Science Museum, London; Yeates 1880,5 offers two models - G.J. Stoney's Local Heliostat 10 0 0 & S.M Yeates' 12 12 0, latter illustrated, so this is likely to be the former; Maynooth has one of these 1435 MAY055 - and yet another (earlier?) Yeates model 1058 MAY034.

2888 UGP296 HORN

PATENT. No.29833-10 S.G. BROWN. LTD HI 26927

BD 172; H 537; MxD 311. Patent 1910.

Mahogany base; black-metal boss and curved cone with wide mouth; two white-metal contacts "2000 W"; button on boss: "CLOSE OPEN ADJUSTING SCREW".

1879 UGP148 HYDROMETER

Unsigned

L 215&295; CyL 326; C 355x132x52. Mid 19 C. G.

Glass; cased set contains sample cylinder with brass base; one (of two) hydrometers; and one thermo-hydrometer.

Black paper-covered wood case with yellow leather lining; cylinder has wider top than main tube; hydrometer has hand-written paper scale "Hydrometer von 0700-1000. Temp:62°..F."; second hydrometer missing; thermo-hydrometer is shorter, and has scale 0-120° "Fahrenheit" on incorporated thermometer; both have mercury weights; hydrometer has cylinder bulb with tapering connection to weight.

1869 UGP138 HYDROMETER

Unsigned

L 336-354; MxD 18-19. Mid to late 19 C. G.

Three; glass; cylinder bulb; mercury weight; hand written paper scales; 850-1000; 1400-1600; 1600-1800.

One has "Hydrometer from 0850-1000. Temp: 62° Fahr." others have no "from" and have "F" not "Fahr".

1868 UGP137 HYDROMETER

Unsigned

L 203; MxD 29. Mid to late 19 C. G.

Five; glass; pear-shaped bulb; mercury weight; hand made paper scales; 700-800; 1200-1400-1600-1800-2000; last four scales 1200-1400, 1400-1600, etc.

2941 UGP349 HYDROMETER - NICHOLSON

Unsigned

L 231; BuD 44. Mid to late 19 C. G.

Brass; concave disc on top; rod to cylinder bulb with conical top and bottom; arc supports for conical weight.

Also more-modern Nicholson hydrometers - five of black painted tin, and three of white-metal.

Curtis 1961,47 illustrates a simpler design: "Nicholson's Gravimeter. This instrument determines the specific weight of both solids and fluids in an easy and expeditious way."

2526 UGP232 HYDROSTATIC CHAMBER

Unsigned

H 383; Ch 339x142x140. Mid to late 19 C. G.

Brass; glass strips on two sides; on top, funnel and two holes, on bottom one hole; inside rising ring on handle.

The ring has two rods which go through the top plate and are joined by a handle which can be moved up or down to alter the position of the ring in the chamber; the only obvious function of this would be to agitate or mix the contents of the chamber.

Apparatus clearly incomplete, as there is nothing below the large hole (D35) in the bottom; there is another hole at the side on the bottom with a screw thread - drain hole?

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1881 UGP150 HYGROMETER - DANIELL

Unsigned

H 138; SrsD 28; C 184x109x56. Mid to late 19 C. G.

Glass; bent tube; pendant spheres, black on long arm, clear on short; ivory scale thermometer 20-110°; mahogany case, red lining in lid, but blue velvet gone from rest; "C 8b" on top.

"Hygrometers:- (b) Daniell's with thermometers" in Galway 1902,12 - but looks earlier than this date; presumably it had a stand which is now missing.

1871 UGP140 HYGROMETER - DANIELL

Unsigned

BD 130; BusD 40; H 258. Mid to late 19 C. G.

Turned wood base and pillar; glass tube, two pendant bulbs, one with thermometer 10-50°C; second thermo-meter in stem.

Lower bulb has gold band around it; upper has gauze cover; both thermometers mercury; one dips into liquid in lower bulb.

1878 UGP147 HYGROMETER - MASON

GRIFFIN LONDON

H(+Ha) 350; W 75. Late 19 early 20 C. G.

Green-painted tin frame; boxwood scales 30-120°F; also unsigned example; and "Max Kohl A.G., Chemnitz" housing.

Frame has lid which, when raised, allows the scale with thermometers to be taken out; mercury and glass thermometers with spherical ends; unsigned example has white metal scales 30-130°F, no backing, with one thermometer broken, and irregular glass beaker for wet bulb gauze; Kohl housing is of green-painted tin with hinged lid.

3723 UGP375 HYGROMETER - MASON, VENTILATED

Wilh Lambrecht Göttingen

Sp 154; PvH 175; CyD 90, L 75; H 495; SrD 23.

Late 19 C. R.

Oxidised brass tripod base; tapering pillar to sphere; into this fits frame for two thermometers and 12 vane fan.

A wing nut clamps one or other of two rods from the cylinder metal fan housing to the brass sphere on top of the brass tapering pillar; a rod through the cylinder has an ebonite T-bar on top, with brass spring clamps for the two missing thermometers; these can thus be held vertical, or at an angle, depending on which knob is inserted in the sphere; inside the cylinder, which is open on both sides, is the fan which ventilates the bulbs of the thermometers, and which can be rotated by a remote handle through a wire pipe.

Brachner gives the foundation of Wilhelm Lambrecht's workshop as 1864?; he exhibited in Hanover in 1878.

2499 UGP205 HYPSONETER

Unsigned

Sp 107; MxH 439; CyD 75, H 81. Mid to late 19 C. G.

Wollaston; brass and copper; folding tripod legs; copper water cylinder; on top, outer tube plus three inner draws.

Water cylinder has brass screw cap on top brass rim; outer tube has sloping drain pipe for condensed water; thermometer missing.

See Griffin 1910,470.

1511 UGP089 IMPACT APPARATUS(?)

F.E. BECKER & CO. 34, MAIDEN LANE COVENT GARDEN LONDON.

B 530X107X19; H 433. 1882-1889. A.

Mahogany; at one end of base, turned pillar holds V-shaped velvet-lined incline at c48°; to roll balls down?

Two width-wise struts on the base to hold missing part, presumably to receive what is rolled down or held by incline.

Dates from Crawforth 1988,4.

3734 UGP385 IMPACT APPARATUS

WATKINS & HILL 5 CHARING CROSS LONDON

B 1375x150x28; TsH 911,920. Pre 1819-1856. A.

Mahogany; base holds arc with scale 19-0-19; from its sides rise two turned rods to two tables with hooks on top.

The turned rods are at an angle of c56° to the base, and hold the two tables (lower 250x143; upper 306x114) at right-angles to each other on top; each of these has hooks underneath, and wires from the lower table now hold a rectangular lead counterweight; the base has three small metal projections for level screws, but only one screw remains.

The apparatus probably corresponds to that described in Curtis 1861,32 as: "Apparatus for illustrating impacts with five small ivory balls, two large ivory balls, and one wooden ball with spring cushion.", though the balls are no longer with the apparatus. Dates from Clifton 1995,291; Watkins & Hill were taken over by Elliott Brothers in 1856, Chaldecott 1989,161.

2519 UGP225 INTERRUPTOR

Unsigned

BD 109; H 167; CyD 42, H 52. Early 20 C. G.

Wood base and turned frame for vertical coil; under top brass cylinder, interruptor system with small coil.

Base has four brass contacts, "2 Volt" inscribed between two and "P" above; "S" above the other pair; the brass cylinder is lined with green velvet and sits on an ebonite platform holding the interruptor system.

2521 UGP227 LAMP - CARBON ARC

F.J. BORLAND LEEDS PATENT (Nos) 049 & 688

W 146&158; L 221. Early 20 C. G.

Two; brass and metal; aligned thick and thin wire coils; two arc cog mechanism between, to move carbon rod arms.

No 688 has pair of scissors in a circle as "REGISTERED TRADE MARK".

2528 UGP234 LAMP - CARBON ARC

E. Leitz-Wetzlar 4-5 Amp Kohlenmaasse.

BD 100; PrH 197; Hs 100x100x24. Early 20 C. G.

Metal; pillar supports housing with carbons meeting at one corner, adjusted by knob; pivoted focusing lens.

A clamping sleeve on the iron pillar allows the housing to move up or down; it can also rotate around the sleeve, and another clamp holds the position; an ebonite knob uses a double rack and pinion mechanism to move the carbons towards or away from one corner of the housing; the lens is in a cylindrical housing with a hole at the contact point of the carbons, and with a chimney above.

2522 UGP228 LAMP - CARBON ARC

ROBT. W. PAUL 68 HIGH HOLBORN LONDON. W.C.

B 165x109x3; H 242. 1903-1919. FA.

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Brass and metal; base plate; pillar has rack and pinion to raise carbons; two more knobs turn and separate them. Bracket to hold one carbon rod gone; beaded wires from contacts to carbon brackets. Dates from Anderson 1990,63 and Cattermole 1987,98-104.

2507 UGP213 LAMP - MINER SAFETY

Unsigned 35 [or 33]

BD 81; H(-Ha) 242. Mid 19 C. G.

Brass oil reservoir; three vertical iron rods around gauze; hinged brass arch top with figure-of-eight shaped iron handle. The oil reservoir has a tin bottom and a wire protrudes from the centre of this.

1925 UGP194 LAMP - MINER SAFETY

Unsigned

BD 93; H 475; HsD 108. Late 19 early 20 C. G.

Demonstration; iron base and pillar; gas pipe clamped to this; flame lit above wire gauze in brass housing.

Both pipe and gauze with housing can move up and down pillar; gas pipe bent upwards in right-angle from clamp, with inlet at another right-angle below.

1906 UGP175 LAMP - OIL

Unsigned

BD 148; H 313. Mid to late 19 C. G.

Turned brass tapering stem houses clockwork fan to cool squashed sphere oil reservoir on top; no globe.

Leaf motif key for clockwork; wick raised with knurled decorated disc; brass cap (MxD132) with instrument does not seem to fit.

2889 UGP297 LANTERN - UNIAL

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON. No.1146 THOMAS MASON OPTICIAN 5 DAME ST DUBLIN

L 445; W 170; H 370. 1900-1916. A.

Russian iron housing; brass-bound lens system.

Housing door has dark circular window with a brass disc flap and ebonite knob; there is space for a missing slide inserter between the (cracked) biconvex lens in the housing and the rest of the brass-bound lens system; focus is by (broken) double knob rack and pinion; the hinged objective lens cap is gone.

Mason dates from Morrison-Low 1989,131.

1479 UGP107 LENS ON STAND

Unsigned

BD 113; H 375; LeHsD 111. Mid 19 C. G.

Brass and oxidised brass; expanding stand; semicircular bracket for revolving plano-convex cylindrical lens.

Lens housing in form of disc in circular mount, with two small screw knobs on the disc at the sides of the lens; base weighted; stand of brass; mount and housing of oxidised brass; elliptical mark on pillar suggests it once had a maker's or supplier's label.

Possibly one of the two lenses mounted on stands listed in Curtis 1861,71.

1478 UGP099 LENS ON STAND

Unsigned

BD 106; Sp 136; H 346; LeHsD 111. Mid 19 C. G.

Brass; expanding stand, three level screws; semicircular bracket for revolving biconvex lens in brass housing.

Perhaps one of the two lenses mounted on stands listed in Curtis 1861,71.

0177 UGP057 LENS MODELS

Unsigned

D 58-60 or 110x47. 1861-1874. R.

Wooden models; six circular oak and two cylindrical mahogany lens shapes.

Presumably "Sets of wooden models of lenses" and "Pair of mahogany models of (cylindrical?) lenses:- Stokes' remedy for ?" added to Curtis 1861,78.

2514 UGP220 LENS SYSTEM

Cussons & Co. Liverpool.

H 42; MxD 40. Mid to late 19 C. G.

Brass bound with slits at each side of the housing for Waterstone stops.

2937 UGP345 LENSES

HARVEY & PEAK LONDON

C 320x167x27. 1884-1909. F.

Boxwood slide-lid case with six green velvet-lined divisions for an assortment of lenses and half-lenses.

A rather incoherent collection, certainly not all, if any, originals; indeed, there is no guarantee that the case was originally for lenses, though this seems likely.

Dates from Downing 1988,57.

2515 UGP221 LENSES

W.W. Rouch & Co, 180 Strand LONDON N.7096 (& N.7597) Instantaneous Doublet

H 41, MxD 45; H 25, MxD 40. Late 19 C. G.

Brass-bound lens system 7076; and brass-bound lens 7597.

The lens system has a slit for Waterstone stops; the lens is convex/concave.

Pearsall 1974,258 lists William White Rouch & Co, 180 Strand WC & 43 Norfolk Street, Strand WC in 1894.

2938 UGP346 LENSES

Unsigned

Cs 211x143x25; LesD 61-63. Mid to late 19 C. G.

Two red leather-covered cases with six royal blue silk and velvet-lined compartments for lenses; also another case.

The latter case is covered in red fibre and has dark blue velvet lining, but is otherwise very similar to the others; fourteen of the possible eighteen lenses remain, plus two half-lenses: eight bi-concave, 2½ concave-convex, 4½ plano-concave.

2882 UGP290 LENSES

Unsigned

D 49-51; C 98x73x64 & 85x69x67. Late 19 C. G.

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Pair of black-covered cases with hinged arched lids containing seven (of 12) assorted lenses. Each case is lined in blue/purple silk and velvet and has slots for six lenses; those remaining are: bi-concave three; concave-convex three, plano-concave one.

1883 UGP152 LESLIE CUBE

Unsigned

102x102x103. Mid to late 19 C. G.

Brass cube; one side original brass; one painted cream (off-white); one dull black; one shiny black.

Circular hole in top; metal bar inside with copper wire handle from this to hold cube.

Tesseract 27,1989-90,53 records that John Leslie (1766-1832), a professor of natural philosophy in Edinburgh, published a basic law of thermodynamics, that the emissivity and adsorptivity of a surface are equal, as demonstrated by the "Leslie cube".

3735 UGP386 LEYDEN JAR BATTERY

Unsigned

D 190-200; H 393-402; NeD 144-150. Pre 1861. R.

Set of six matching jars; foil coatings inside and out; four have wood cross bars inside and brass rod conductors.

Each vertical brass bar conductor passes through a horizontal wood cross bar, and below this is an X-shaped wood bracket to the bottom of the jar.

These presumably correspond to the "Electrical battery or combinations of six large glass Jars", listed in Curtis 1861,90.

There are also two smaller non-matching jars, one without a neck (D174,H301), and one with a neck (D197,H340, NeD125) with a mahogany cap (D128), and brass conductors above and inside. .

2957 UGP365 LEYDEN JAR BATTERY

Unsigned

B 215x215x114; JasH 219, D 90. Late 19 early 20 C. G.

Partitioned boxwood base, with two brass handles, for four cylinder glass jars; brass rod conductor system.

Cylinders have foil coatings to above half height; the conductor system consists of four stands on bases which fit into the jars, with four wire arms to the tops of the coatings, and brass spheres with connecting brass rods on top.

2903 UGP311 LEYDEN JAR WITH REMOVABLE COATINGS

Unsigned

BD 125,119&112; ToD 138,142&133; H 452; SrD 13.

Mid 19 C. G.

(Cracked) tapering glass has tin cup outside and closed tin vessel inside with central brass crook to sphere.

3716 UGP368 LEYDEN JAR WITH WIRE GAUZE COATINGS

Unsigned but attributed to Elliott Brothers

BD 131; MxD 145; H 425; BsH 177; SrD 13. Mid 19 C. R.

Conical metal gauze cylinder basket; in this, conical covered gauze cylinder; on top, brass crook to sphere; the original glass jars are missing.

The instrument corresponds to that listed and illustrated in Elliott 1856a,91 and Curtis 1861,87: "Faraday's Electrical wire-gauze mounted Glass Jars, for illustrating the inductive principle of the Leyden jar, and for demonstrating the effects of metallic surfaces on which electricity develops itself.--14s."

0186 UGP066 MAGDEBURG HEMISPHERES

Unsigned

L 233; D 80. Pre 1861. R.

Brass; one hemisphere with elliptical handle; other is similar but with stop-cock incorporated.

"Consisting of two hollow half globes of brass, ground and fitted to each other, so that their rims when touching are air tight; the lower one has a stop-cock attached for convenience in exhausting. This apparatus is illustrative that the pressure of the air nearly equals 15lbs. for every square inch of surface." - Curtis 1861,49.

Invented c1650 in Magdeburg by Otto von Guericke - Tesseract 15,1987,64.

1902 UGP171 MAGNET

Unsigned

L 103-204; W 26; D 7-10. Mid to late 19 C. G.

Six; two bar magnets; four cylinder magnets, three painted red and blue; also two bunches of steel wires.

1898 UGP167 MAGNET - ROTATING

Unsigned

B 209x170x23; H 74. Mid 19 C. G.

Mahogany base; hollowed ring in two parts; brass contacts to each; central pin for (missing) magnetic needle.

Presumably, when the current is reversed, the needle deflects in different directions; it is restrained from spinning by a bent red wire parallel to the pin; base has four mahogany disc feet; matches Ampere trough 1899 UGP168.

1890 UGP159 MAGNET - ROTATING

Unsigned

B 165x102x21; H 287. Mid 19 C. G.

Mahogany base; brass support for wood mercury reservoir; another in centre for three turning vertical magnets.

The black-painted brass support turns at a right-angle at the top to hold a pointed brass bar by means of a clamp; the bottom of this dips into the wood mercury cup holding the rotating magnets (not now magnetised); a pointed brass rod from the base holds this cup; a brass disc at the top of the bars keeps them in place; a wire from the mercury cup dips into the mercury ring reservoir held by the brass support.

1889 UGP158 MAGNET - ROTATING

Unsigned

B 165x99x17; H 232. Mid 19 C. G.

Mahogany base; brass support holds top of missing bar magnet; wood mercury reservoirs at centre and on base.

One of four feet missing; central reservoir in form of ring through which magnet would go; lower has raised centre to hold bottom of magnet with reservoir around it.

1895 UGP164 MAGNET & ROTATING CONDUCTOR

Unsigned - attributed to Elliott Brothers

BD 94; H 204. 1856-1861. R.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Richie's apparatus; brass base; red painted U-magnet; central brass pillar to mercury cup; bar electro-magnet gone.
"Richie's Apparatus to exhibit the rotation of a straight bar electro-magnet about its centre, between the poles of a horse-shoe magnet. This is effected by rapidly reversing the poles of the bar at the proper period, attraction being then changed to repulsion: the revolution of the bar is continuous. -12s., 15s." - Elliott 1856b, 11-12.
Listed in Curtis 1861, 96; firm founded in 1856, Chaldecott 1989, 161.

1893 UGP162 MAGNET & ROTATING CONDUCTOR

Unsigned
BD 74; H 157; MD 28. Late 19 early 20 C. G.
Boxwood mercury cup base; cylinder magnet; cage of copper wires, brass ring below, rotates around this.
Cage broken; at its top, small brass cup for electrical connection; other connection from mercury cup, but connector gone and base split.

1891 UGP160 MAGNETIC NEEDLE

MAX KOHL A.-G. CHEMNITZ
BD 65; H 105; N 162x9. Late 19 early 20 C. G.
Black metal base; brass pillar with point; rectangular needle.
Two other brass needle stands, one with elongated diamond shape needle (L51, BD33, H78).
Also a heavier rectangular needle (162x13).
Only the first instrument is signed.

2565 UGP265 MAGNETOMETER

W.G. PYE MAKER CAMBRIDGE
BD 108; H 225; HsD 84. Late 19 early 20 C. G.
Turned mahogany base; glass bell housing with ground stopper; magnet hangs on a fibre from a brass arch; neck of housing chipped.

2864 UGP284 MAGNETOMETER - SUSPENSION

Elliott Bros. 30 Strand London
Sp 140; H 300; ScHsD 172, W 31; TuD 28.
1858-1863. A.
Brass; tribach base; shallow glazed cylinder for white metal scale 0-90-0-90-0; glass tube for missing fibre.
The latter fits between brass sleeves and, on top, there is a small capstan to raise or lower the needle, which can be secured on the base of the housing, between four pins, by a small pivoted arm.
Dates from Crawforth 1988, 8.

3736 UGP387 MANOMETER

Unsigned
BD 170; H 1116; CyD 114. Mid 19 C. G.
Glass bell jar; ground bottom; brass cap; glass rod through cap turns 2x180°; second rod to reservoir under cap.
There are two vertical brass sleeves through the cap; a glass tube (D8) rises through one of these, turns through 180° on top, and again just above the cap, and ends in a vertical cylinder reservoir (D24) with a neck constriction; the other sleeve has, below it, another glass tube which bends through 180° to a vertical cylinder reservoir under the cap.
Clearly for vacuum experiments, on an air pump plate.

1921 UGP190 MANOMETRIC FLAME APPARATUS

GRIFFIN GRAMME STANDARD LONDON
B 394x189x20; H 242; WhD 158. Early 20 C. G.
Mahogany base; brass five-spoke pulley wheel; leather thong turns bent gas pipe; disc and wires around flame.
At end of base, away from pulley wheel, is a brass fitting on which a small pulley wheel turns, driven by the large wheel; a black pipe rises in two right-angles from this to the centre of an oxidised brass disc; two of three brass wires rise vertically from this bent around on top, for missing globe.
Apparatus used with manometric flame capsule and trumpet.
Illustrated in Griffin 1910, 400.

1920 UGP189 MANOMETRIC FLAME APPARATUS - CAPSULE

Unsigned
BD 97; H 405; HsD 51. Mid to late 19 C. G.
Fluted iron base; brass pillar; sliding bracket holds mahogany housing for (burnt) manometric capsule.
Latter has gas input at side with wire to close stop-cock; at centre on one side is a brass tube (D18) which slides onto a brass pipe from the capsule; at its other end the tube is squashed to give a long (L29), thin output.
Also present a mahogany trumpet (MxD58) with a brass pipe outlet (D14) used with manometric capsules, though with no obvious role in this case.

3729 UGP380 MECHANICAL MODEL – BEAM ENGINE

WATKINS & HILL Charing Cross LONDON
B 1010x222(or280)x39; Pvh 810; WhD 568; BmL 688.
1822-1856. R.
Wood with some light metal couplings; wheel and handle; beam; cut-away cylinder, piston, valves and chambers.
A support box (925x225x150) above the base holds the axis of the six-spoke wheel at one end, and a vertical piston cylinder (H264, D135) at the other; three turned support pillars hold upper T-section bar holding the axis of the beam; at one end is a two-balls governor; the cut-away of the support box and piston cylinder show the internal workings of the engine; the model is in a somewhat distressed condition.
Dates from Clifton 1995, 291; Watkins & Hill were taken over by Elliott Brothers in 1856, Chaldecott 1989, 161.

3733 UGP384 MECHANICAL MODEL - BOILER

Unsigned but attributed to Watkins & Hill
B 920x218x38; H 1150; CyL 570, D 244. 1822-1856. R.
Wood with some light metal couplings; imitation brick building with chimney stack, horizontal tank and grate.
Under the tank, at one side, is the grate for the fuel; at the other end is the chimney stack; in-between is the water tank, about two-thirds full, and all are cut away to show the workings, with valves on top of the tank, including a pressure adjust balance on a tall central pipe with a wide top; one end of the base is missing, and there is a wood level screw at the other end.
This model has similarities with the other wooden mechanical models in the collection, and is thus attributed to Watkins & Hill.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

It was in the collection in 1861, as it is listed with the other models: "Five sectional models of beam engines (4), and boiler (1)", in Curtis 1861,33.

3730 UGP381 MECHANICAL MODEL - PISTON ENGINE

WATKINS & HILL Charing Cross LONDON

Sp 697&316; B 698x270x75; WhD 610; H 1180; TH 505.

1822-1856. R.

Wood with some light metal couplings; wheel and handle; table for cut-away cylinder, piston, valves, chambers.

The base, on two cross feet, has a raised platform, and two turned pillars to a table; curved cross-brackets under the table meet at the axis of a six-spoke wheel with a handle; just above the base platform is a two-balls governor; above the table is the vertical cut-away piston cylinder (H298,D142); above this again is a tall bracket with a central vertical slide for one end of a coupling raising and lowering the piston, whose other end is on a cam to the wheel axis; the model is in a somewhat distressed condition.

3731 UGP382 MECHANICAL MODEL - STEAM LOCOMOTIVE

WATKINS & HILL Charing Cross LONDON

B 1385x275x38; H 1033; CyL 805, D 290;

WhsD 440&270. 1822-1856. R.

Wood with some light metal couplings; two wheels; cut-away boiler, barrel, valves, whistle and chambers.

A handle turns the larger wheel, whose axis is attached to a cam and horizontal levers to a piston at the front of the engine; the cut-away shows the pipework within the horizontal barrel of the locomotive; the complete side shows the coopered barrel, the flared-top chimney, springs above the wheels, and a (burst) leather buffer; the model is in a somewhat distressed condition.

3732 UGP383 MECHANICAL MODEL - WATER WHEEL

WATKINS & HILL Charing Cross LONDON

Sp 1050&330; B 1047x276x90; H 1325; WhD 970.

1822-1856. R.

Wood with some light metal couplings; single-side 12-paddle wheel; cut-away cylinders, pistons, valves, etc.

A handle at the centre of the wheel, which has a reinforcing ring and twelve spokes, drives a coupling to one side of a beam near the base; the other end of the beam raises and lowers the piston in the large cylinder (H340,D253) rising from the base; the beam has another coupling on the wheel side of its axis to raise and lower a piston in the smaller cylinder (H205,D119); the cut-away shows the insides of the cylinders, valves, etc; the model is in a somewhat distressed condition.

2942 UGP350 MELLONI APPARATUS

ELLIOTT BROS. STRAND LONDON.

B 871x184x43; PrsD 17. 1864-1886. A.

Mahogany base with central groove (W66) for five hollow brass pillars, on mahogany slides, for components.

The pillars have clamping nuts on top to hold the components; these are now depleted, with only two tables and a thermocouple remaining

Firm in the Strand from 1850-1886, Crawforth 1988,8, but the number of the building is usually given up to 1863.

0184 UGP064 MERCURY DIFFUSING CUP

W. LADD PENTON PLACE WALWORTH

D 51; H 77; PD 62. 1850-1857. A.

Boxwood egg-cup with screw top and circular brass plate below.

"Wood Mercurial Filtering Cup, with flat ground brass plate to place on top of a glass receiver. This piece of apparatus illustrates the porosity of hard wood, as mercury placed in the cup may be forced through the pores of the wood in the form of a beautiful silvery shower by the pressure of the external air when the internal air is removed by the air pump." - Curtis 1861,51.

Dates from Clifton 1995,161.

2899 UGP307 METAL GLOBE

Unsigned

BD 241; H 410; D 260. Mid 19 C. G.

Sphere on base; brass inlet and outlet, with stop-cocks, on top; no sign of heating below; may be gas reservoir?

Painted black with gold lines around equator and base; pipe on top centre has tapered teat above the stop cock, but this is missing from the other pipe which is at an angle (c33°) from the vertical.

0074 UGP031 METRONOME

METRONOME ENREGISTRANT par l'AIR & l'ELECTRICITE insteme(?)

de Ch VERDIN 6 Rue Rollin Paris 1886

B 109x109; H 232. 1886. S.

Gas inlet and electrical contacts; pyramid mahogany housing; clockwork mechanism.

0166 UGP045 MICROMETER - WIRE

Yeates & Son, DUBLIN

BD 57; H 57. c1877. CT.

Circular ebonite base; brass; scale around the edge of the disc, with vernier.

See Yeates 1877,24.

2538 UGP244 MICROSCOPE - COMPOUND

R & J BECK LONDON 4768 UNIVERSAL MICROSCOPE

BD 132; PrH 163; TuL 186, Se 28x28. c1866. N

Incomplete; brass; ring base; turned pillar, bracket above; tube complete with slide for missing support; black panels with round top on sides of square-section tube.

Turner 1989,171 gives c1866 for No.4925.

1486 UGP100 MICROSCOPE - SOLAR

Unsigned - attributed to Duboscq in Curtis 1861,72.

P 229x229; ApD 95; MiHs 285x125x13. 1849-1861. RF.

Brass and oxidised brass; incomplete; plate with central aperture; two pillars to housing for mirror/black glass.

Central aperture has screw thread for missing microscope arrangement; two knobs at the other side of the plate rotate the mirror or revolve the central part of the plate and so the pillars and mirror.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

"By the aid of solar light, this instrument exhibits to a number of observers at the same time, highly magnified images of very minute, opaque and transparent objects thrown upon a flat wall or screen." - Curtis 1861,72.
Brenni 1988,3-4 gives Duboscq dates 1849-1883.

2860 UGP280 MICROSCOPE - TRAVELLING

Griffin, London

Fr 250x92x90; TuMnL 183, D 26. Early 20 C. G.

Iron rectangular frame; brass knob turns bar to move bracket for tube, which can be turned at right-angles.

Griffin 1910,77 describes this as: "New Vernier Microscope, with four possible positions. The microscope is fitted with a two-inch objective and can be used with its axis either vertical or horizontal with a traverse which can also be vertical or horizontal. A total movement of 16cm. is possible and the vernier reads to 1/20mm. 4 10 0".

2539 UGP245 MICROSCOPE - TRAVELLING

GRIFFIN LONDON

B 123x99x19; SuMnH 136; TuL 165, D 25.

Late 19 early 20C. G.

Brass; U-foot; pillar, double rack and pinion to raise support; tube on side arm to fit support; scale 0-90.

Eyepiece, and cylindrical block to allow instrument to be used vertically, missing.

"Reading Cathetometer Microscope, mounted on a rigid horseshoe base of brass, rack adjustment, with double pinion. Accurate machine-divided scale in millimetres with vernier to read 1/10 mm. The microscope may be used in either a horizontal or vertical position by means of the brass block shown in the illustration" - Griffin 1910,76.

3727 UGP378 MICROSCOPE - TRAVELLING

Max Kohl Chemnitz

Sp 192; MnH 415; TeMnL 157. Early 20 C. G.

Brass and silver metal; black tribach base; tubular and triangular expansion limbs; spirit level on microscope.

The base has three level screws and holds a brass pillar; inside this is a silvered draw tube, divided 150-10, with a screw clamp; on top of this is a brass sleeve bracket with a two-knob rack and pinion adjust for a silver triangular limb, divided 10-70, with a vernier; on top again is a horizontal brass microscope with double-knob rack and pinion focus, and silvered push-draw, divided 14-19 at objective end.

Similar "Reading Microscope" illustrated in Kohl 1911, 226, "with extension and rack work".

0167 UGP046 MICROSCOPE - TRAVELLING

YEATES & SON DUBLIN

B 461x160x45; TH 113. Mid to late 19 C. G.

Mahogany base; rectangular brass plate slides between parallel bars, moved by drum micrometer; incomplete.

One plate has a scale; a lens in a wooden housing is attached to the sliding plate - a later addition of unknown purpose; a screw hole in the centre of the sliding plate is assumed to be for a travelling microscope?

This seems to be supported by an entry in Galway 1902,6 "Reading microscope, reading to 1/100mm. with screw adjustment in firm brass slides."

3728 UGP379 MICROSCOPE - TRAVELLING

Unsigned

Sp 345,232,132; MnH 276; PB 252x69. Early 20 C. G.

Brass, silver-metal, oxidised brass; microscope on vertical bar on plate running along horizontal scale.

Two brass level screws and two (replacement) brass pillar props hold a base plate with a rectangular raised slide bar and a V-shaped valley slide bar; a brass plate (93x85) slides on these, adjusted by a rack and pinion knob along a silver horizontal scale 0-20 with a vernier; a vertical bar in the shape of a cut-off triangle rises from the plate; a silver scale on it is divided 1-18, with a window vernier attached to a bracket raised by a rack and pinion knob; the brass microscope can be clamped horizontally or vertically to this, and it has a silvered drum micrometer eyepiece divided 0-14.

2548 UGP254 MIRROR - CONCAVE

BECKER, LON... BIRMINGHAM

B 189x158x133; H 282; MrHsD 98. Late 19 early 20 C. G.

Wood-housed mirror on pillar above paper scale 0-90-90 -0°; below, box, two windows, for revolving glass plate.

Box appears modern; the angle of the plate glass is measured by a pointer to the scale from the pillar holding the mirror above and the plate below.

1519 UGP101 MIRROR - CONCAVE & CONVEX

W.G. PYE & CO. MAKERS CAMBRIDGE (WB NICOLSON)

D 147; HS 217x214 & 216x212. Early 20 C. G.

Two; glass; convex and concave; in square wood frames with cut corners; one on WB NICOLSON GLASGOW iron tripod stand with brass pillar; convex mirror on unsigned rectangular-base iron stand.

2543 UGP249 MIRROR - CONCAVE & CONVEX

Unsigned

BD 202; MnH 393; MiHsD 203. Mid 19 C. G.

Two; mahogany and brass; turned base; pillar, ring clamp; insert to brass semi-circle mounts for glass mirror.

Base, insert, and mirror housing of mahogany; brass pillar, clamp, and fittings.

2544 UGP250 MIRROR - CONVEX

HARVEY & PEAK LONDON

HsOD 196; H 348; PrD 7. 1884-1909. F.

Two; brass pillar leads to wood ring housing for glass mirror; only one mirror present - not original; original base to hold pillar missing.

Dates from Downing 1988,57.

1917 UGP186 MIRROR - ROTATING CUBIC

Yeates & Son Dublin.

BD 145; H 400; Mis 154x148. Mid to late 19 C. G.

Black fluted iron base; handle turns disc to rotate another at right-angles to revolve mirrors (two remain).

Discs and support pillar of brass; mirrors held by mahogany squares (164x162) top and bottom.

2953 UGP361 MIRROR - ROTATING CUBIC

Unsigned

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

B 457x248x30; MiHs 105x104x83. Early 20 C. G.

Black wood base; three white-metal level screws, and housing (135x106x78) for clockwork to turn mirror on top; iron key for clockwork; hole at other end of the base for missing part.

2952 UGP360 MOMENTS DEMONSTRATION APPARATUS

Unsigned

Sp 260; H 1082; Br 1028x13x9. Late 19 early 20 C. G.

Iron tripod foot; steel pillar to oxidised brass bracket for pivoted rod with hook and notches; brass protractor.

The latter is divided 0-180° and is attached to a sleeve and clamp on the pillar above the rod; it has a watch-hand pointer in front and a pulley wheel behind, which presumably is attached to a hook on top of the pillar and to the hook on the bar, to show the angle of inclination of the bar.

1508 UGP084 NEWTON RINGS APPARATUS

Unsigned

D 68; H 36. Second ½ 19 C. G.

Brass cylinder with knurled knob on one side to alter pressure on glass with black backing to produce rings.

3722 UGP374 OERSTED APPARATUS

Unsigned but attributed to Elliott Brothers.

BD 68; NH 136, L 152; H 178; W 212; WiD 5.

Mid 19 C. R.

Weighted brass base and turned pillar to single turn copper coil; three brass screw contacts; central needle.

One of the brass screw electric contacts is at one side of the single turn coil, where the coil is bent through two right-angles; the other two contacts are on the other side at the free ends of the coil; the red jewelled needle is in the shape of two long triangles.

Curtis 1861,95 includes a similar instrument, with the illustration and details taken from Elliott 1856b,6 - "Apparatus to show Oersted's experiments. By means of this contrivance the deflection of the magnetic needle from its natural position (when opposed to a straight portion of a connecting wire) is conveniently shown, whether the electric current be transmitted either above or below the needle. The arrangements are such, that nothing more is necessary than to remove the connecting wire from one cup to another, when it will be seen that in every case the magnetic needle has a tendency to form a right angle with the wire transmitting the current of electricity.--13s." In this case the cups are replaced by screw contacts.

2933 UGP341 OERSTED APPARATUS

Unsigned but attributed to Elliott Brothers

B 282x113x18; H 175; BrD 6.5. Pre 1861. R.

Mahogany base; brass; two vertical supports for horizontal bar which can be rotated; pin and needle gone.

The vertical bars have screw electrical contacts; one end of the bar has a knurled knob.

Curtis 1861,95 lists this instrument with illustration and description taken from Elliott 1856a,6: "Apparatus to exhibit Oersted's elementary fact in Electro-magnetism. It consists of a horizontal metallic wire capable of being turned on its axis while forming part of the conjunctive wire of a voltaic battery. The magnetic needle is attached to the wire with free motion in a plane parallel with it, so that when the electric current pervades the wire, the deflection of the magnetic needle will be the same in all positions of the revolution of the wire on its axis.--18s."

2946 UGP354 OPTICAL BENCH

Unsigned

Sp 1322&218; H 374. Early 20 C. G.

Brass, oxidised brass and steel; frame on four level screws for three sliding bases to pillars for element holders.

The latter have a variety of sophisticated adjustments and two have fluted side panels to hold lenses, slits, etc; scale on base 0-120cm; each pillar base has a vernier; one has a drum to adjust position of element; another has slides and screws at the base to adjust the lateral position of the pillar; there is also a sliding wood table.

0178 UGP058 OPTICAL MODEL

W & S JONES No 30 HOLBORN LONDON

B 761x85x32; H 105; LeHsD 75. 1800-1860. A.

Mahogany base; four brass and ebonite discs; mounted lens and detached lens; holes for strings to show light rays.

Discs are at one end of the model, beyond centre is a brass mounting for a concave-convex lens; at other end is a detached concave-convex lens, with holes, and small arrows attached.

Dates from Clifton 1995,155.

1484 UGP082 OPTICAL MODEL

Unsigned π shaped monogram

Sp 103; L 246; H 147. Early 20 C. G.

Microscope; black tripod foot; optical diagram; on top, five black frames for object, lenses, image; one lens gone.

Gold decoration on foot; diagram on rectangular block above foot, black illustration of lenses and light path on white background.

Instrument illustrated in Becker 1931 catalogue available in UCG.

1483 UGP081 OPTICAL MODEL

Unsigned

B 383x85x31; H 158. Second ½ 19 C. G.

Splitting of light by prism; mahogany base; brass and oxidised brass fittings; prism mounted in centre.

Arrow object now replaced with a candle; small turned brass pillars to hold it and prism; brass straight pillar at other end with oxidised brass plate on top having seven holes for threads representing the splitting of light into its spectral colours; threads now replaced.

1482 UGP080 OPTICAL MODEL

Unsigned

B 382x85x30; H 110; MiD 50. Second ½ 19 C. G.

Gregorian reflecting telescope; mahogany base; brass and oxidised brass; speculum mirror with central aperture.

Arrow object at one end; near other end mirror on pillar with three disc eyepiece system model attached; small disc mirror on pillar near object; threads to demonstrate light path replaced.

1481 UGP079 OPTICAL MODEL

Unsigned

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

B 382x85x31; H 144; MiD 51. Second ½ 19 C. G.

Newtonian reflecting telescope; mahogany base; brass and oxidised brass; circular and angled elliptical mirrors. Arrow object at one end; at other, speculum mirror in circular mount on pillar; towards arrow end, angled elliptical mirror on pillar with two disc eyepiece model; missing strings would have demonstrated the light path.

1480 UGP083 OPTICAL MODEL

Unsigned

B 345x78x28. Mid 19 C. G.

Refracting telescope; mahogany base; fixed objective lens; moving support for brass two lens eyepiece system.

Both the circular housing for the objective lens and the turned base for the eyepiece system are mahogany.

This could be the "model of telescope" listed in Curtis 1861,71.

2542 UGP248 OPTICAL STAND

Unsigned

BD 112; MnH 274; PrD 13. Mid 19 C. G.

Iron base; brass pillar with lip and clamping screw on top; in this, iron bar; on top three-arm curved support.

The latter looks like a three-petal flower, and can be raised and lowered using the clamp screw.

Presumed to be for optical elements, but could be for other purposes.

2541 UGP247 OPTICAL STAND

Unsigned

BD 94; H 305; RiD 113. Late 19 C. G.

Black iron base and pillar; on top, black brass ring; at opposite sides, two sprung hollowed V-brackets for lens.

Two more present missing the V-brackets.

2516 UGP222 OPTICAL STAND

Unsigned

B 89x90x5 & 89x44x8; H 131-310; RdD 110.

Mid to late 19C. G.

Two; brass and oxidised brass; central pillar; semi-circular rod slides on this; brackets on pillar and rod.

The brackets are V-shaped and hollowed to hold the lens; the bottom of the rod has a screw clamp bracket to the central pillar, which is expandable and can be clamped at the required length with another screw; the stands are basically identical, but have different bases; that with the smaller base is missing one of its Vs.

2896 UGP304 ORGAN PIPE - REED

HARVEY & PEAK LONDON

Hs 231x58x55; L 272 1884-1909. F.

Boxwood with black wood edgings; three windows on top to show brass reed "B" on black wood housing; tapering pipe below.

Also two tapering square-section cones of similar appearance to reed pipe - (L342&154, MxSe 67x66 & 66x64).

Dates from Downing 1988,57.

2895 UGP303 ORGAN PIPE - REED

YEATES & SON OPTICIANS DUBLIN

Hs 262x50x50; L 292. Mid to late 19 C. G.

Oak housing; three windows on top to show brass reed on oxidised brass back; short tapering pipe below.

Another somewhat similar reed pipe is unsigned.

1931 UGP136 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN

L 433&332; Se 56x51&48x45. Mid to late 19 C. G.

Two; boxwood; "G3" & "C4"; with a manometric flame capsule on front of each.

0048 UGP018 OSCILLATOR - HERTZ(?)

MILLER & WOODS 2, GRAYS INN ROAD, LONDON

B 384x203; H 212; SrsD 96 & 34. c1895. W.

Mahogany base and supports; heavy brass sphere on ebonite disc in centre; at sides insulated sphere conductors.

Crawforth 1988,18 lists the firm at this address in 1895.

2886 UGP294 PENDULUM - GRIDIRON, MODEL

Unsigned

L 995; W 148; BbD 180. Mid to late 19 C. G.

Central iron rod; on each side two gold and two grey parallel wood rods on frame bars; biconvex wood bob.

1929 UGP198 PHONIC WHEEL

Unsigned

Sp 163; H 245; DiD 223. Patented 3:10:1889. SI.

"Raleigh Synchronous Motor or Phonic Wheel"; two iron tripod feet; cog and motor drive to rotate slotted disc.

Tripod feet at right-angles to position disc vertical or horizontal; brass cog wheel and endless screw mechanism with electric motor drive to rotate disc.

Instrument used to determine absolute pitch of tuning forks - Pye 1914,34.

1524 UGP110 PHOTOMETER - JOLY

GRIFFIN LONDON

H 220&215; W 78&86. Early 20 C. G.

Two; brass pillar to wood block; on this, paraffin wax blocks; at front, black metal window and flaps.

Wax blocks missing from second instrument; same or similar to that illustrated in Griffin 1910,564.

1521 UGP103 PHOTOMETER - JOLY

YEATES & SON DUBLIN

B 159x88; H 91. Mid to late 19 C. G.

Mahogany housing for two white wax blocks; windows at sides for light sources; black wood shades.

Latter slope inwards from outside of frame towards the wax blocks; back of instrument has been replaced.

Joly wrote "If...a prism be cut from a translucent body, and so exposed to a source of light that one only of its faces be illuminated, the light diffused through the substance and reflected out through the unilluminated faces of the prism gives it an appearance as if lighted up internally. The effect, in fact, is as if the prism itself was a source of light. Two such prisms laid

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together on smooth faces, and receiving light from separate sources (placed so as to be at opposite sides of the plane of division), appear as if each was emitting light proportional in intensity to the source of its supply.....When the supply to each prism is brought to equality, they appear as if emitting equal quantities of light. In fact it is hard to detect any longer that two prisms are being observed, so completely does all trace of the plane of division disappear....The sensitiveness of the arrangement is still further increased by interposing a silver leaf between the prisms, thus stopping all passage of light from one prism to the other." - Scientific Proceedings of the Royal Dublin Society, 4, 1885, 345-6.

1517 UGP095 PHOTOMETER - LUMMER BRODHUN

Unsigned

H 238; Hs 103x75x42; TuD 18. Late 19 early 20 C. G.

Turned wood handle; oxidised brass housing for opaque white glass photometer disc; push-focus eyepiece.

Handle holds frame with two right-angles to two pivot points for the housing, which has holes at each side, and the eyepiece in a brass sleeve for viewing.

See Kohl 1911, 469.

0183 UGP063 PHOTOMETER - WHEATSTONE

Elliott Bros. 30. Strand London.

D 55; H 44. 1858-1861. R.

Brass cylinder, with castellated top, guides hand-driven cogged disc (some of the fittings are gone); a further disc with five spikes in a line fits into the revolving disc.

"Wheatstone's Photometer for measuring the intensity of light. This instrument far exceeds in accuracy and convenience any which has yet been contrived, and is founded upon the physiological principles of the permanence of the impression of light upon the optic nerve."; it provides an endless variety of elliptical curves in brilliant light.

Quote from Curtis 1861, 71; firm moved to 30 Strand in 1858, Crawford 1988, 8.

Christie 28:8:89, Lot 94, was a complete instrument, described as follows: "The cylinder with internal gearing and ivory handle winder, the rotating stage with five pins and counterweight, arranged to carry cork discs, each with silvered glass beads, all contained in a leather covered case----This instrument was the invention of Charles Wheatstone and was devised to show that the intensity of reflected light indicates the relative luminosity of light sources. When rotated, an intricate geometrical pattern is seen, the relatively [sic] intensity of this geometrical pattern produced by light sources is adjusted for equal intensity by moving the instrument nearer to the weaker light source."

1509 UGP087 PIEZOMETER

Unsigned

BD 146; H 786; CyD 85, H 290. Second ½ 19 C. G.

Glass cylinder between brass base and plate; stop-cock above to connect liquid reservoir or syringe pump.

Four brass rods with screws on top clamp the cylinder between base and upper plate; the reservoir, for introducing water into the cylinder, is of brass-bound glass (H75, D48).

A simpler form of the instrument, for measuring the compressibility of liquids, is illustrated in Ganot 1877, 76; this one is missing its internal glass vessel and manometer.

1516 UGP094 POLARISCOPE

Yeates & Son Dublin.

BD 104; H 313; MnL 86. Mid to late 19 C. G.

Brass; expanding stand; top horizontal bar and two pillars for two lenses; centre housing for iceland spar crystal.

Lenses push-adjusted in brass sleeves; crystal in oxidised brass housing which can tilt from the vertical and is contained in an outer ring; silver foil with a pin hole covers one end of the crystal housing.

0147 UGP010 POLARISCOPE - DUBOSCQ

Duboscq Soleil à Paris

H 440; BnL 321; D 63. Mid 19 C. G.

Brass; expanding stand with pivot; objective, sample clamp, and analyser system move independently.

Nicol prism system; cylindrical housing for nicol prism sets 2545 UGP251; double disc clamp; revolving diaphragm, slit and three circular apertures; condensing lens and nicol prism; optical bench on pivot on stand top.

"Duboscq's Large polariscope with three lenses two nicol's prisms, two double image prisms, brass ring for holding large specimens, compensator for rotating disc with apertures [sic].", Curtis 1861, 76.

0150 UGP013 POLARISCOPE - NORREMBERG

ELLIOTT BROS 30 Strand, London.

B 154x152x52; H 501; TH 380. 1858-1861. AR.

Mahogany base with drawer; brass and oxidised brass; mirror on base; white glass; two apertures; black glass.

Circular mirror on top of base has become corroded; two brass pillars support revolving rectangular glass plate with scale; movable brass circle with scale; stationary top circular table with scale; rectangular black glass hinged to top table.

Presumably "Norremberg's polariscope apparatus with two mounted double image prisms" of Curtis 1861, 77 - but prisms not now with apparatus.

Dates from Crawford 1988, 8.

2904 UGP312 PRESSURE VESSEL

Unsigned

BD 261; H(-Ha) 365. Mid to late 19 C. G.

Black-painted iron cooking pot with three hooks to hold arched lid, which has a central valve and curved pipe.

Central valve seized; as well as the curved pipe, there is another hole with a screw thread which probably held another pipe; a thick wire handle is attached to hoops on the sides of the pot; very much in the style of old Irish cooking pots.

2940 UGP348 PRISM - HOLLOW

Unsigned

H 90; Sis 53, 53, 70. Mid to late 19 C. G.

Glass bottle with top for missing stopper; one curved side and two flat sides with glass plates glued on.

Unusual in that the curved side is not frosted, and the flat sides are glued on rather than being integral parts of the bottle.

0185 UGP065 PRISM - JELLETT

YEATES & SON DUBLIN Jellett's Prism.

L 52; D 26. c1880. CT.

Brass cylindrical container houses two long prisms in cork surround; crystals of iceland spar?

Advertised in Yeates 1880, 19 "Jellett's Analysing Prism...2 2 0".

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2545 UGP251 PRISM - NICOL

J. DUBOSCQ à PARIS

HsD 69, H 48&32; Pms 47x36&25x18. 1849-1883. F.

Two; brass cylinder housings for two prisms each, can be separated or rotated; for polariscope 0147 UGP010.

Dates from Brenni 1988,3-4.

1488 UGP112 PRISM ON STAND

LEREBOURS & SECRETAN A PARIS

BD 112; PvH 248; PmSis 63,44&44. 1847-1855. F.

Brass expanding stand to pivot; right-angled bracket and clamp to revolving triangular mount; prism gone.

Possibly mount for polyprism added to Curtis 1861,75.

Dates from Payen 1985,175.

1490 UGP104 PRISM ON STAND

Unsigned

BD 85; H 117; PmSis 54,24,24,12. Mid 19 C. G.

Turned brass base and pillar; horizontal bracket with two right-angle sides for first prism; holes for seconds (missing).

Remaining prism of green glass is fixed; the other would have been able to be moved in or out of the light path by rotation about an axis through the holes at the top of the bracket.

Probably "achromatic compound prism mounted" added to Curtis 1861,75.

1489 UGP135 PRISM ON STAND

Unsigned

BD 126; H 395; PvH 323; PmSis 72,3X38. Mid 19 C. G.

Brass expanding stand; pivot; horizontal frame with sides at right-angles for prism pins; another similar.

Cracked prism can rotate around screw pins; oxidised brass frame; second prism also cracked but not so much - dimensions L78,3X39.

May be "mounted prisms of flint and crown glass" added to Curtis 1861, 75.

2883 UGP291 PROOF PLANE

Unsigned

L 327; DiD 31; HaD 7. Mid to late 19 C. G.

Ebonite handle; brass sleeve and angled disc; to show that charge is outside a hollow sphere conductor.

See Deschanel 1891,564.

0041 UGP032 PULLEY FRAME

Hiysns(?)

B 679x152x46; H 725. Pre 1861. R.

Mahogany base holds two turned pillars with bridge on top for pulley systems; two side scales, divisions one inch.

Probably "Frame of pulleys containing 16 blocks" in Curtis 1861,31, though only five pulley systems remain.

1877 UGP146 PULSE GLASS

Unsigned

L 234; BusD 39. Late 19 early 20 C. G.

Glass tube bent at both ends, with bulbs; contains red liquid; hand heat drives liquid into other bulb.

"Pulse glass, containing coloured spirit which has been boiled for some time to expel all the air from the apparatus. When one bulb is taken in the hand, as shown in the figure, the heat is sufficient to produce a pressure, which drives the liquid into the other bulb and causes brisk ebullition. The cooling of the liquid consequent on the evaporation produced is distinctly felt." - Griffin 1910,460.

2509 UGP215 PUMP - LIFT

Unsigned

CyD 62, H 52; HaL 177. Mid 19 C. G.

Brass; incomplete; cylinder has side support for pivoted handle which moves piston with central valve.

The cylinder is painted red inside and has an output spout at the bottom; the piston rod goes through the centre of the cylinder and a sleeve below it, and has a hinge for an arch which holds the piston ring; the reservoir part of the apparatus is missing.

Illustrated in Griffin 1910,298.

1526 UGP113 RESISTANCE

Unsigned

Hs 85x47x23; DiD 29. Mid to late 19 C. G.

Mahogany housing and lid; brass fittings, including two contacts; carbon disc under glass cover in housing.

Since there is no means to alter the pressure on the carbon disc, it is not a variable resistance.

1928 UGP197 RESONATOR - HELMHOLTZ

Unsigned

B 343x267x22; D 66-175. Late 19 C. G.

Black wood base and pillars; five brass spheres "ga3=192" - "t28=512"; holes at bottom, top conical ear pieces.

1537 UGP129 RHEOSTAT

ELLIOTT BROS. 30 STRAND LONDON.

B 304x132x32; H 109; CoHsD 70. 1858-1863. A.

Mahogany base; brass fittings; incomplete copper wire around ceramic cylinder; handle; sliding contact.

Handle of ivory and brass; one side of brass coil housing divided 0-9; bar for disc contact also divided 0-16; two contacts, one to bar and one to coil through turning disc and spring contact.

Listed and figured as "Wheatstone's Rheostat" in Elliott 1956b,16 & 1895,46; "for regulating voltaic currents of comparatively small resistances", turning the handle lengthens or shortens the conducting portion of the wire - Elliott 1856b,16.

Dates from Crawforth 1988,8.

1538 UGP130 RHEOSTAT

NEWTON & CO 3 FLEET ST LONDON

B 203x203x25; H 313; CysHsD 75. Late 19 early 20 C. G.

Marble base; two ceramic upright cylinders with brass tops for wire; ebonite and brass sliding contacts; two brass contacts on base.

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0149 UGP012 SACCHARIMETER

SACCHARIMETRE A PENOMBRES Mon Jules Duboscq à Paris No 268

PvH 307; H 488; L 465. Acquired 1886.

Brass; iron tripod foot; large circular scale with magnifier near eyepiece; acquired 1886.

Scale inscribed "Sucre Incristallisable" and "Sucre Cristallisable"; added to Curtis 1861,79 "Penumbra Saccharimeter (1886) £12.12.-".

Brenni 1988,3-4 gives Duboscq dates 1849-1883.

1926 UGP195 SAVART DISC

HARVEY & PEAK LONDON

B 372x185x19; H 465; WhD 223 DisD 50,61&83.

1884-1909. F.

Cast iron base and support for five-spoke brass pulley wheel and second at axis of spindle with three toothed discs.

Large pulley wheel with wood handle drives small one to turn discs; on end of spindle is a knurled knob, which seems likely to be there for a Seebeck siren disc, but that in collection (1927 UGP196) does not match.

Dates from Downing 1988,57.

2890 UGP298 SCREW PRESS

Unsigned

B 434x187x29; MnH 570. Mid 19 C. G.

Mahogany base and bridge for telescoping double wood screw worked by turned wood handle; press plates gone.

A square-section bar descends through the bridge when the screw is turned, and this would have pressed the pressure plates together.

1892 UGP161 SEEBECK RECTANGLE

Elliott Bros. 5 Charing Cross & 56 Strand London

BD 69; H 178. 1856-1858. A.

Brass base and pillar for rectangle of copper and antimony (broken); with astatic double needle.

Elliott 1856c,12 notes: "for exhibiting the thermo-electric action of a rectangular frame composed of copper and bismuth. This apparatus is very sensible of minute changes of temperature, and the deviation of the needle is considerable, 10s.6d.".

Dates from Chaldecott 1989,161.

2958 UGP366 SELF-INDUCTION STANDARD

NALDER BROS & CO WESTMINSTER No.27,459 MANSBRIDGE'S PATENT MILLIHENRYS

D 232; W 35; C 310x297x88. 1890-1910. F.

Two ebonite discs; five contacts; scale 10-100 & .6-13.

The five brass contacts are at the side, and two can be shorted with a bar; the white scale turns with the upper disc, and is read by a pointer at the side; in a mahogany case with green velvet lining.

A leaflet with with the instrument reads: "Mansbridge's Patent Variable Standard of Self-Induction...This Variable Standard of Induction consists of four compound wound "D" shaped coils, two of which are embedded in the lower ebonite disc and two in the upper ebonite disc. The compounding of the coils enables a much greater range of inductance to be obtained in one instrument, and the special shaping of the coils gives a scale of practically equal divisions throughout..."

The firm issued catalogues from 1890-1910, Anderson 1990,57-8.

2930 UGP338 SHIP SECTION

Unsigned

BW 206, H 180, De 22-206; H 807. Pre 1861. R.

Wood; section of ship's hull with brass sleeve for mast; adjustable weight for mast gone.

Curtis 1861,45 describes this: "Apparatus consisting of a section of a ship at right-angles to its length, with adjusting weight for exhibiting the properties of the metacentre or stability of floating bodies."

1476 UGP056 SINGING FLAMES APPARATUS

Made by Yeates & Son Dublin

Sp 197; H(-Tu) 406. 1865-1878. FR.

Iron tripod; brass and oxidised brass; gas input under tripod; stop-cock; two tapering jets; two tube supports.

"Apparatus for singing flames with two gas jets, and tubes" - added to Curtis 1861,55, between 1861 and next dated acquisition in 1878; Yeates & Son presumed after 1865.

0187 UGP067 SIREN - CAGNIARD

Max Kohl, Chemnitz

BD 97; CyD 82; H 317. Late 19 early 20 C. G.

Turned mahogany base; brass cylinder housing; four stops; two disc counters on frame on top with silvered scales.

Modification by H.W. Dove (1803-1879) of siren introduced by Charles Cagniard (1777-1859) in 1819; the stops allow different sequences of holes to be sounded separately or together; a brass disc with four circles of holes on top of the housing revolves, the rate being measured by watch-hands on the scales 0-90 and 1000-5000.

Dove details from Turner 1983,137; very similar to siren illustrated in Kohl 1911,421.

1911 UGP180 SIREN - CAGNIARD

Yeates & Son, Dublin

H 200; CyD 77. Mid to late 19 C. G.

Brass; tube input below to cylinder; turning disc with 18 holes on this; above, endless screw and scale plate.

Plate was silvered and has two watch-hands for scales, 10-100 and 5-25, supported by oxidised brass frame from cylinder.

1927 UGP196 SIREN - SEEBECK

HARVEY & PEAK LONDON

D 509. 1884-1909. F.

Zinc(?) disc with patterns of holes; at centre, brass boss with screw thread; spinner missing.

Would expect spinner on Savart disc 1926 UGP195 to fit, but screw threads different.

Dates from Downing 1988,57.

2547 UGP253 SLIT

J. DUBOSCQ à PARIS

HsD 95, W 23; SIPs 86x17. 1849-1883. F.

Brass; cylinder housing with one side open; other side has two slit plates, spring, and knurled adjusting knob; iron screw from

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adjusting knob bent.
Dates from Brenni 1988,3-4.

1904 UGP173 SOAP BUBBLE DRUM - BOYS

C.V. BOYS'S PATENT 16732/11 MADE BY GRIFFIN, LONDON
Sp 203; H 212; DrD 127. 1911 Patent.

Metal tripod; steel pillar; brass sleeve to brass revolving drum; bubbles show light interference.

Level screws on two of the three feet; grooved disc below drum for pulley string; base of drum chamber concave and lined with black velvet; 12 holes on lip on top; last number of patent might be 9 rather than 2.

Tesseract 15,1987,63 calls the instrument "CHARLES V. BOYS' RAINBOW CUP APPARATUS" and notes that by placing a soap solution in the chamber, and spinning, a carefully controlled liquid film may be maintained, producing dramatic interference colours on reflection.

1913 UGP182 SONOMETER

YEATES & SON [*sic*] DUBLIN

L 953; H 208. Mid to late 19 C. G.

Mahogany and boxwood; two shaped feet support sound box; fixed wire; variable wire and pulley gone; scale 2-98.

Units neither centimetres nor inches - 100=758mm; four circular holes (D24) in sides of sound box; brass support for missing pulley wheel at one end.

1915 UGP184 SOUND TUBE

Unsigned

L 654 & D 208. Mid & late 19 C. G.

Cut brass ring tube, input pipe, sliding arc insert for output; other has parallel tubes and 180° bent ends.

Former has strengthening tube to support cut-out part to accommodate sliding insert; latter has two parallel oxidised brass tubes with input and output arms at right-angles and cross strut to hold them together - one bent brass tube is permanently attached to these and the other slides into them (now stuck) in trombone-like manner; purpose of these needs to be confirmed, but latter is reminiscent of Kohl sound apparatus.

2495 UGP201 SPECIFIC HEAT APPARATUS - REGNAULT

PHILIP HARRIS & CO LTD Scientific Instrument SPECIALISTS. BIRMINGHAM & DUBLIN.

B 363x215x33; H 452; JD 97. 1902-1911. F.

Wood base and frame; copper jacket and calorimeters.

Water jacket around cylindrical hole for body being studied; this pivots on a shelf, and can be turned so that the body falls into a small calorimeter (D39,H77) held on three strings in a larger calorimeter (D119,H120), both in a sliding wood box; the latter is separated from the part of the instrument having the water jacket by a sliding vertical tray, and can be slid under the jacket when the tray is raised.

Name from Griffin 1910,434; dates from Morrison-Low 1989,126.

1885 UGP154 SPECIFIC HEAT APPARATUS - REGNAULT

HARVEY & PEAK LATE W. LADD & CO 56, CHARING CROSS RD.

B 531x276x68; H 467. Post 1891. A.

Two; wood base and frame; lagged copper water jacket; box below for (missing) calorimeter slides in grooves.

Body being studied is heated in the water jacket; a lagged plate underneath holds it until this is withdrawn, when it falls into the calorimeter in the lagged box below.

Name from Griffin 1910,434; firm moved to this address in 1891, and was there until 1901+, Downing 1988,57.

2508 UGP214 SPECIFIC HEAT APPARATUS - REGNAULT

Unsigned

B 203x150x29; H 283; CyD 49, H 60. Mid to late 19 C. G.

Mahogany base and slide for brass cylinder; vertical wood panel from centre holds lagged steam heater.

Latter has mahogany discs top and bottom and a mahogany lever to allow body being studied to fall into a (missing) calorimeter in the cylinder.

See Griffin 1910,432.

1485 UGP098 SPECTROSCOPE

Unsigned - prism by Mertz [*sic* - actually Merz]

BD 91; PvH 216; TuL 190, DCe 28. Pre 1861. R.

Brass; turned pillar to pivot; telescope with hinged mounting for Merz prism at end; for Fraunhofer lines.

"Achromatic Telescope Arrangement, with brass stand and superior mounted equilateral glass prism, prepared by Mertz [*sic*], successor to Fraunhofer of the Optical Institute, Munich, for observing by day with artificial light, Fraunhofer's dark bands which occur in the spectrum produced by prismatic refraction."; light is simple to fit up, and the apparatus can be used at all seasons of the year - Curtis 1861,72.

Brachner 1985,145 gives Georg Merz dates 1793-1867.

0140 UGP003 SPECTROSCOPE - DIRECT VISION

Yeates & Son Dublin

L 244; D 27. Mid to late 19 C. G.

Hofmann type; clip in centre for stand (missing); optics incomplete (spectrum not visible).

Segmented cylindrical brass body, with fish-skin covers on two segments; can revolve a little around a screw pivot; removable slit attachment; focus by draw tube in front of eyepiece.

Noted in Galway 1902,27 as "Direct-vision spectroscopes:-(b) Yeates & Son's spectroscope on stand." - but stand now missing.

Bennett 1984a,8 - instrument type added at late stage to 1862 London Exhibition.

0138 UGP001 SPECTROSCOPE - DIRECT VISION, GRACE

Grace's Spectroscope John Browning, 63, Strand, London.

L 143; D 24. 1882. AQ.

Brass; cylinder housing; (in the possession of Dr A. O Rodaighe); added to Curtis 1861,78 in 1882.

Galway 1902,27 notes that it had a case, now missing.

0141 UGP004 SPECTROSCOPE - MICRO

John Browning London

L 207; D 24&39; C 382x121x105. c1877. D.

Sorby Browning Micro Spectroscope; brass; fitted mahogany case with instructions dated January 1877.

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Focus by draw tube in front of eyepiece; bright line micrometer near eyepiece; side slit for introducing comparison spectrum. Instructions dated January 1877.

0148 UGP011 SPECTROSCOPE - PROJECTION

LEREBOURS & SECRETAN A PARIS

BD 89; H 311; HsD 64. 1847-1855. F.

Expanding brass stand holds prism, one side silvered; very near this is a lens in an oxidised brass housing.

Presumably "Prism with achromatic lens" in Curtis 1861,75.

Dates from Payen 1985,175.

0142 UGP005 SPECTROSCOPE - TABLE

John Browning 63 Strand London

W 733; H 305; TH 208. 1873-1900. A.

Brass and oxidised brass; platform with clamps for two prisms; slit mechanism missing.

Probably the instrument described in Galway 1902,28 "Spectrometer; with right-angled prism to fit on slit; a stand with bunsen burner and bead holder; three tables, one for taking a diffraction grating, one with two prisms attached, and one flat: and a second eyepiece for telescope."

Dates from Crawforth 1988,4; details from Galway 1902,28, so pre 1902.

0146 UGP009 SPECTROSCOPE - TABLE

GRIFFIN LONDON

L 560; TH 236. Early 20 C. CT.

Iron tripod foot and tapering pillar; brass; silvered scale; cylinder housing around prism.

Very similar to spectroscope illustrated in Griffin 1910,586.

0144 UGP007 SPECTROSCOPE - TABLE

HARVEY & PEAK LONDON

L 507; TH 227. 1884-1909. F.

Brass and oxidised brass with iron tripod foot; slit missing; telescope detached from mounting.

Dates from Downing 1988,57.

0143 UGP006 SPECTROSCOPE - TABLE

Max Kohl Chemnitz.

L 540; HsH 304. c1890. R.

Brass; incorporating Rowland/Brashear grating plus one prism; side collimator with slit for reference.

Iron tripod foot; fixed collimator and telescope; light from collimator reflected by a prism to grating, which is revolved from outside, and so to the telescope; rack and pinion focus; side collimator with slit for reference.

Grating: 'Ruled on Prof. H.A. Rowland's engine at John's Hopkins University Baltimore Md. 14438 lines /". Plate prepared by John A Brashear Alleghany Pa U.S.A.' 'Log.K=7.51427. l=K.sin.w./n'.

Rowland/Brashear gratings dated 1888-1891 in Bennett 1984b,100-102; visible in UCG c1900 photograph.

0145 UGP008 SPECTROSCOPE - TABLE

Unsigned

L 407; TH 210. Turn 19/20 C. G.

Iron tripod foot and tapering pillar; brass; circular prism table above scale disc; prism plate detached.

0139 UGP002 SPECTROSCOPE - TABLE

Unsigned

H 316; W 660; HsL 335&150, W 174. c1860. R.

Instrument similar to original Bunsen and Kirchoff spectroscope - mahogany trapezoid with three brass legs.

Housing has hinged lid and both are blackened on the inside; circular prism table, revolved with brass handle below; brass tapering cylindrical telescope and collimator; slit adjusted with small knob - three holes on housing for reference prism (missing but mentioned in Galway 1902,27); three thin brass legs.

See Bennett 1984a,5; Elliott Brothers made a similar but different model - Hill 1971,no333.

2517 UGP223 SPHEROMETER

Griffin London (GRIFFIN LONDON)

Sp 67; SH 109; CrSD 89. Late 19 early 20 C. G.

White metal; iron legs and centre screw; side linear scale 40-0-40 " $\frac{1}{2}$ M/M"; circular scale 0-450; case.

Latter is covered in dark purple fabric and is lined with purple velvet and silk; it is fitted for the instrument and for a piece of plate glass (100x102x10).

There is also a small "GRIFFITH LONDON" spherometer (H68,SD39) and four other small unsigned examples, some older than the Griffith instruments.

1494 UGP117 SPINNER

Unsigned

BD 173; H 442; LaWhD 179. Mid to late 19 C. G.

Mahogany; turned base and pillar; large pulley wheel near bottom; two small wheels at top sides and one on top arm.

Hook from horizontal pulley wheel on top arm will rotate anything attached to it around a vertical axis; metal side disc spinner on extra pulley opposite arm is later addition.

"By means of this apparatus it is possible to show the difference between static and dynamic equilibrium, where the position is governed by both gravitational and centrifugal forces..." - Turner 1973,163.

1473 UGP122 SPOUTING VESSEL

ELLIOTT BROTHERS OPTICIANS 30 STRAND, LONDON

BD 153; H 640. 1858-1861. AR.

Russian iron; brass fittings; tall black cylinder, three spouts with screw caps; glass side tube; base tap.

Spouts at top, middle, and bottom; hinged tap with cap at base on side opposite to spouts.

"Apparatus to illustrate the spouting or flowing of water through jets, and the effects of adjutages in streams of fluids." - Curtis 1861,45.

Deschanel 1891,227 shows such a vessel used to verify Torricelli's theorem.

Firm moved to 30 Strand in 1858, Crawforth 1988,8.

1887 UGP156 STAND

ELLIOTT BROS 30 STRAND LONDON

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BD 224; RiD 152-202; H 142. 1858-1863. A.

Mahogany; circular base on three turned feet; three turned pillars to ring; base underside burned; use unknown.

Also another mahogany stand with the same signature - rectangular base (B486x152x27;H222) with two vertical Y-supports for unknown parts.

Looks like base for "Sliding Forceps, for showing electric light by the ignition of charcoal points" in Curtis 1861,102, but the pivoted joints and electric forceps are no longer with it, and it would seem that glass or ebonite pillars would have been expected, not wood.

Dates from Crawforth 1988,8.

2932 UGP340 STAND WITH GLASS U-TUBES

ELLIOTT BROS. 30 STRAND LONDON

Sp 210&149; H 336; P 210x307; TusOD 19&6.

1858-1863. A.

Two shaped mahogany feet for vertical wood plate; three (of four) glass U-tubes each with one capillary arm.

Horizontal lines are drawn on the wood plate, which has the remains of clips (now broken) for the tubes, now stored on a wood carousel.

Listed in Galway 1902,8; dates from Crawforth 1988,8.

3719 UGP371 STANDARD CELL - WESTON

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO LTD CAMBRIDGE ENGLAND No13902

Harold M. Dean 69 Hatton Garden EC.

BD 92; CyD 83; TaH 125, D 91; C 166x119x119.

1911. N.

Brass base and cylinder with ebonite table, four contacts.

The contacts are of brass with ebonite (bakelite?) tops, labelled "A+", "-", "B+", "-"; the disc table on top of the brass cylinder has the additional inscriptions "WESTON NORMAL CELL" and the National Physical Laboratory monogram (NPL intertwined) with number 9581; in the centre of the cell is a mercury and glass thermometer 0-40°C, with the Harold M. Dean signature; the cell is in a mahogany hinged case.

Cambridge dates from J. Bennett, PC.

3718 UGP370 STANDARD CELL - ZINC/MERCURY

STANDARD CELLS MUIRHEAD'S PATENT

Hg Zn No.5964

BD 82; H 125; TaH 99, D 76; CyD 66. Turn 19/20 C. G.

Brass base and cylinder to ebonite table; on this, frame for bent thermometer plus four ebonite and brass contacts.

The thermometer is now missing; the inscription includes: "E.M.F. = 1.454 B.A. VOLTS T=15°C", and, scratched by hand on top, is: "1.4313 at 11.5".

This is presumably one of the two "Latimer Clarke's standard cells, in brass case, e.m.f. 1.454 B.A. volts. at 15°C." listed in Galway 1902,20, giving a pre 1902 date.

2511 UGP217 STEAM ENGINE

Unsigned

H 189; CyD 61, H 57; MxD 77. Third ¼ 19 C. G.

Brass and copper; water cylinder has two pillars above, which hold axle coupled to piston ring; incomplete.

Below the water cylinder is a copper cylinder with vents and an open bottom to shield the heat source; the brass water cylinder has a stop-cock at the side, two turned brass screw-caps on top (only one now turns), a pressure release valve (using a horizontal screw), and the two pillars; one of the latter, in the centre, has two small holes at the base - are these to pass steam into a (rocking?) cylinder mechanism for the piston ring?

2510 UGP216 STEAM ENGINE

Unsigned

CyD 74, H 115; MxD 90; MxH 220; TuL 81, D 9.

Third ¼ 19 C. G.

Brass; cylinder open at the bottom with vents, water chamber above; two bent pipes lead to revolving tube.

When the water chamber is heated, steam is forced up the bent pipes into the hollow tube, which has closed ends but pin holes at opposite sides - this would make it revolve; there are stop-cocks in the water chamber and on one of the bent pipes; there is also a screw cap on the disc on top of the water chamber to allow water to be put in the chamber.

A form of "Hero's reaction machine" - Ganot 1877,391.

1487 UGP074 STEREO VIEWER - BREWSTER

Elliott Bros. 56 Strand London.

BD 125; H 392; PrD 21. 1854-1855. A.

Brass expanding pillar to pivot; on this, rosewood(?) veneer brass-bound viewer; front frame replaced; eyepieces gone; hinged flap on top of housing.

Curtis 1861,74 illustrates Brewster's stereo viewer, but gives the description: "Wheatstone's Stereoscopes [sic] This beautiful instrument has the remarkable property of giving to two views or diagrams, of one object taken at different angles and seeming to the unassisted eye merely plain surfaces, an appearance when examined by the instrument of absolute solidity and atmosphere. The effects are capable of being multiplied to almost any extent, and the instrument is a valuable adjunct to portraiture by Daguerreotype."

Brewster and Wheatstone disputed the origins of the stereoscope, and indeed Brewster only insisted that he invented the "lenticular" form of the instrument (i.e. using lenses rather than mirrors as in the Wheatstone type) - Morrison-Low 1984,62,98,99.

This listing uses this distinction, and there is a Wheatstone type also in the collection - see 2867 UGP287.

Dates from Downing 1988,41.

2867 UGP287 STEREO VIEWER - WHEATSTONE

Unsigned - attributed to Elliott Brothers

B 863x222x43; MnH 370; Sus 305x199; Frs 138x114.

1856-1861. R.

Mahogany; rounded base holds two pivoted slides for black arched supports; angled mirrors frame in centre.

Base is of brown stained mahogany, the rest is black; the arched plates have a bar below and an adjustable boss above to hold missing plates.

Curtis 1861,73 illustrates this instrument, with the description displaced from the illustration (p74): "Large Reflecting Apparatus for illustrating on an extended scale all the phaenomena observed by Professor Wheatstone in his experiments on Binocular Vision. This apparatus is very effective for large drawings, prints or Calotype pictures".

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The signature plate is missing, but it was the same size as the Elliott Brothers plaque on eg 1498 UGP069.
Firm founded in 1856, Chaldecott 1989,161. Wheatstone invented this 1832, published 1838, Turner 1983,300.

2939 UGP347 STOOL - INSULATED

Unsigned

H 201 & 144; T 403x355 & 341x269. Earlier pre 1861. R.

Two; mahogany table on four tapering glass legs; the larger is older, and bar below table has been repaired.

Curtis 1861,91 describes these: "[Two] Electrical Stools, with solid glass [and gutta percha] insulating legs and mahogany top, extremely useful for the performance of certain experiments, and necessary in most cases where medical electricity is employed."; the words in square brackets have been added in hand-writing.

2532 UGP238 SWITCH

MASON DUBLIN PALMER MADE IN ENGLAND

MxH 210; P 88x64x12. Late 19 early 20 C. G.

Green G-clamp, brass screw, to ebonite plate; ebonite handle to pivot brass bar to connect two brass contacts.

Latter in form of rectangular solids (38x13x13), each with two screw brass contacts; right-angle between handle and bar, with latter having triple spring at contact point.

Second almost-identical instrument not counter-signed by Mason.

Looks too modern for the various Palmers listed in Clifton 1995,207.

1886 UGP155 TELEGRAPH - MORSE

ELLIOTT BROS. 30 STRAND LONDON

B 230x151x32; H 275. 1858-1863. A.

Mahogany base and vertical support for elongated brass-bound coil around a needle attached to front arrow; two brass contacts on base.

Dates from Crawforth 1988,8.

0058 UGP015 TELEGRAPH - MORSE

Yeates & Son Dublin

B 302x172x37; H 328; ReD 135. c1877. CT.

Mahogany base; brass; clockwork mechanism; electro-magnetic relay system; prints on tape from brass reel.

Yeates 1877,41&42, illustrated.

1518 UGP096 TELESCOPE - READING

Unsigned

Sp 149; SD 145; TuD 25, L 180. Second ½ 19 C. G.

Brass and oxidised brass; tripod base, three level screws; pillar to silvered vertical scale 10-360° and telescope.

Pillar can turn about its axis but there is no horizontal scale on the base; spirit level on top of pillar above counter weight on one side and circular scale beside telescope on the other; two verniers and leading glasses for scale; rack and pinion focus to telescope.

Clearly an instrument for measuring vertical angles, but not a theodolite since the horizontal circle is not divided.

1506 UGP076 TELESCOPE - REFRACTING

J. BROWN. 76. ST. VINCENT ST. GLASGOW

MnL 977; PvH 387; TuD 77; C 1011x240x138.

1871-1912. A.

Folding iron tripod foot; brass; tapering pillar; pivot for tube; celestial and terrestrial eyepieces; case; eyepiece focus by rack and pinion.

Dates from Clarke 1989,183-4.

1505 UGP075 TELESCOPE - REFRACTING

W. WATSON & SONS, 313 HIGH HOLBORN, LONDON

MnL 992; PvH 397; TuD 77, MxD 95. Late 19 C. F.

Folding iron tripod legs; brass; tapering pillar; pivot for tube; support strut from pillar; small finder (L295,D30).

Celestial and terrestrial eyepieces; rack and pinion eyepiece focus; push focus finder; objective lens cap.

Firm assumed this name in 1882, Clarke 1989,87.

2540 UGP246 THEODOLITE

Griffin London Rd No 21627

BD 147; H 151; VeCrD 115; TuL152,D19. Design 1885.

"School Theodolite"; oxidised brass; three level screws; silvered circles, horizontal 10-360°, vertical 60-0-60.

"Designed by Stanley De Brath, M.Inst.C.E., of metal throughout, with vertical circle reading by a vernier to five minutes and revolving horizontal circle divided into whole degrees throughout and reading likewise by a vernier to five minutes. The tube has a pin-hole and crosswebs for sighting. The base is provided with three levelling screws...and has two bubbles...3 10 0" - Griffin 1910,352.

2505 UGP211 THERMAL CONDUCTIVITY APPARATUS

GRIFFIN LONDON

CyD 128, H 72; DiD 128, H 12. Early 20 C. CT.

Nickel-plated brass; closed hollow cylinder, input and output pipes; solid disc, three side rods for suspension.

To demonstrate Lees' and Chorlton's method; the disc is suspended by three strings (one of three rods for this is gone); on top of this is a disc of material whose conductivity is to be tested; on top of this again is the cylinder through which steam is passed (one of two pipes for the steam is gone); thermometers are placed in the thick brass plate which comprises the bottom of the cylinder, and in the disc.

Also an older all brass version (D100,H93).

Instrument illustrated in Griffin 1910,480.

2504 UGP210 THERMAL CONDUCTIVITY APPARATUS - INGENHOUSZ

Unsigned

Rs 258x129x59. Mid to late 19 C. G.

Tin reservoir has two handles at sides and five sleeves near the bottom for metal rods in corks.

Name from Griffin 1910,477.

2862 UGP282 THERMAL CONDUCTIVITY APPARATUS - SEARLE

Unsigned but attributed to Griffin London

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Hs 292x154x152; TuD 41. Early 20 C. G.

"Stout" copper bar heated by steam and cold water at different ends; in insulated mahogany housing.

Steam goes into a copper cylinder at one end (D69,L50) and water through a spiral at the other, with input and output temperatures measured with thermometers; there are two more thermometers in the bar; these give the: "slope of the temperature, and when the difference of temperature between the inflowing and outflowing water and also the mass of the water flowing through are known, the conductivity of the copper can be calculated." - Griffin 1910,479.

The characteristic plaque shape for "GRIFFIN GRAM STANDARD" is there but the plaque gone.

2503 UGP209 THERMAL RADIATION APPARATUS

Unsigned

BD 98; H 360; DiD 163. Late 19 C. G.

Black, white and natural tin discs with cylinder rims, on black brass pillars on black turned iron bases.

Each disc has a small horizontal projection near the centre at the back, to hold a piece of phosphorus; there is a spare tin disc without a stand or back projection, which seems to match, but does not fit into the other discs; the radiant source (e.g. a steam radiator) is missing.

Presumably: "Metal discs, with different surfaces for radiation experiments, four mounted on stands and five unmounted" - Galway 1902,13 (No.31).

See also Griffin 1910,482.

2496 UGP202 THERMAL RADIATION APPARATUS - RICHIE

HARVEY & PEAK LONDON

BD 152; H 487; CyD 58, L90. 1884-1909. F.

Turned wood base and frame; glass U-tube; black metal cylinder with white and black sides between tube ends.

The horizontal cylinder is on top of a glass insulating pillar and has a hole above to add hot liquid; the smaller cylinders on top of the arms of the glass U-tube are missing; they would have had white and black sides facing the opposite colour on the central cylinder, to demonstrate the "identity of adsorbing and radiating powers".

Name from Ganot 1877,339; dates from Downing 1988, 57.

1882 UGP151 THERMO-ELECTROMAGNET

E. Leybold's Nachfolger A.G. Köhl-Rhein MASON DUBLIN

BD 95; H(+Ha) 276; WiD 10. Early 20 C. G.

Iron 5Kg weight; nickel block on top split in two; bent thick copper wire in two grooves in block; hook on top.

"Thermo-Electromagnet..comprising one copper-nickel thermocouple the current of which is sufficient to saturate the electromagnet to such an extent as to enable it to carry 5 kg with one turn of copper wire." Kohl List 100, Vol.3,1926,1044.

1873 UGP142 THERMOMETER - GLASS MERCURY

J. Griffin & Son London No. 1410067 Patent 3647

L 353; BuD 10. Mid 19 C. G.

Scale 10-190° "FAHRT"; metal clips at both ends with three lips on each pointing towards centre.

There is a solid glass tube fused on the end away from the bulb; there is a bend in the mercury column before the scale starts.

1477 UGP133 THERMOMETER - LESLIE DIFFERENTIAL

ELLIOTT BROS 449. STRAND

B 212x162x32; H 440; BuD 56. 1864-1886. A.

Matthiessen form; mahogany base and support; glass U-tube bent in two right-angles to two bulbs near base; top of U joined by tube with stop-cock (insert gone); one bulb broken.

This "has the advantage of being available for indicating the temperature of liquids. It consists of a bent glass tube, each end of which is bent twice, and terminates in a bulb; the bulbs being pendant can be readily immersed in a liquid. The bend contains some coloured liquid, and in a tube which connects the two limbs is a stop-cock."

Illustrated in Ganot 1890,284; dates from Crawforth 1988, 8.

1874 UGP143 THERMOMETER - MAXIMUM

MAXIMUM GRIFFIN, LONDON.

B 365x68x23. Fourth ¼ 19 C. G.

Mahogany base; broken horizontal mercury glass thermometer; cracked white scale 40-150°; 2 hanging rings; bend in thermometer tube just above bulb.

3721 UGP373 THERMOPILE

ELLIOTT BROS. LONDON No336

BD 98; PvMnH 195; ConeL 111, D 33-60. Acquired 1879.

Lead weighted brass expanding stand to pivot; on this, ebonite disc with ring on top for thermopile; two cones.

The base has two screw electric contacts, which are connected by spiralled wires to contacts on the sides of the ebonite disc; the thermopile has 7x8 contact points, and the ring mount has brass sleeves at each side for brass cylinder caps (one remains) or brass and copper cones (two remain).

It is assumed that this is "Noe's Thermopile" listed in Curtis 1861 as acquired in October 1879.

A similar instrument (not showing the external wires) is illustrated in Elliott 1895,133.

1870 UGP139 THERMOSCOPE(?)

Unsigned

BD 79; BusD 31; H 167. Mid to late 19 C. G.

Turned brass base; glass U-tube with glass bulbs on top ends, one close to the base; hook at centre of base; one bulb has nipple on top, other is fully spherical.

Looks like "Ether Thermoscope" in Griffin 1910,483.

0188 UGP068 THUNDER HOUSE

ELLIOTT BROS. 30 STRAND LONDON

B 266x158x40; H 688; SpD 24. 1858-1861. AR.

Mahogany base and single (gable) wall with brass conductor rod, ending in a sphere on top.

"Mahogany Model, called 'Thunder House', to explain the use of metallic rods as a protection to buildings from the effects of lightning, and also to show the superiority of the pointed over the rounded surface, as a quiet and slow conductor of electricity."

- Elliott 1856a,12, Curtis 1861,87.

1918 UGP187 TONGS

Unsigned

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L 260; Hs 330x30x16. Mid to late 19 C. G.

Turned mahogany handle; oxidised brass arms, one fixed to handle other moves on pivot; square housing at end.

A metal spring, part missing and snapped off, held the arms apart; at the end of the moving arm is a pivot which holds two sides of the housing; the other two sides are fixed at the end of the handle arm.

It is uncertain what square-section item the tongs were made to hold.

0157 UGP036 TUNING FORK - ELECTROMAGNETIC

Yeates & Son Dublin CAST STEEL

B 772x174x32; H 174. 1861-1878. R.

Large tuning fork mounted on mahogany base; electro-magnetic coil vibrator set between fork ends.

"Large tuning fork kept vibrating by an electro-magnet, with silk coil." - Curtis 1861,56 - entry added between 1861 and 1878.

1916 UGP185 TUNING FORK - LISSAJOUS

HARVEY & PEAK LONDON

B 252x121x19; H 420. 1884-1909. F.

Marble base; mahogany support; white metal fork C 128; moving clamped weights and disc (D19) mirrors on prongs.

Dates from Downing 1988,57.

3717 UGP369 TUNING FORK ON RESONANCE BOX

W. LADD & Co LONDON DO256

Bx 307x180x94; H 390; FkMxW 60, De 21.

Acquired 1882. R.

Boxwood box with one open end and mahogany veneer on sides; metal fork screws into turned wood boss.

The veneer is chipped on the edges of the open side.

Curtis 1861,57 records this as acquired in April 1882 for £3.

1528 UGP115 VACUUM APPARATUS

GRIFFIN SARDINIA ST LONDON

B 509x328x72; VD 290; H 582. 1899-1905. A.

Clément and Désormes apparatus for ratio of two specific heats of a gas; mahogany base; glass; iron stop-cock.

Base, on four feet; has turned mahogany pillar at one side; on top of this is an iron support to the neck of the large glass vacuum vessel with the strong stop-cock above; latter has a spanner to turn it; away from the support is tube with a side arm for a manometer and a small brass stop-cock at the end.

Illustrated in Griffin 1910,436; dates from Anderson 1990, 34.

1475 UGP086 VACUUM APPARATUS

Unsigned

B 248x247x40; H 592; CyD 97; VD 94. Pre 1861. R.

Mahogany base; tall brass cylinder, closed top, stop-cock at bottom; two glass sphere vessels on side arms.

"Pouillet's apparatus for absorbing vapours in vacuo" - Curtis 1861,53; appears to be a form of freeze-drying apparatus, which might correspond with this description.

2524 UGP230 VAPOUR PRESSURE APPARATUS

ELLIOTT BROS. LONDON.

B 356x204x26; H 665; SrD 57. Fourth ¼ 19 C. G.

Wood base and H-frame; glass U-tube, funnel on top of one side, sphere and stop-cocks on other; boxwood scales.

The long arm, with the small conical funnel on top, has a scale 0-40cm; the horizontal limb at the bottom has a central stop-cock; the shorter arm has a scale 0-20cm, and has a stop-cock, a sphere, and then another stop-cock with a small funnel on top; presumably liquid can be introduced into the sphere and its effect on the mercury or spirit levels in the two vertical tubes studied.

2887 UGP294 VAPOUR PRESSURE APPARATUS

A. GALLENGKAMP & CO LTD 19 & 21 SUN STREET FINSBURY LONDON E.C.

B 448x268x51; H 1053. Early 20 C. G.

Teak base and vertical support for barometer tube 0-770 mm in bung with U-shaped copper heating tube; glass water jacket and mercury siphon missing.

"The instrument consists of a barometer tube, graduated in millimetres, and surrounded by a water-bath, which may be heated to any desired temperature by means of a steam coil mounted on solid teakwood stand." - details from Gallenkamp 1930,159, which gives further information, particularly about the missing mercury siphon arrangement.

Anderson 1990,31 indicates that the Company became Limited between 1900 and 19021.

2858 UGP278 VAPOUR PRESSURE APPARATUS

A. GALLENGKAMP & CO LTD 19 & 21 SUN STREET FINSBURY LONDON E.C.

B 278x246x35; H 970. Early 20 C. G.

Teak base and vertical support for glass U-tube, one end closed and calibrated 25-40cc; copper U-heating tube.

The glass tube has a bulb at the closed end above the calibrations "C.C."; the taller arm ends with a small funnel; the tube sits above a bung which supported a missing glass cylinder jacket containing water, heated using the copper tube.

Anderson 1990,31 indicates that the Company became Limited between 1900 and 1902.

1472 UGP126 VAPOUR PRESSURE APPARATUS

YEATES & SON Dublin

B 334x231x28; H 1000. Acquired 1880.

Mahogany base and support; iron trough for mercury; places for four barometer tubes (gone) with metre scale.

Latter in centre of frame, cut off at 85mm; adjustable table at side; manometer tubes behind.

Date assumes this corresponds to "4 barometer tubes (1880)" noted as addition to Curtis 1861,36.

3715 UGP367 VIBRATING ROD FOR LISSAJOUS FIGURES

Attributed to Yeates & Son [label painted over]

BD 124; PvH 137; RdL 302. Mid to late 19 C. G.

Black painted fluted cast-iron base; tapering brass pillar to pivot; clamp for rod in two parts at right-angles.

The clamp is a wing nut screw; the rod ends in a whitened bulb, looking like an egg (D7) in an egg cup; the base has been painted, and this has covered a small paper label reminiscent of the scroll signature on Yeates & Son instruments.

The firm has made other such instruments - see 0804 UDP070, 1812 MAY295, 3389 NMC020; see also the entry for the Kaleidophone 0803 UDP069.

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2563 UGP263 VOLTMETER

VOLTS N.C.S. No. 21975 NALDER BROS. & THOMPSON

B 158x155x42; H 195; HsD 88. 1900-1909. R.

Mahogany base and arched vertical frame; brass glazed cylinder housing; white scale 0-3; two level screws; two brass contacts on base and two more below cylinder housing.

Firm listed in 1900, Crawforth 1988,18; and in 1909, Anderson 1990,58.

2855 UGP275 VOLTMETER - ELECTROSTATIC

AYRTON & MATHERS PATENT ELECTROSTATIC VOLTMETER No.889 R.W. PAUL LONDON

Hs 160x157x146. 1891-1919. F.

Brass housing, curved front; white arc scale 100-250.

Glazed panel in housing to see scale; hinged bar at side leads to ebonite block with two ebonite-coated contacts; the bar is secured to the housing with a brass knurled screw.

Dates from Cattermole 1987,98-104.

0175 UGP054 VOLTMETER - MULTICELLULAR

LORD KELVIN'S PATENTS MULTICELLULAR VOLT METER No 1584 JAMES WHITE, GLASGOW & LONDON

H 327; SD 200; HsH 233. 1892-1900. R.

Brass housing; torsion suspension for needle.

Silvered disc with paper scale (0-160) on arc of disc; thick glass cover; three adjustable feet.

Instrument described and illustrated in White 1898,39-44.

Kelvin was raised to the peerage in 1892, Smith 1989,799; firm became Kelvin & James White in 1900, Bryden 1972,59.

2863 UGP283 VOLTMETER - RECORDING

HOLDEN RECORDING VOLTMETER (PATENT) No.138 J. PITKIN MAKER LONDON

B 398x247; Hs 314x208x160; DrD 92, L 143.

Mid to late 19 C. G.

Iron base; oxidised brass glazed housing; brass drum.

Brass plate on base with brass recording mechanism and fittings; two terminals on the base connect to the ends of a U-shaped bar, across the ends of which is a thin wire; at the centre of the bar is a pivoted mechanism for the white-metal pen to the horizontal recording drum.

There is no obvious way for the pen to be moved, which suggests a missing part, presumably responding to the length of the heated wire.

Downing 1988,103 gives dates 1858-1949 for the firm of James Pitkin.

1875 UGP144 WATER HAMMER

Unsigned

L 301,405; MxD 50,48. Mid to late 19 C. G.

Two; glass; spherical bulb and figure-of-eight bulb; both with straight glass tubes attached.

Labelled "B 39" "Philosophical water-hammer, two" in Galway 1902,9.

2498 UGP204 WATER JACKET

GRIFFIN SARDINIA STREET LONDON W.C.

OD 179; ID 126; H 268. 1899-1905. A.

Copper double cylinder; brass tap at bottom, two inlets on top; closed below; plus other copper heat vessels.

One of the top inlets on the jacket is a tube, the other has a screw cap with a central hole; jacket presumably used for calorimeter experiments.

The other vessels include a cylinder with a closed bottom and a top rim (H178,CyD119,MxD165); a closed cylinder (D108, H219) - white metal inlet and outlet pipes and stop-cocks, and a glass side tube for liquid level; and a cylinder (D58,L290) rounded on both ends with four pipes.

Dates from Anderson 1990,34.

1530 UGP119 WEIGHTS

YEATES, 2., Grafton Street, DUBLIN

C 127x75x29. 1843-1858. G.

Mahogany case only with nine rectangular indents, five still lined with green velvet, and groove for tweezers.

Indents rather crudely carved; lid now detached; closed with two hooks and eyes.

Since Samuel usually signed his first name, this is assumed to be George Yeates; dates from Morrison-Low 1989,139.

1471 UGP077 WHIRLING TABLE

W.M. Stiles, London

MxL 1455; WhsD 407&153; H 348. 1830-1866. R.

Mahogany frame; large and two small pulley wheels, whirl dumb bell or two vertical/horizontal weights systems.

Leathers connect large wheel to the small with a choice of two sizes of groove diameters; wood and brass handle; whirling tables (724x57x22) have central box wood scales 13-2 and 2-13; one has a dumb bell on a brass wire with a small diameter black sphere (D23) and a larger diameter (D45) ivory sphere; others have brass system which allows weights running on parallel brass bars to connect to vertical weights frame (1861).

"Whirling wheel with 3 slides and 16 weights" Curtis 1861,33; Downing 1988,128 gives dates 1840-1866.

Allen Simpson, Bull SIS No.39,1993,25 provides information about William Mason Stiles (1786-1871), a subcontractor to W. & S. Jones, who married Sarah Burn in 1808 and had sons, Mason, Richard, James, Alfred and Charles. He was at 29 Seward Street, off Goswell Road, Clerkenwell, London between 1830 and 1846, and 70 Ossulston Street between 1851 and 1866.

2518 UGP224 WHISTLE - GALTON

SPILLER LONDON

MnL 78; MxD 11.5. Late 19 early 20 C. G.

Brass; outer cylinder sleeve divided 0-9 revolves along scale 0-14; demonstrates limit of audibility; outer sleeve has "OFF" on opposite side to the signature.

Also another model of the same instrument, unsigned and without the micrometer screw, but with a screw which rises right up to the lip.

Name from Kohl 1911,445; Downing 1988,126 lists a George Spiller from 1882 into this Century.

1930 UGP199 WIND CHEST

Made by Yeates & Son Dublin

Sp 260&163; Bx 202x102x62; H 133. Mid to late 19 C. G.

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Cast iron base; four decorated feet; mahogany box; pull-out stops below bosses; brass air tubes and stop-cocks. Feet have gold leaf patterns on black back of base; large (D19) and small (D8) brass air tubes at back of box; stop-cocks on top of box attached to brass bracket which also holds air tubes; turned mahogany bosses to hold organ pipes.

2922 UGP330 X-RAY TUBE

Unsigned

L 305&293; MxD 71&72. Late 19 early 20 C. G.

Two; glass; central sphere; tubes both sides; angled metal plate; ring and spherical concave electrodes.

1924 UGP193 XYLOPHONE

Unsigned

L 362; H 80; MxW 177. Late 19 C. G.

Boxwood frame with closed bottom and sloping interior for 15 white metal notes, including three Cs.

Two red lines around frame; mahogany stick (L722), with leather-wrapped end, could be for striking this, though it seems a bit much for this purpose!

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

ULSTER MUSEUM - ULS

Botanic Gardens

Belfast BT9 5AB

Telephone 01232-668251

3913 ULS010 ABACUS

Unsigned

Fr 268x188x32. Acquired 1838. D.

Boxwood frame; brass corner supports; 10 rows of white and red ceramic beads; 10 on rows 1-6,8,9, 4 on 7,10; Russian. Label underneath records that this Russian Abacus was "Presented by Geo. Ferguson Esq 1838".

3912 ULS009 ABACUS

Unsigned

Fr 227x118x21. Acquired 1843. D.

Dark brown fruitwood[?]; in two sections; 13 rows of five wood beads, and 13 rows of two wood beads; Chinese.

Label underneath records that this Chinese Abacus was: "Presented by GORDON A. THOMPSON, ESQ. 1843".

3709 ULS002 ASTROLABE - MARINER

Unsigned

D 192; W 14-17. Late 16 C. G.

Bronze; wheel type with base ballast; found in the wreck of the Spanish Armada galleass "Girona" in 1968.

Anderson 1972,18 reports that that the Girona broke up on rocks off Lacada Point, close to the Giant's Causeway, on 26:10:1588; this instrument has no discernible marks, and the limb scales are obliterated; its alidade, pin and ring are missing; it is in the form of a circle, with four spokes, a central hole, and a semi-circular weighted base merging with the circle and one of the spokes.

Described and illustrated in Flanagan 1988,63.

3860 ULS005 ASTROLABE - MARINER

Unsigned

D 176; W 9-20. Late 16 C. G.

Bronze; wheel type with base ballast; found in the wreck of the Spanish Armada galleass "Girona" in 1968.

Anderson 1972,20 records that the instrument is in nine pieces; it has no discernible marks and the scales of the limb are obliterated; he remarks: "Assuming that the instrument has eroded evenly, the additional ballast provided by the wedge-shaped cross-section is proportionally greater than for most other examples known."; the instrument differs from 3709 ULS002 in that the weighted base is not semicircular, but rather has concave sides from a spoke to the outer circle; the central indent does not go through the instrument, its edges are also concave, and not in the form of a small central ring.

Described and illustrated in Flanagan 1988,64.

4365 ULS052 BALANCE - FOLDING COIN

WARRANTED AND SOLD BY ROBT. NEILL, 25, High-street, Belfast

Folded 148x32x16. 1819-1840. A.

Mahogany hinged housing; brass; support at hinge for beam fulcrum; two pans; platform on one side; two sets of weights.

On one side of the beam is a slider which can be moved from 1-12; one of the circular weights, for a guinea, is marked "5 8" (5 pennyweights 8 grains) and can be divided into three parts (1, 1/2, 1/3); the sovereign weight marked "SO 5x2½" (5 pennyweights 2½ grains) can be divided into two parts (1,1/2); these rare compound weights were made by H. Bell & Co. of Prescott (Crawforth-Hitchins 1994,1828).

Dates from Burnett & Morrison-Low 1989,153.

4363 ULS050 BALANCE - FOLDING COIN

RICHARDSON[S] (in blue with crest)

Folded 136x38x18. Early to mid 19 C. R.

Brass on mahogany hinged housing; slider to 0 ½S S; two turns; pasted instructions.

"Current wts of gold coins. Guinea 5 dwt. 8 gr; Half Guinea 2 16; 7 shillings piece 1 18; Sovereign 5 2½; Half sovereign 2 13 1/8"; "Both turns towards the centre for a seven shillings piece. [Sm]all turn thrown back for half a guinea, and both turns back for a guinea with the slide at the cypher. The turns for a half sovereign same as a half guinea with the slide at ½S; -- and the turns for a sovereign same as a guinea with the slide at S. These balances are as accurate as the best of scales, more expeditious, portable, and not as liable to be out of order; they may be tried with scaled weights for the satisfaction of those who refuse to take money by them. Before you [shut] the box put the slide to the cypher and turn up the scale." Crawforth 1979,101, records that Richardson's balances were made by Stephen Haughton & Son, dates p.153.

4364 ULS051 BALANCE - FOLDING COIN

A. WILKINSON, KIRKBY, Near LIVERPOOL

Folded 133x24x14 1781-1785. R.

Brass on mahogany hinged housing; hinged frame turn can be placed forward or back; slider 0-12; pasted instructions.

"The turn at the end for a guinea; to the centre for half a guinea; and the flide at the cypher, where it ftops; every ftop nearer the centre, is a farthing above the currency; the divifions the other way are a penny each for light gold - Thefe balances are as accurate as the beft of fcales, more expeditious, portable, and not fo liable to be out of order. Price Where you want to weigh quick, put the flide a farthing or two above weight, for fafety; and what gold will not draw, may be tried afterwards with the flide at the cypher. Thefe balances may be tried with fealed weights at any time, for the fatiffaction of fuch as refufe to take money by them: [If] they vary they are foon brought to by the flide. Keep the machine (when open) as level as you can, left you break the centre of the beam. Before you fhut the box, put up the flide."

There are two more, similar, balances, with no surviving signature, folded 132x25x18 and 132x27x16.

Anthony Wilkinson was assessed for land tax at Kirkby between 1781 and 1785, Crawforth 1979,167.

4366 ULS053 BALANCE - FOLDING COIN

A. WILKINSON Ormſkirk, (Late of Kirkby) Near Liverpool

Folded 129x19x10. 1786-1801. R.

Similar to 4364 ULS051, but all brass, including base; pan missing; pasted instructions as for 4364.

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Plus two other similar all-brass balances, one with pan missing; missing all or most of their pasted instructions and signatures. Sizes folded 132x18x10, 120x18x10.

Anthony Wilkinson was assessed for Land Tax at Ormskirk from 1786-1801, Crawforth 1979,167.

4367 ULS054 BALANCE - FOLDING COIN

Unsigned

Folded 149x19x12. Late 18 C. G.

Brass base and frame, but with iron beam and two pans; pasted instructions missing; red velvet lining.

The lined base has two circular wooden frames for missing weights. (42-1909)

4355 ULS042 BALANCE - COIN

Unsigned

BL 72; H 66. Late 18 early 19 C. G.

Hollowed-out wood base with widening pillar at one side to fulcrum for bent metal pan/counterweight bar.

The counterweight end of the bar looks like an old rough nail, with a small disc end; beyond the fulcrum, the bar bends (a little more than a right-angle), and narrows, before bending again (a little less than a right-angle) to the flattened disc-shaped pan.

Robert Heslip (personal communication) notes that the balance is to weigh a half guinea, suggesting a date before the introduction of the sovereign in 1817.

4368 ULS055 BALANCE - ROCKER COIN

HARRISON

L 98. c1828. R.

Brass; short base with supports to fulcrum; counter-weight one side, frames for sovereign and half on other.

Crawforth 1979,33 records: "So it would seem that scales for the sovereign and half sovereign only made their appearance soon after the introduction of those coins [1817]. By 1828, Samuel Harrison was already advertising his 'Improved Sovereign Balance' which was of the simple 'rocker' type....with slots to gauge the thickness and diameter of the coins."

There are two more similar unsigned rocker balances (L95 and L105), the latter with a black covered case (108x18x20), and a "PATENT" label but no further details.

4442 ULS063 BALANCE - EQUAL ARM

DC [Daniel Crosby]

BmL 257; PsD 63. 1753-1804. R.

Dark iron beam, shears and pointer; elliptical box ends; brass pans.

On top of the shears, below a tassel, are double rings with a central pin.

Daniel Crosby (w1753, d1785) and his son, also Daniel (w1785-1804), both worked at 36 Pill Lane, Dublin, and stamped their pans "DC"; further details of the Crosbys are given by Diana Crawforth-Hitchins in *Equilibrium* 1994,1760-1764.

4441 ULS062 BALANCE - EQUAL ARM

SD [with a crown mark above]

BmL 249; PsD 60. Early 18 C. R.

Iron beam, shears and pointer; swan neck ends; brass pans.

Diana Crawforth-Hitchins, *Equilibrium*, 1994,1767, records that the pans of a scale by William Archdall from Skinner Row in Dublin bore the initials SD surmounted by a crown; she suggests he was working in Dublin around 1730 (Archdall was working c1702 and died in 1751).

4354 ULS041 BALANCE - EQUAL ARM

Ephraim Hand Scale maker Liveing att ye Signe of the hand and Scales in pill Lane Dublin [Trade Label]

BmL 159; PasD 63; CL 259, MxW 101. c1725. PC.

Iron beam, shears and pointer; tassel; swan-neck ends; brass pans; nine coin weights; shaped fruit wood(?) case.

Inside the lid of the case is a trade card, and two (later?) pasted-on tables of weights and values: wt. gr. To pafs for l. s. D.; The Piece that weighs 18 09 4 00 00; The Piece that weighs 09 05 2 00 00; The Piece that weighs 04 15 1 00 00; The Piece that weighs 02 08 0 10 00; The Piece that weighs 01 03 0 05 00; dwt. gr. ??; QUadruple-Piftole to weigh 17 8 0; pass for 3l. 14s.; Doublon-Piftole 8 16 0; Piftole to weigh 4 8 0; Half-Piftole 2 4 0; Quarter-Piftole 1 2 0; Moydore at 30s. 6 22 0; Half-Moydore 3 11 0; Quarter-Moydore 1 17½ 0.

Robert Heslip (personal communication) notes: "It has nine full weights associated, all referring to the 1709 proclamation. There are also three fractional weights in grains. My date of c.1725 is based on the fact that the label gives a weight of 17dwt 8grs for the four-pistole pieces (1712), and does give the weights for the new Portuguese coins (proclamation of 1725)."

Diana Crawforth-Hitchins (personal communication) notes that the trade card in the box was derived from those of one of three London makers: Samuel Neale, working 1644-1690, Henry Neale, working 1686-1695, or Western Gowers, working 1690-1707; in London, after 1700, the younger makers developed a round section beam (as here) rather than square sectioned and chamfered; another change in London in about 1730 was from fruit wood boxes (as here) to mahogany; between about 1720 to 1730 the linings changed from apple green silk or velvet to darker green baize wool linings (as here); the weights were probably made by Vincent Kidder.

The Hand scale and box are illustrated by Crawforth-Hitchins 1994,1801, where she notes that the beam in the case is not original, being substantially shorter than the space allowed for it in the box. The list of coins would have been useful only until 1737, so Hand would have been working before that date.

A similar but smaller balance to that of Hand, with no case, has beam length 136, and pans diameter 54.

4358 ULS045 BALANCE - EQUAL ARM

Deze Gewigte werden Gemaakt en Verkogt, te Amfterdam by Hk. LINDERMAN en ZOON

BmL 87; PasD 34; C 109x56x22. c1770-1785. PC.

Iron beam, shears and pointer; swan neck ends; hinged case with four brass weights; deep brass pans.

For weighing diamonds (Diana Crawforth-Hitchins, personal communication); carat weights labelled 32, 16, 4, 2; coloured trade card on lid of case: "Op de Nieuwendyk het veertiende huys van den Dam, en op de Zaal boven de Bewurs"; the top of the case is decorated with a simplified form of the arms depicted in the trade card (Amsterdam), and is fastened with two curved hooks.

Hendrick Linderman lived from 1719-1785 and his son Jan from 1745-1806 (Diana Crawforth-Hitchins).

4443 ULS064 BALANCE - EQUAL ARM

Unsigned

BmL 118; PsD 40; CL 126, W 54. 18 C. G.

Black iron beam, shears and pointer; swan ends; black and white tassel; brass pans; elliptical tin case.

The case is lined with green tweed below and white silk in the lid; it contains a tapering brass weight with a stamp of a four-legged animal and "5 8".

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4362 ULS049 BALANCE - EQUAL ARM

Unsigned

BmL 115; PasD 38; C 132x58x14. Late 18 C. R.

Iron beam, shears and pointer; red tassel; swan-neck ends; flat brass pans; oval tin case, green tweed lining.

One of the pans is marked "1413"; in the box is a wooden block, with red cover and silk lining, for two (missing) circular weights.

This arrangements dates the balance to after 1774 and the great recoinage of guineas and half guineas (Diana Crawforth-Hitchins, personal communication).

4361 ULS048 BALANCE - EQUAL ARM

Unsigned

BL 145; PasD 66; C 179x85x39. Mid 19 C. PC.

Iron beam, shears and pointer; red tassel; swan-neck ends; glass pans; oak case with purple velvet lining.

Glass pans were used in apothecary scales; aniline dyes, which produce mauves, violets and purples, were invented in 1853 (Diana Crawforth-Hitchins, personal communication).

4360 ULS047 BALANCE - EQUAL ARM

Unsigned

BL 139; PasD 63; C 171x85x30. Mid 18 C. D.

Iron beam, shears and pointer; swan-neck ends; brass pans; oak case with red velvet lining; two weights.

A hand-written note in the case reads: "Ireland George II 1727-1760 Coin weight 1751...Grainger collection".

4369 ULS056 BALANCE - STEELYARD

Unsigned

BL 331, D 19-20; MxD 34. 18 C. G.

Turned wood beam with knob on end; brass sleeve with shackle hook and two rings; brass and lead conical poise.

Two roman number scales, on opposite sides of beam: IVXXX XXX IIXX IIIVX XII and IIX IIIIV IV III.

This steelyard is very similar to one illustrated in Crawforth 1984, 11 (Fig.1), which is described as a French trader's steelyard; like this one, it has two weight ranges using the alternative suspension loops on opposite sides of the beam - and is thus called the turn-over type.

Names of parts from Crawforth 1984, 78.

3919 ULS016 BALANCE - STEELYARD

Unsigned

L c495. Late 16 C. R.

Bronze; shaft with one end decorated, and two short side arms; from Spanish Armada "La Trinidad Valencera".

The decorated end is bifurcated, and has a dot pattern; there are three diamond-shaped suspension holes; and the short side arms are perpendicular to the shaft near these holes; the long shaft has a diamond cross-section.

There is turned lead and copper weight (H c170, D c95), with an ellipsoid centre, necked base and top, and circular surround to the suspension hole, from the same vessel.

Also a brass pan (D c210), probably used with a steelyard but found on another Armada vessel - "Santa Maria de la Rosa".

3916 ULS013 COMPASS

Unsigned

D 104. Late 16 C. R.

Turned wood base and central pin (bent) only; found in wreck of Spanish Armada "La Trinidad Valencera".

A compass card would have been placed on the flat disc base, and the pin would have held the magnetised compass needle. Described and illustrated in Flanagan 1988, 63

3921 ULS018 COMPENDIUM FRAGMENT(?)

Unsigned

D c37. Late 16 C. PC.

Gilt bronze disc; central hole plus three more nearer edge; concentric divisions; from Spanish Armada "Girona".

The disc has a raised edge; several letters and numbers can be seen (including "V S", "I S", "D O", "6 7 8[?]" between the concentric rings, but the instrument is so corroded that no coherent pattern can be identified; it may be part of an astronomical compendium, and indeed has similarities with the back of a lunar dial rotating volvelle as seen on a pocket horological compendium by Vdalrico Schniepp, dated 1566, offered by Christies 26:9:91, Lot 138; details there report that about 50 instruments by Ulrich Schniepp (FL 1545-1588) have been recorded, usually marked in German or Latin, although that on offer is marked in Italian; the date would correspond with the Armada, the "Girona" foundering on 26:10:1588.

Date of break up of the "Girona" from Anderson 1972, 18.

4498 ULS066 DIAL - ALTITUDE RING

H[?] HANCOCK

D 54. 1828-1837. R.

Brass; central groove for slide with pin hole; months on the outside, and hours on the inside.

The sequence of month and other letters on one side of the groove is O N D [Oct-Nov-Dec] W S M[?] W A M I [Apr-May-June] S; and on the other S I A S [Jul-Aug-Sep] I F M [Jan-Feb-Mar]; inside are hours 1-6 and 4-12.

Clifton 1995, 123 lists Hannah Hancock in Sheffield from 1828-1837.

4499 ULS067 DIAL - ALTITUDE RING

[Ha]ncock

D 51. 1822-1837. R.

Brass; central groove for copper slide with pin hole; months on the outside, and hours on the inside.

The sequence of month and other letters on one side of the groove is A M I [Apr-May-Jun] O N D [Oct-Nov-Dec] S H I A S [Jul-Aug-Sep] I F M [Jan-Feb-Mar]; inside are hours 1-6 and 6-12.

As this is in the collection with 4498 ULS066, it seems likely that it also is by Hannah Hancock of Sheffield, or possibly by her husband William, who worked from 1822-1825, Clifton 1995, 123.

4500 ULS068 DIAL - ALTITUDE RING

PROCTOR

D 50. Late 18 early 19 C. R.

Brass; central groove, but slider missing; one side of ring cracked; months on outside, hours inside.

The sequence of month and other letters on one side is O N D [Oct-Nov-Dec] M H S A M I [Apr-May-Jun]; and on the other I F M [Jan-Feb-Mar] I A S [Jul-Aug-Sep]; inside are hours 1-6 and 6-12.

Clifton 1995, 224 lists several Proctors in Sheffield between 1774 and 1834.

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3930 ULS027 DIAL - HELIOCHRONOMETER

G.J. GIBBS INVENTIT PILKINGTON & GIBBS LTD PRESTON

BD 163; H 270; DisD 228,206,124. Early 20 C. G.

Brass; base and circular cup for angled lower disc; on this, hour disc with sight and target, plus small disc.

The disc on, and a little smaller than, the base disc is marked with hours VII-XII-VII at its edge; one perpendicular vane has two holes in it, and the other a central line; the smallest disc is marked with the months and at its edge is a small arc attached to the base, divided 0-30(-31) for the days.

Daniel 1986,27 reports that this mechanical equinoctial dial was invented by Gibbs in 1902, being of the type termed a heliochronometer, compensating for the equation of time automatically; by setting the month disc against the day scale, a cam adjusts the upper perpendicular pinhole vane (the gnomon) for the value of the equation of time; the dial plate is then turned until the sun is directly in line with the two vanes, causing a spot of light to be projected on to the centre line of the lower vane; mean time is then read off the scale fixed to the rim of the dial.

See also heliochronometer entry 4488 CIL001.

4371 ULS058 DIAL - COMPASS

Unsigned

C 80x79x23. Early 19 C. G.

Hinged mahogany case; brass; ring with hours IIII-XII -VIII; arc for folding gnomon; pin for compass needle.

Gnomon angle c49.7°; the needle is held on an arc running from hours V to VII, with leaf decoration, and has its other support at hour XII; the edge of the gnomon also has leaf decoration; the dial sits above a circular indent in the base for a missing compass card and needle; only the pin remains; there is an equivalent indent in the lid of the case.

3936 ULS033 DIAL - HORIZONTAL PEDESTAL

JOHN BOYLE. Lat. 54°.45'.

W 210. Mid 19 C. G.

Slate; octagonal; three sets of concentric circles; hours 8-12-4 between outer two; divided ½,¼,5 mins; no gnomon.

There is a central rectangular hole for the missing gnomon; the divisions are outside the hours on the outer circles; lines go from the hour marks towards the point of the gnomon, stopping at an inner circle; the back of the dial is not flat and has numbers: "1 2 3" engraved - perhaps as a trial.

3937 ULS034 DIAL - HORIZONTAL PEDESTAL

THOS.. FITZPATRICKS DIAL A.D. SEPT. 9 1825 Lat. 54°.

W 290. 1825. S.

Slate; octagonal; central compass design; hours IV-XII-VIII between outer concentric circles; no gnomon.

The engraver seems to have made a mistake, leaving out the "Z" in "FITZPATRICK", which he then added above the "TP"; the central hatched compass design, which has sixteen points, is surrounded by poorly drawn concentric circles with hatching between them; outside these are the divisions of the hours into eighths, and outside again the hours themselves; beyond these is a pattern of semi-circles; "N W S E" are marked on the relevant corners of the octagon; and "LON 7°. 14.W" is engraved between "N" and "E"; the central rectangular hole for the missing gnomon is enlarged by the chipping off of a rounded piece from the slate on one side.

3928 ULS025 DIAL - HORIZONTAL PEDESTAL

Edward Gernon Esq 1711

175x175. 1711. S.

Bronze; square; hours IIII-XII-VIII within concentric circles, divided below into eighths; curved gnomon insert.

The gnomon angle is about 54°30' - suggesting that it was made for the Belfast district (54°35'N); between the signature and the point of the gnomon is engraved a scene of a standing man (who appears to be smoking a long pipe, and holding a cylinder), a dove with an olive branch, and a tree; there are four holes at the corners of the dial for fixing it to a base.

4497 ULS065 DIAL - HORIZONTAL PEDESTAL

MADE BY JAME [sic] KANE FOR MR WILLIAM BEATTY Lat 54° 2'

c650x400. Mid 19 C. G.

Slate; rectangular; hours IV-XII-VIII on top; below this is a drawing of an elaborate five-story house.

The signature is in very large lettering around three edges of the dial; there is some floral decoration, but the basic dial is otherwise plain, divided to three minutes; the dramatic house underneath has three roof turrets; the dial has a large chip broken off (part of the house on the bottom left); a previous crack on the upper part has been repaired; the gnomon is missing.

3939 ULS036 DIAL - HORIZONTAL PEDESTAL

LATITUDE 54 30 I.W.G. MALCOM 1830

204x204. 1830. S.

Slate; square; remains of solid metal gnomon; radiating lines from gnomon point to hours IIII-XII-VIII.

The only other decorations are four identical devices on the corners, which look rather like balloon aircraft with circular balloons (the upper larger arc plain, the lower hatched) with a hanging basket below.

4439 ULS060 DIAL - HORIZONTAL PEDESTAL

Made by RICHARD MELVIN. For Latitude 51°20 North September 4..A.D. 1851

782x750. 1851. S.

Square slate; large central dial; four corner dials - Bombay, Rome, New York, Channel Isles; no gnomons; cracked.

The large central dial has a compass in the centre; further out are divisions for hours, half-hours, quarter-hours, and five minute intervals; outside are hours IV-XII-VIII; the smaller dials are similar, but with roman hours, and inscriptions, e.g. "Night Latitude 6°17' East" (for Bombay); between the dials are geometrical patterns and other inscriptions, but the dial is worn and these are difficult to identify.

Information about Richard Melvin or Melville is given in Clarke 1989,210-216.

3932 ULS029 DIAL - HORIZONTAL PEDESTAL

MADE BY DANIEL NISDEAL FOR E. HULL ANNO. 1827

190x186x15. 1827. S.

Slate; hours 4-12-8 in concentric circles, divided below into half hours by lines and quarters by dots; no gnomon.

The thick slate is damaged on one corner; "E H" is inscribed near one of the two holes for the missing gnomon; there are four holes in the corners for fixing to a support.

3938 ULS035 DIAL - HORIZONTAL PEDESTAL

Jas Philips Derraghy A*D* 1800 LAT 54.38

W 454. 1800. S.

Slate; octagonal; finely and elaborately engraved; hours IV-XII-VIII; central compass design; no gnomon.

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The central compass has sixteen points, with eight directions marked; outside this are rows of concentric circles, cut off for the signature on the corner opposite the hour XII; "TOO SLOW" and "TOO FAST", each engraved twice, have day dates and then the months engraved beyond; then the hour "XII" is marked for different places - from "Moghal; Conception..." to "Siam. Peking"; beyond this are half and quarter hour divisions, labelled outside "60 45 30 15", then the large hours themselves, with a degree scale beyond them 60-0-90-0-60"; the signature has a dove and olive branch above it, and foliate designs around; the octagon corners have small decorations - a ship, an anchor, the moon, etc.
This is a very fine large and professionally engraved dial in fine condition, noting some chipping on two corners.

3941 ULS038 DIAL - HORIZONTAL PEDESTAL

54.45 For James Reily of Carrickfergus 1765 [Makers - Belfast Pottery]

Hs 175x173x42; DI 128x128. 1765 S. G.

Black wood housing for white ceramic tile with black marking; hours IIII-XII-VIII in concentric circles.

The hours are on the outside; inside lines radiate from the hours to one end of the missing gnomon, with shorter lines for half and quarter hours; just inside the hours are five minute divisions.

Robert Heslip reports that this was made by Belfast Pottery.

3933 ULS030 DIAL - HORIZONTAL PEDESTAL

JAMES THOMPSON 1802 For Lat. 54d. 25m. North.

L 383; W 326. 1802. S.

Slate; octagon with two sides extended to make a heptagon; compass with 32 points; hours IIII-XII-VIII.

The signature, with a fleur-de-lys, is in the point made by the extended sides above the octagon; the large compass is on the other side of the dial, with overlapping triangles to the 32 marked points; below the compass is the word: "Elavation" [sic]; the hours are engraved around the octagon, and are divided at the outside edge into half and quarter hours, with dots for five minute divisions; there is no gnomon.

3934 ULS031 DIAL - HORIZONTAL PEDESTAL

Unsigned

D 127. Mid 19 C. G.

Slate, crudely cut circle; three sets of concentric lines, with hours IIII-XII-VIII between outer sets; no gnomon.

Hours divided into quarters below; central hole for missing gnomon, and two more for fixing to base; possibly a rough trial piece or made by a youngster.

4370 ULS057 DIAL - UNIVERSAL EQUINOCTIAL RING

Unsigned

OD 118. Mid 18 C. G.

Brass; outer ring divided 10-80°; verso 0-90 (inclined); inner I-XII hours (x2); pierced bridge; iron suspension piece.

The meridian and hour rings should pivot, but appear stuck; a pin-hole gnomon slides over a calendar scale on the rotating bridge: "I F M A M I" on one side, and "I A S O N D" on the other; the verso has a declination scale 20-0-20.

3929 ULS026 DIAL - UNIVERSAL EQUINOCTIAL RING

Unsigned

OD 99; ID 76. Late 18 C. G.

Brass; outer ring divided 10-80° and "S" 20-0-20 "N"; verso 10-90; hour ring III-XII-XI; pierced bridge.

The meridian and hour rings should pivot, but appear to be stuck; a pin-hole gnomon slides over a calendar scale on the rotating bridge: "D I F M A M I" on one side, and: "I I A S O N D" on the other; the verso has a declination scale: "N" 20-0-20 "S".

3935 ULS032 DIAL - VERTICAL

MADE to the four-ern STAR in the C..BEAR or Plou[gh] [w]hofe Righ[t] 204°11½ Declin 50 42'N LAT. 54°24½ N Long 23°3 2/3[?] made for Lat. 54°24' north

D 141. Early 19 C. G.

Crudely cut slate; hours outside 2-12-11; no gnomon.

One half of the dial is marked: "MORNING" (hours 11-1) and the other: "EVENING" (hours 2-11); poorly made dial with much chipping; irregular central hole for missing gnomon.

3940 ULS037 DIAL - VERTICAL

JAMES THOMPSON HIS SOUTH DIAL FOR LAT 54°25' MADE 1801

MxW 304. 1801. S.

Slate; irregular shape - small half circle and large arc; signature above horizontal line; hours VI-XII-VI.

Lines are engraved from the hours to one end of the gnomon (now missing); they are divided on the outside into halves and quarters; the outside edge of the dial is very uneven - either it was never finished or was subject to substantial battering, yet the surface, though crudely engraved, is well preserved; as an example of the poor engraving, the word "SOUTH" has the "SO" on one line and the "UTH" on another.

3914 ULS011 DIVIDERS - NAVIGATIONAL

Unsigned

L 98-133. Late 16 C. R.

Brass/bronze; four sets; straight legs end in a half-circle and hinge; from Spanish Armada "Girona", sunk in 1588.

One of the half circles of the hinge goes through a hole in the other; all are damaged to some degree, one is substantially embedded in concretion, and only one hinge works (partly).

Described and illustrated in Flanagan 1988,64-5.

3915 ULS012 DIVIDERS - NAVIGATIONAL

Unsigned

L 120. Late 16 C. R.

Brass/bronze; straight legs end in half circle and hinge; from Spanish Armada "La Trinidad Valencera".

One of the half circles goes through a hole in the other; the upper part of each leg is decorated with motifs in the form of the letter "M"; there is a small projection on each leg near the bronze hinge rivet, missing from the pairs of dividers found on the Girona (3914 ULS011); this set is in good condition, and still fully functional.

Described and illustrated in Flanagan 1988,64.

3920 ULS017 GUNNER'S RULE

Unsigned

LoP c90. Late 16 C. R.

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Wood; linear rule; in three pieces; divisions seen 50-120; from the Spanish Armada "La Trinidad Valencera"; for measuring the correct calibre of shot for each gun.
Illustrated and described in Flanagan 1988,82.

3924 ULS021 HYDROMETER - SIKES

SIKES HYDROMETER T O BUSS 33 LAYSTALL STREET LONDON

L 135; SrD 31; C 157x108x59. 1929-1934. A.

Gilt brass; central sphere; top scale 0-10; nine disc weights; glass sample cylinder; mercury thermometer.

The signature is on an ivory plate on top of the hinged mahogany case, which is lined with purple velvet; the hydrometer and weights (10-90) are numbered "143"; the set includes a glass cylinder (H134,D37) with a pouring lip; and an ivory-backed glass/mercury thermometer, scale (115x18) 30-110°.

Dates from Crawforth 1988,5.

3927 ULS024 HYDROMETER - SIKES

SIKES'S HYDROMETER LOFTUS MAKER TO THE REVENUE 6 BEAUFOY TERRACE LONDON

L 173; SrD 40; C 204x98x52. 1858-1868. A.

Gilt brass; scale 0-10; seven disc weights; thermometer.

The signature is on an ivory plaque on top of the hinged mahogany case, which has a boxwood beading frame on top; the plaque has lion and unicorn arms above it; the lining of the case is gone; the hydrometer is signed: "No9228 SIKES LOFTUS London"; the weights are inscribed: "W.L. 9228", 10 and 50 are missing, the rest going from 20-90, plus a stem cap weight; the thermometer scale 30-90° is now yellow.

Dates from Crawforth 1988,11.

3910 ULS007 LAMP - MICROSCOPE

WATSON & SONS. 313. HIGH HOLBORN. LONDON.

BD 103; H 272; CyD 60, H 38; PhBD 55, H 75.

1881-1902. FA.

Brass and oxidised brass; ring base and pillar; clamped sleeve raises cylinder holding oil phial and chimney.

Beside the cylinder is a turned pillar leading to a ball joint for a bull's eye condensing lens; the glass phial, sitting in the brass cylinder, has a filling vent on its top side, but the stopper is missing; above the phial is the wick assembly with a side window (51x26) having runners for a missing slide; and with an oxidised brass chimney above.

John Wilson reports that this lamp was owned by Joseph Wright FGS, 1834-1923, palaeontologist.

Dates from Downing 1988,138 and Anderson 1990,88-9.

4440 ULS061 LANTERN - DOUBLE

CARPENTER & WESTLEY 24 REGENT ST LONDON

C 546x492x407. Mid to late 19 C. G.

Matched pair of russian iron lanterns with bent chimneys and circular phantasmagoria varying aperture system; case.

The lanterns have brass fittings; the dissolving view system is in the form of a large disc covering both objectives, with a crescent slit which, on revolving, increases the aperture of one lantern while reducing that of the other.

The instrument, in its original case, is in pristine condition with oil lamps, concave mirrors and tallow burners; the lid of the case has three stuck-on printed papers; one has an illustration of the apparatus with "CARPENTER & WESTLEY'S DISSOLVING VIEW Phantasmagoria LANTERNS WITH IMPROVED SOLAR LAMPS"; another is a list of prices for lanterns and slides supplied by "CARPENTER & WESTLEY, OPTICIANS, 24, REGENT-STREET, WATERLOO-PLACE, LONDON." - the lanterns are priced from £2 12 6 to £11 11 0; the third printed paper gives "GENERAL INSTRUCTIONS".

Clifton 1995,49 lists Mary Carpenter & William Westley at this address from 1838-1914+.

4080 ULS039 LANTERN - UNIAL

[Booklet] RILEY BROTHERS LTD HEAD OFFICE 55&57 Godwin Street, Bradford, Yorkshire. [Lantern] PATENT No 2459.

L 451; H 213; W 135; C 376x227x160. 1915. P.

Russian iron and brass; two doors with blue windows.

The housing over the lamp compartment is rounded, and the cowl is gone; inside is a modern replacement electric lamp on a sliding mahogany plate; there is a door with a rounded top at the back of the lantern, and two doors with small brass-framed circular windows, having hinged flaps, at the sides; the brass lens housing has a gap to insert the slides, and is focused by double-knob rack and pinion; there is an oxidised brass lens flap on front of the optical system, which is inscribed "7in. R D No 230677" - corresponding to 1894; but the lantern itself has a plate with "PATENT No2459" on it, relating to date 1915; the lantern is housed in a wood case, which contains a booklet "THE LANTERN Operator's Guide EIGHTH EDITION PUBLISHED BY RILEY BROTHERS".

4081 ULS040 LANTERN - UNIAL

Unsigned

L 480; H 273. Early 20 C. G.

Russian iron and brass; rectangular housing for lamp; knob to adjust separation of front and back optics.

The cowl has been replaced by a brass lid; the housing contains a modern electric lamp; inside the back of the housing is a concave mirror; two doors at the sides have brass-bound orange windows; a wood slide inserter fits between the brass lens housing near the lamp and the larger front lens system, which is moved by a knob on front; there is double knob rack and pinion focus of the front lens, which has an oxidised brass lens flap, but there is a modern silver-metal lens system added in front.

3925 ULS022 LANTERN - UNIAL

Unsigned

B 430x230; H 300; Hs 255x242x180; MnL 500.

Late 19 early 20 C. G.

Mahogany base and housing; lined inside with tin, and with tin top; brass bound optics; rack and pinion focus.

There are two hinged doors at the back of the housing, and one on each of the two sides, the latter with blue glass disc windows (D38); between the housing and the optics is a slide compartment with a spring to hold a slide in place; the optics are in a housing of two brass cylinders (D104&62), with a double knob rack and pinion on the smaller one, which has a hinged lens flap over the objective lens.

A collection of photographic apparatus has not been included in the inventory - but it includes an enlarger in the form of a lantern with a bellows and camera lens in an oak housing: "BRITISH MADE THE Coronet ENLARGER WRAY LONDON No73786 'SUPAR'" (early 20 C); also various cameras, including a bellows camera with a hand-engraved ivory plaque: "A.R. Hogg Belfast 25520", and another bellows camera on a heavy mahogany tripod stand: "MEAGHER MANUFACTURERS 21 SOUTH-AMPTON ROW HIGH HOLBORN London, W.C.".

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3931 ULS028 LINEN PROVER

J. Casartelli & Son, Manchester 5075 PAT. SEPT. 20-10

H 60; W 85; P 61x61; C 101x79x74. Patent 1910.

Curved brass frame; horizontal screw thread and metal runners for magnifier above revolving triple scale.

The instrument is numbered 901879; a brass square is with the instrument, marked "1. Cotton Eng."; the black fabric-covered wood case is lined with purple silk and velvet, and contains a type-written paper:

"WILLIAM CARTER & SON, 25 Donegall Street, BELFAST SOLE AGENTS FOR IRELAND".

3909 ULS006 MICROSCOPE - COMPOUND

J. SWIFT & SON LONDON 12532 WF

Sp 141&163; MnH 375; SaD 115. c 1907. R.

Brass and oxidised brass; two feet and curved back to pivot for limb; tube bracket in dove-tail; mechanical stage.

Fine focus is by a knob on top of the limb, divided .1 - .5 MM; coarse focus by double knob rack and pinion, which moves the tube bracket in the dove-tail; below the limb is a cylinder with a sliding sleeve for the revolving plane and concave mirror; under the circular mechanical stage, which is divided 10-360°, is an elaborate condensing system, with a divided knob 0-315; triple nose piece (but now with only one objective); the body tube has a slide to insert either a single large aperture, or a wheel of six small apertures.

The microscope is similar to the petrological microscope by Swift & Son, dated 1908, in Turner 1989,192, which is numbered 13088 Hy.

Firm became Swift & Son in 1878, and Swift & Son Ltd around 1910, Turner 1989,184-201, Anderson 1990,83.

3911 ULS008 MICROSCOPE - COMPOUND

Unsigned

Sp 151&132; MnH 244; Sa 77x60; C 287x192x148.

Late 19 C. G.

Iron and brass; straight-legged tripod to limb pinion; fine focus knob; bracket to tube; push coarse focus.

Limb has cylinder below with sliding sleeve for rotating plane and concave mirror; rectangular stage with two copper slide clips, and with inserted wheel of four apertures; the limb leads to a sleeve into which the tube fits; there are two objectives in brass cylinders, a "1 Inch", and a "1/6 Inch", the latter having three screw-in lenses; in a mahogany case with drawer of slides, and wood samples 1884-5.

4079 ULS001 MICROSCOPE - COMPOUND, MUSEUM

W. WATSON & SONS LTD, MANUFACTURERS 313, HIGH HOLBORN LONDON No1. WATERHOUSE

MUSEUM MICROSCOPE 62411

H 364; CB 289x403x13, H 353. 1902-1914. R.

Glazed mahogany case; brass tube; 12-slide carousel.

Case, stained black, glazed on three sides, rises to a point near the eyepiece of the microscope; iron stand has disc base and a swan-neck bracket for tube; focus fixed; rotating mirror to give light to slides on carousel through a hole on each mount; knob at side of mounting rotates the carousel; two white-metal clips secure each slide to carousel.

Came from Botany Department Q.U.B.; almost identical to 2367 NMD072.

Firm had this address between 1902 and 1914, Anderson 1990,88-89.

4372 ULS059 MORSE SIGNAL MEMENTO

[Morse signal, with hand written translation] pm to malta your

76x64x15. Mid to late 19 C. G.

Red leather-bound hinged case holds gold glazed frame for morse signal scan and wire bent in three right-angles.

The attractive decorated case looks like a small book and has a shaped brass clasp; the inside top is lined with red velvet; the combination appears to be a memento of the receiving of a morse signal, in which either the content or the technology has been memorable; the bent wire could perhaps be the moving part of the galvanometer which was used to receive the signal.

3711 ULS004 SAND GLASS

Unsigned

No measurements available. Late 18 C. G.

Octagonal wood top and bottom joined by six bars; brown sand in glass orbs joined with leather.

On display at the Armagh Observatory Exhibition in Dublin, 1991.

3926 ULS023 SHAFT SPEED INDICATOR

BUTLER'S PATENT SPEED INDICATOR BELFAST

H c600. Late 19 C. D.

Cast iron base and dumb-bell-shaped housing with side wheel for strap to engine; glazed scale on top 20-60.

The shallow glazed cylinder housing for the silvered scale on top has a brass frame for the glass; the reading needle pivots from the centre, which has a small brass framed blue centre; as well as the signature, the scale disc includes a crown.

A note with the indicator records that it was invented c1870 by John Butler, a Belfast engineer and millwright, for measuring the speed of steam engines.

3710 ULS003 SINKING BOWL TIMER

Unsigned

No measurements available. Bronze age.

Metal hemi-spherical bowl with a hole in the bottom; in the Armagh Observatory Exhibition Dublin, 1991.

Butler 1990,10 records that such bowls were placed in water and allowed to sink, in order to measure small intervals of time. Examples have been found in the bogs of Ireland, but similar timers are found to this day in Algeria, where they are used to measure the period for which a farmer may use water from an irrigation canal.

3917 ULS014 SOUNDING LEAD

Unsigned

L 216. Late 16 C. R.

Slightly tapering lead weight; round top with diamond hole; from Spanish Armada "Girona", sunk 26:10:1588.

The base has a circular depression for filling with tallow to take samples from the seabed.

Described and illustrated in Flanagan 1988,65.

3918 ULS015 SOUNDING LEAD

Unsigned

L 189. Late 16 C. R.

Conical lead weight with circular hole on narrow top; from Spanish Armada "Girona", sunk 26:10:1588.

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This lead differs from 3917 ULS014 in being triangular in section, rather than the more cylindrical shape of the other lead; this also has a cupped depression in its base for tallow. Illustrated and described in Flanagan 1988,65.

3922 ULS019 TELESCOPE - REFRACTING

Dollond London Day or Night

L 533-1020; MxD 62; LeD 39 (1½"). Mid 19 C. G.

Brass; leather cover on main tube; plus one draw; sliding objective cylinder shield; eyepiece lens flap.

3923 ULS020 TELESCOPE - REFRACTING

Unsigned

L 627; D 44-51; LeD 38 (1½"). Early 19 C. G.

Slightly tapering mahogany tube; brass ends - that at objective being longer (for push-focus but now stuck?)

The brass cylindrical tube holding the objective lens is slimmer than the brass ring at the end of the main tube, and looks as though it used to be able to slide into this, as would be necessary to focus the telescope - though it is now stuck; around the main tube is pasted a white paper with hand-writing, this cannot now be read, but appears to end with "R.M. Cole Capt R.N."

4359 ULS046 WEIGHTS - COIN

Unsigned

C 147x86x33. Second quarter 17 C. S.

Decorated mahogany case for missing beam balance, holds 10 square weights on top, and fifteen more in drawer.

The pans of the beam balance seem to have been triangular in shape; the box contains also a quartz crystal with imbedded gold nugget; the weights have illustrations of coins, some with dates: 1605, 1611, 1622 - Spanish (Ferdinand and Isabella), Dutch, Arabic, etc; the case has green velvet lining in poor shape; its top is secured with two right-angled hooks, and has a carved man on a horse, other figures, roses, shamrocks, lines, etc; inside is an engraved lion and plant designs.

Diana Crawford-Hitchins notes (personal communication) that the double-layered box is probably continental, but it might be early English, even by Samuel Neale in his early years.

4356 ULS043 WEIGHTS - NESTED

Unsigned

BD 46; MW 72; H 27. Second half 14 C. PC.

Bronze; widening shallow cylindrical box with hinged lid, decorated with white dots; no inside weights remain.

Found, containing a coin hoard, at the Cistercian Monastery, Greyabbey, Co. Down, around 1812 and described by W.A. Seaby in the *Ulster Journal of Archaeology* (21,1958,pp.91-97).

R.J. Holtman (personal communication) suggests a date at the second half of the fourteenth century, possibly earlier; he describes it as: "round inside, angular outside with six tapering buttresses, the cast work was then put in a lathe to finish the inside. The outside has two double jaws protruding at each side"; decoration is of "dots-in-a-circle on the lid, forming an outer ring, an inner ring and a cross within the inner ring; dots-in-a-circle on the hinge and fastening part of the lid and on the rim of the cup-weight..."

4357 ULS044 WEIGHTS - NESTED

16 P [scissors] S

BD 24; Mxw 56; H 35. 17-18 C. G.

Bronze; tapered shallow cylinder box with hinged lid, clasp and handle; five nested and one disc weights

Another somewhat similar box, in poorer condition, (BD29,MxD52,H36) is missing its handle, and has only one (stuck) inner weight; it has no signature, but is engraved with a curly-haired head.

A third set, again with no handle, (BD30,MxW48,H30), has no signature, and is missing all of its weights. There is also a set of three nested weights with no box (BD 22,25,29, ToD 28,36,43).

**INSTRUMENTS BY THE GRUBB FIRM OF DUBLIN
LOCATED OUTSIDE IRELAND**

The firm of astronomical instrument makers founded by Thomas Grubb (1800-1878) and continued by his son (Sir) Howard Grubb (1844-1931) was by far the most successful internationally of the many Irish instrument making firms. Both Thomas and Howard became Fellows of the Royal Society (in 1864 and 1883), in spite of the fact that neither was a graduate.

This listing attempts to identify as many Grubb instruments as possible located outside Ireland, both those which are preserved and those no longer extant, but about which some written evidence is available. (The main Inventory listings record Grubb instruments located within Ireland.) While this listing is far from complete, it still gives a good indication of the success of the Dublin firm.

Instruments by Thomas Grubb are listed first, then those few signed Grubb & Son, and then those by Howard, who joined his father in 1865, and took over the business in 1868 (Burnett 1989,94). The firm moved to St Albans in England in 1922, and joined with the firm set up by (Sir) Charles Parsons (of the Birr family from Co. Offaly) to become Grubb, Parsons & Co in 1925 (Herries Davies in Mollan 1985,60-61). As most instruments are signed simply "Grubb", it is in some cases difficult to distinguish between father and son.

This Inventory incorporates the details of Grubb instruments contained in lists made by John Burnett and Ian Glass, and also those detailed in various Grubb catalogues - see the Bibliography under Burnett 1989, Glass 1990, and Grubb.

Abbreviations used in the listing:

MHSO - Museum of the History of Science, Oxford

RMS - Royal Museum of Scotland, Edinburgh

SAAO - South African Astronomical Observatory, Cape Town

SM - Science Museum, London

Whipple - Whipple Museum, Cambridge

Christies, Philips, Sothebys, etc. refer to well-known auction houses, and the dates to auction dates.

The instruments are listed in alphabetical order of the name of the instrument and then by date. Signatures in brackets have not been seen.

Ex0584 LENS

(Grubb Patent Aplanatic Photo Lens 1857)

No measurements available. 1857. S.

Information from SM computer: SM 1913-249; regd papers 13/1374; presented by T.H. Court; location NK.

Ex0318 LENS SYSTEM

No.476 [Thomas] Grubb PATENT

No measurements available. Third ¼ 19 C. G.

Brass-bound; rack and pinion focus with knurled knob; Christie 14:9:89, part of Lot 141, with J.H. Dallmeyer & R. & J. Beck Ltd lenses.

Ex0310 MAGNETOMETERS

(Thomas Grubb Dublin)

MsL 305-381. 1839. R.

Declinometers, Horizontal Force, and Vertical Force Magnetometers; for 40 Magnetic Observatories; Burnett 1989,106.

Those from St Helena Observatory are in SM 1876-796; illustrated in McConnell 1986,33.

The SM computer gives more information; date given 1840; presented by Meteorological Office; negatives 517-9/81, 144/64, location B/T26/FR/C5f.

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Ex0058 MICROSCOPE - COMPOUND

Grubb Dublin (Thomas Grubb)

No measurements available. c1860. PC.

Mahogany base; brass; circular mechanical stage; rack and pinion focus; angled mirror on arc; MHSO 67-65.

Very advanced for its time - made from first principles; transferred from the Cavendish Laboratory 1967; bell-shaped trunnion supports on base hold tapering shaft with triangular insert raised by double knob rack and pinion; fine focus knob on top of bar limb to the tube, which is angled with a mirror at the angle, and a triple nose piece; the mechanical stage which is turned by a knob below, has a slide spring; the angled mirror is in a housing which revolves in a grooved arc so that stage illumination can take place from below or above.

This is an example of Thomas Grubb's "New Table Microscope", described in the Journal of the Royal Dublin Society 3,1860,85-88; it is also referred to in the Proceedings of the Royal Irish Academy, Vol.5, 296-7, referring to a Meeting on 10:5:1852; in this, Grubb remarked that over recent years improvements had been made in the optical part of the instrument, but corresponding improvements had not been made in the mechanical part; among the mechanical innovations in this microscope, he mounted "a suitable illuminator on a vertical circular sector (nearly a complete circumference) concentric with the focus; this part of the arrangement enables me to throw the beam on the object at all angles of incidence, whether from beneath...or from above...I have the power of observing and restoring any position at pleasure." In addition "the stage of the microscope is made

to revolve around the optical axis, and in a plane perpendicular to it...By this arrangement the beam of light may be thrown on an object in any azimuth, and a suitable graduation of the stage enables the observer to register and restore its position at any time."

This instrument is illustrated in Burnett 1989,102.

Ex0472 MICROSCOPE - COMPOUND

(Thomas Grubb Dublin)

B 217x176; H 415. Third ¼ 19 C. G.

Mahogany base; brass; circular mechanical stage; rack and pinion focus; angled mirror on arc; SM 1921-204.

"Grubb sector microscope purchased by Sir Frank Crisp from Sir Howard Grubb in the 1880s"; since it is of the type described by Thomas Grubb in 1860, it is attributed to him; bell-shaped trunnion supports on base hold tapering shaft with triangular insert raised by double knob rack and pinion; fine focus knob on top of bar limb to the tube, which is straight and has one objective; the mechanical stage, which is turned by a knob below, has a slide spring; the silvered glass prism revolves in a grooved arc so that stage illumination can take place from below or above; it can be raised or lowered by a knob on the mount.

Listed on the computer: "Grubb Sector microscope, with one eyepiece, no objective"; Regd Papers 21/606 ScM; Presented by T.H. Court; Location B/T14/36B.

See "On a New Table Microscope", by Thomas Grubb, the Journal of the Royal Dublin Society, 3,1860,85-88.

Ex0508 MICROSCOPE - COMPOUND

(Unsigned - Attributed to Thomas Grubb)

H(-E) 403. 1860-1875. R.

Mahogany base; brass; circular mechanical stage; mirror mount on arc; Macleay Museum, Sydney, Australia.

Illustrated in Holland 1989,16 (but not there attributed to Thomas Grubb), the microscope is of the type detailed by Thomas Grubb in the Journal of the Royal Dublin Society 3,1860,85-88; it is described: "Rectangular wooden base with inset brass plate; bell-profile brackets supporting massive limb of brass and wood; stage and substage on dovetail mount on limb; lateral lever through wooden back of limb operates fine focus by raising or lowering stage mount; substage (missing) attached by rack and pinion to a block mounted to slide in an arc graduated 0 to 110 degrees to give oblique illumination below or above the stage; circular stage has side-attachment underneath, gearwork rotation, two milled discs operating on a series of leaves for lateral and back-and-forth adjustment, spring-mounted double clip to hold slides; bar limb construction, triangular-section beam operated by rack and pinion for coarse focus, surmounted by horizontally waisted bar to body tube; four screw adjustment for body and nosepiece assembly; quadruple nosepiece (sprung-mounted on central boss which is pulled down to rotate) with RMS threads and adaptors for smaller diameter Ross objectives; in wooden box."

The microscope is accompanied by a box with fifteen drawers of slides, and a drawer of accessories, including Ross lenses and an angled tube. Holland records: "The microscope is unusual in several respects and is possibly unique. The construction is exceedingly robust. The long lever fine focus acting on the stage is very novel. The graduated arc for the substage is designed to give oblique lighting below and above the stage...Given that this microscope is adapted for using Ross objectives of the early 1850s and that it uses a sliding mount in an arc rather than a swinging arm, it is possibly an early experiment in oblique illumination." He suggests dates 1860-75.

Ex0561 MICROSCOPE - COMPOUND

(H.T. GRUBB & Co. DUBLIN) ([Label] H.T. GRUBB. DUBLIN.)

No measurements available. Mid 19 C. R.

Mahogany base; brass; circular mechanical stage; rack and pinion focus; angled mirror on arc; RMS.

The former owner records that this microscope, purchased in 1991, has an original case, with an incomplete trade label, but it has room only for the optical tube, with no room for accessories; it does however have accessories: five objectives (three by A. Ross, one by Nachet, and one by A. Pritchard), four eyepieces, and, in addition to the substage prism assembly, an unusual oval framed bundle of glass plates for polarised light, the reverse side having a plano mirror; a substage plate is present, which slots into the base of the stage and accepts a parabolic condenser which is also present.

The instrument was purchased by the National Museums of Scotland in 1995.

The illumination system is described in the "Cantor Lectures" by John Mayall, London 1886, 75-76.

The reported H.T. Grubb signature has not been found elsewhere. Neither Thomas nor Howard Grubb seem to have used another initial. However, as this instrument is clearly an example of Thomas Grubb's sector microscope, it is listed with the Thomas Grubb instruments.

Ex0137 TELESCOPE - REFLECTING

(Thomas Grubb Dublin)

D 559 (22"); new mirror D 508 (20"). 1853. R.

Glasgow University; Ramage mirror; Aberdeen; reworked by Grubb 1847-51; Grubb mirror 1894; Burnett 1989,114.

Reworking of mirror 1847-51 paid for by Marquis of Breadalbane; became the "Breadalbane Telescope".

Glass 1990,3 notes: "Perhaps only the speculum-metal mirror was made by Thomas Grubb, although Howard Grubb in his correspondence showed that he believed the whole instrument to be due to his father. Still in use, 1912." He gives reference - Monthly Notices of the Royal Astronomical Society 72,278,1912.

Dreyer 1911,955 records the 20 inch silvered glass reflector [sic] by Grubb with spectrograph.

Ex0138 TELESCOPE - REFLECTING

(Thomas Grubb Dublin [with Howard Grubb])

D 1219 (48"). 1865-1868. R.

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Melbourne; Cassegrain; metal mirror; mounting moved to Mount Stromolo in 1954.

Illustrated in Grubb 1885,17, Grubb 1899,21, and Burnett 1989,96.

Burnett 1989,114 notes the moving of the mounting.

Dreyer 1911,960 records "The great Melbourne tele-scope", a Cassegrain reflector, equatorially mounted, of 4ft aperture, made by T. Grubb, which was erected in 1869, but very little used.

T.R. Robinson & T. Grubb, Philosophical Transactions of the Royal Society 1870,159,127 (l. Glass 1990,1).

Ex0134 TELESCOPE - REFRACTING

(Thomas Grubb Dublin)

D 338 (13.3"). 1834. R.

Mounting for E.J. Cooper Markree; Cauchoix Paris object glass; to Manila Observatory c1947.

Sold to the Jesuit Seminary at Aberdeen, Hong Kong, c1928; bombed 1941; then to Philippines; Burnett 1989,113.

John McConnell, of Moira, Co. Down, has been researching Markree instruments for some years - he gives 1944 for the bombing of the large refractor in Hong Kong, and agrees that the large lens is part of a solar telescope in Manila; the comet seeker still exists as a complete unit except for the lens.

Ex0135 TELESCOPE - REFRACTING

(Thomas Grubb Dublin)

D 170 (6.7"). 1838. R.

Royal Observatory, Greenwich; mounting only; Cauchoix Paris object glass; NMM 00/R.9; Burnett 1989,113.

Known as "Sheepshanks Equatorial"; Glass 1990,12 notes that the Cauchoix object glass had focal length 8'2".

Ex0136 TELESCOPE - REFRACTING

(Thomas Grubb Dublin)

D 152 (6"). 1840. R.

U.S. Military Academy, West Point; equatorial mounting only; Lerebours Paris object glass; Burnett 1989,113.

Glass 1990,12 gives the 1840 date, and focal length 8ft - he gives references: W.H.C. Bartlett, Transactions of the American Philosophical Society, New Series 9,191,1846; C. André & A. Angot, L'Astronomie Pratique et Les Observatoires en Europe et en Amérique, Paris, 1877.

Ex0350 TELESCOPE - REFRACTING

([Thomas] Grubb, Dublin)

L 910. "19th Century". PC.

Brass; mahogany folding tripod; mahogany case; Phillips 19:11:80/4:3:81, Lot 65/75.

"A 19th Century brass Reflecting Telescope by 'Grubb, Dublin', the tube 91cm. long, contained in a mahogany case, raised on a mahogany folding tripod."; assumed to be by Thomas Grubb.

Ex0553 SPECTROSCOPE - ASTRONOMICAL

(Grubb & Son Dublin)

W 395. 1865-1868. CT.

Oxidised and lacquered brass single-prism spectroscope, Christie 6:5:93, Lot 103A, £500-800, illustrated.

"A rare oxidised and lacquered brass astronomical spectroscope...with rack and pinion adjustment to telescope body tube, with vernier scale and micrometer adjustment on main mounting bracket arm, cylindrical drum prism housing, the eyepiece with adjustable cross hairs, secondary eyepiece with slit, micrometer adjustment and twin dust slides, in fitted mahogany case."

This spectroscope is illustrated in Grubb 1877,15-16 and later catalogues, and described as a: "one-prism Spectroscope in which the required motion is obtained with a screw, sector, and micrometer heads, similar in principle to those supplied to the Melbourne Government, Earl of Rosse, Dr. Huggins, Lord Lindsay, and Professor Pritchard, and intended for observations of great accuracy. Supplied with one compound Prism of five square inches of base. Price.....15 0 0".

Ex0057 SPECTROSCOPE - ASTRONOMICAL

(Grubb & Son, Dublin)

L 425; PmCD 192. c1870. R.

Six prism; glazed cylinder housing for automatic double prism train; Whipple 1064; illustrated Bennett 1984,8.

Part oxidised brass; aperture for incident light; no collimator; eyepiece rack and pinion focus; wavelength varied with knurled screw linked by rack and pinion to prism train; scale 10-0-55.

Automatic arrangement as described by Howard Grubb, Monthly Notices of the Royal Astronomical Society 31,1870-2,36-8, so, in spite of the unusual signature (Thomas retired 1868), it is unlikely to be pre-1870 as the arrangement is described as new; it may have belonged to Dr Huggins.

Better picture in Burnett 1989,99.

Ex0046 BASE LINE MEASURES

GRUBB DUBLIN 1874

One - 1230x180x145 (without end covers). 1874. S.

Eight; mahogany brass-bound casing; sliding doors; presented by Edinburgh Royal Observatory; RMS T.1984.95.

For Lord Lindsay (later Earl of Crawford)'s expedition to Mauritius in 1874 to observe the transit of Venus across the sun's disc.

Illustrated in Burnett 1989,99.

Ex0237 CHRONOGRAPH

(Howard Grubb Dublin)

CyD 235, L 813. Pre 1899. R.

Capetown; best controlled clock; two barrel register; for five hours' continuous work; seconds represented by spaces of 0.4".

Grubb's largest chronographs were supplied for Dunsink, Capetown, and Oxford Observatories; described and illustrated in Grubb 1903,18; Grubb 1899,22 lists only Dunsink and Capetown.

Ex0238 CHRONOGRAPH

(Howard Grubb Dublin)

CyD 235, L 813. 1899-1903. R.

Oxford; best controlled clock; two barrel register; for five hours' continuous work; seconds represented by spaces of 0.4".

Tony Simcock (PC 1992) records that the blueprints and drawings relating to this chronograph are dated 1897-99, and that it was for the Radcliffe Observatory (MS Radcliffe 55).

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Ex0152 CLOCK - REGULATOR

(Howard Grubb Dublin)

No measurements available. 1888. R.

Siderial clock; Rousdon Private Observatory, Devon; Observatory built in 1884 by Sir Cuttibert E. Peek.

Listed in Burnett 1989,115.

Ex0240 COELOSTAT

(Howard Grubb Dublin)

No measurements available. 1900. D.

To Spanish Government for Solar Eclipse, 1900; suitable for any latitude; type described in Grubb 1903,18.

"Specially designed for Eclipse and other work, and either adjustable for latitude, or made specially for any fixed latitude, supplied with clockwork of best form, and, if desired, with electrical control."

Glass 1990,11 gives place - Ebro, and reference: P. Ignacio Puig, El Observatorio del Ebro, 1928.

Ex0194 COELOSTAT

(Howard Grubb Dublin/St Albans)

D 381 (15"). Pre 1926. R.

Marine Observatory, Kobe, Japan; illustrated in Grubb-Parsons 1926b,24.

Ex0457 CORONAGRAPH

(Howard Grubb Dublin)

D 76(?) (3"). 1885. R.

Royal Observatory; Cape; South Africa; with wooden tube and speculum mirror; listed in Glass 1990,15.

Mentioned in Gill-Grubb correspondence, SAAO Archives; C.R. Woods was involved in the design.

Ex0246 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

D 3x8230 (27'), 1x13716 (45'). c1881. R.

Imperial and Royal Observatory, Vienna; three domes of 27' diameter; one steel dome of 45'.

The latter, carried on Howard's system of five rollers, covers the great 27" equatorial.

Illustrated in Grubb 1885,20 and 1903,22; described in "Engineering" for 1880 and 1881.

Ex0250 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

No measurements available. Pre 1885. R.

Great roof of Chapultepec, Mexico; Thomas Grubb's system, giving weight reduction of 1/400.

Grubb 1885,20.

Ex0248 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

No measurements available. Pre 1885. R.

Great roof of Dun Echt, Aberdeen; Thomas Grubb's system, giving weight reduction of 1/400.

Grubb 1885,20.

Ex0242 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

D 4572 (15"). Pre 1885. R.

Springfield Observatory, Gomersal; canvas covered; interior and exterior illustrated in Grubb 1885,22.

Ex0249 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

D 13106 (43'). Pre 1885. R.

In 43' great roof at Washington; Thomas Grubb's system giving weight reduction of 1/400.

Grubb 1885,20.

Ex0243 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

D 11278 (37'). 1885-1899. R.

Calton Hill, Edinburgh; papier-mâché; "recently erected" and illustrated in Grubb 1899,25.

Not in Grubb 1885; this is presumed to be the: "still more effective and rather cheaper arrangement lately devised by SIR HOWARD GRUBB, and adopted in the larger roof of the new National Observatory, Edinburgh, and at Beyrout, Syria. By this simple system the tractive force is reduced to about 1/700 part of the weight." This is contrasted with figures for the older system of triple rollers by Thomas Grubb giving 1/400 reduction, and for this single roller system.

Ex0245 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

D 9754 (32'). 1899. R.

Radcliffe Observatory, Oxford; papier-mâché; also hydraulic-powered rising floor.

Glass 1990,3, gives date 1902 and reference: Engineering 82,819,1906.

Tony Simcock (PC 1992) records that the documents relating to the dome are dated 1899 (MS Radcliffe 64).

Illustrated in Grubb 1903,22; also noted in Burnett 1989, 116.

Ex0244 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

No measurements available. Pre 1903. R.

Beyrout, Syria; more effective and cheaper single roller system to give 1/700 weight reduction.

Older system by Thomas Grubb, with triple rollers gave 1/400 reduction.

Figures to illustrate system in Grubb 1903,21.

Ex0241 DOME - ASTRONOMICAL

(Howard Grubb Dublin)

D 3048 (10'). 1885-1903. R.

Alt-azimuth Pavilion, Paisley Observatory; papier-mâché; illustrated Grubb 1903,20; not in Grubb 1885.

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Ex0426 ELEVATING FLOOR

(Howard Grubb Dublin)

Various sizes. Pre 1899. R.

Lick Observatory; Gesellschaft Urania Observatory, Berlin; Royal Observatory, Capetown; USA: etc.

"ELEVATING FLOORS FOR OBSERVATORIES. A Solution of the Troublesome Question of the Observing Chair. SIR HOWARD GRUBB desires to intimate that the principle of the Elevating Floor, which he designed specially for the Lick Observatory, and which has been adopted by the Trustees of that Institution, and since then by the Gesellschaft Urania Observatory of Berlin, and the more modern larger Observatories of the United States, and for the Royal Observatory, Capetown, is equally applicable to small as well as large Observatories, and that he is prepared to furnish designs for same applicable to any particular case." - three views are given of: "Sir H. Grubb's Lifting Floors as applied to a small Observatory of 20-feet diameter, and worked by a handle without hydraulic power." - lowest, mean and highest position. Illustrated in Grubb 1899,26.

Ex0257 EYEPIECE - MICROMETER

(Howard Grubb Dublin)

No measurements available. 1879. R.

Duplex; for Prof. Charles Pritchard of Savilian (University) Observatory, Oxford; to measure far-apart stars.

If the stars were too far apart to be brought into the field of an ordinary micrometer, a heliometer was used involving the use of a special telescope with a divided object glass, which was complicated and costly; this micrometer does the same at about 1/20 the price; it consists of plate of glass 2½" square ruled with 21 lines in one direction and two in the other; along one side a micrometer frame is mounted with a brass cap having two eyepieces in right-angled grooves.

Details from Grubb 1880b,365-6.

Ex0458 EYEPIECE - MICROMETER

(Howard Grubb Dublin)

No measurements available. Pre 1885. R.

Collurania-Teramo, Sicily; filar micrometer and some sort of camera on Cooke telescope.

Glass 1990,15.

Ex0045 EYEPIECE - MICROMETER

Grubb DUBLIN.

H 70; W 265; D 85. Telescope 1897. R.

Brass; rectangular body with eyepiece on one side, screw thread on other; two drum micrometers; RMS T.1984.22.

On the eyepiece side of the body are two glazed linear scales; this is the bifilar micrometer from the Grubb standard equatorial at Paisley (Grubb 1899,11 - see Ex0167) and came from the Paisley Astronomical Society.

Information from A. Morrison-Low - Photograph negative 8847.

Ex0201 HELIOMETER

(Howard Grubb Dublin)

No measurements available. c1878. R.

Bought by Lord Lindsay for observations of Juno and Mars and sold by him to Cape of Good Hope; Burnett 1989,114.

Ex0448 HELIOMETER

(Howard Grubb Dublin)

D 142 (5.6"). Pre 1884. R.

Royal Observatory, Brussels; special heliometers for transit of Venus; Cauchoix lens.

Glass 1990,14 gives reference: J.C. Houzeau, Annals de L'Observatoire Royal de Bruxelles, N.S.5,1884.

Ex0159 HELIOMETER

(Howard Grubb Dublin)

D 229 (9"). 1891. R.

Royal Observatory, Greenwich; "Photoheliograph"; listed in Burnett 1989,115.

Dreyer 1911,955 records a 9 inch photographic refractor by Grubb, presented by Sir H. Thompson, mounted on one stand with the 13, 26, and 28 inch refractors; a heliometer is a refracting telescope with a split objective lens; are the heliometer and the 9 inch refractor the same instrument?

Ex0196 HELIOSTAT

(Howard Grubb Dublin)

D 482 (19"). 1890. R.

Smithsonian Institution, Washington; large single mirror [up to 20" diameter] Heliostats, Grubb 1899,22.

Glass 1990,3-4 gives the 19in size: "The governor of the clock was soon replaced by one due to Warner & Swasey" - he gives references: H. Grubb, On a heliostat for the Smithsonian Institution, Scientific Proceedings of the Royal Dublin Society 6,1890,598; S.P Langley & C.G. Abbot, Annual Astrophysical Observations of the Smithsonian Institution 1,1900,45.

Illustrated in Grubb 1899,23.

Ex0634 HELIOSTAT

(Grubb Dublin No.4654)

No measurements available. Late 19 C. G.

"Heliostat, small type, clockwork driven", in the Physics Department, University of Adelaide, South Australia.

Historical Accessions Acquisition Number 85.207.

Listed in Runge 1986,22.

Ex0468 HELIOSTAT

(GRUBB DUBLIN)

No measurements available. Late 19 C. G.

In the Historical Collection of the School of Physics, University of Sydney; no further details available.

Information (26:3:90) from Julian Holland, Curator of Technology at the Macleay Museum of the University of Sydney, New South Wales, Australia, who gives a contact name, Dr L.R. Allen.

Ex0585 LENS

(Grubb Patent 2483)

No measurements available. Mid to late 19 C. G.

With a drop-front camera by Middlemiss; SM 1984-5199; camera also has a Dallmeyer lens No.37744.

Information from SM computer: presented by Patrick Bradshaw; location Kodak K10A.

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Ex0625 LENS

(Howard Grubb, Dublin, Aplanatic, 10x8. 5309) On case (Grubb Lens)
D 92; L 86; C 115x102. Late 19 C. G.
Photographic; rotating disc with apertures; lens cap; cylindrical leather case; RMS T.1967.X.23.
Apertures for work at f16, 24, 32, 48, 64;
Information from A. Morrison-Low.

Ex0451 LENS

(Howard Grubb Dublin)
D 127 (5"). c1898. R.
Kodaikanal, India; portrait lens, 36" focal length; mounted on Lerebours equatorial, 1850.
Glass 1990,14 gives reference: Kodaikanal and Madras Observatory Report for 1903.

Ex0455 MIRROR - SPECULUM METAL

(Howard Grubb Dublin)
D 76 (3"). Pre 1884. R.
Focal length 6ft; used in attempt to photograph solar corona from a mountain in Switzerland.
Glass 1990,15 gives reference: C.R. Woods 1884 (no further details); Observatory 7,376,1884.

Ex0253 OBSERVATORY FRAMEWORK

(Howard Grubb Dublin)
No measurements available. Pre 1885. R.
Complete iron framework, of stronger construction, for Cape Town Observatory; cast iron pillars.
Grubb 1885,21 - £400.

Ex0252 OBSERVATORY FRAMEWORK

(Howard Grubb Dublin)
No measurements available. Pre 1885. R.
Complete iron framework supplied for Constantinople, with Transit Room.
Type illustrated in Grubb 1885,21 - £180:0:0.

Ex0251 OBSERVATORY FRAMEWORK

(Howard Grubb Dublin)
No measurements available. Pre 1885. R.
Complete iron framework supplied for Durban Observatory, with Transit Room.
Type illustrated in Grubb 1885,21.

Ex0247 ROOF - OBSERVATORY

(Howard Grubb Dublin)
Various measurements. Pre 1885. R.
To Capetown, Chapultepec, Constantinople, Edinburgh, Natal, Tulse Hill, Vienna, and Yale.
Also to Armagh & Cork. Various forms "DOMES, DRUMS, SLIDING FLAT ROOFS AND TRANSIT ROOFS". Thomas Grubb's system for domes, giving a weight reduction of 1/400 "has been adopted in the great roofs at Dunsink, Dun Echt, the new forty-three feet roof at Washington, in all of the four observatory roofs for the New Imperial and Royal Observatory at Vienna (of which the largest is forty-five feet external diameter), and at the New Observatory of Chapultepec, Mexico."; Grubb 1885,20.
Grubb 1899,2 illustrates the "38-FEET REVOLVING ROOF AT THE NEW NATIONAL OBSERVATORY, EDINBURGH."

Ex0239 SIDEROSTAT

(Howard Grubb Dublin)
MiD 280 (11"). 1897. R.
Illustration of "Kodaikanal Observatory [Palani Hills, Madras, India] with Siderostat" in Grubb 1903,18
Address from Burnett 1899,116.
Glass 1990,8 gives size and date, and notes also "with 6-in lens" focal length 40ft; reference: Report on the Madras Observatory for the Year 1897-98.

Ex0423 SPECTROGRAPH - SOLAR

(Howard Grubb Dublin/St Albans)
"7m"; LeD 203 (8"). 1924. R.
7m solar spectrograph Pulkovo Observatory, Simeis, (Crimea), Russia; Burnett 1989,117.
Glass 1990,11 notes the 8" lens in the Solar Telescope (Coelostat), which he dates to 1923 - it was ordered before World War I, designed in collaboration with Dr Belopolsky; references: Engineering, July 18, 1924; & Grubb-Parsons Publication No.2, 1926.

Ex0193 SPECTROHELIOGRAPH

(Howard Grubb Dublin)
No measurements available.
Manchester; listed in early but not final draft of Burnett & Morrison-Low 1989.

Ex0082 SPECTROSCOPE

[Howard] Grubb Dublin 1871
L 600; W 420; H 400. 1871. S.
Three prism; automatic; on fixed equatorial mount for latitude of Dehra Dun in India; SM 1927-807.
Presumably the three prism spectroscopy, on the same principle as the Royal Dublin Society model, with prisms of 3½ square inches of base, mounted on an equatorial stand for solar observations, with slow motions in right ascension, declination, and clockwork, as supplied to the Royal Society for Observations in India. Price £60:0:0, noted in Grubb 1885,19; Dreyer 1911,960 records that the Observatory of the Indian Survey was at Dehra Dun.
The spectroscopy has a black metal equatorial mount, and a brass frame for the telescope and collimator; its three prisms adjust automatically for minimum deviation; the computer lists two boxes which were not seen in Blythe House (8:94) 19½"x8"x11" for equatorial mount and 23"x17"x8".

Ex0574 SPECTROSCOPE

(Howard Grubb Dublin)
No measurements available. c1877. R.
Spectroscopy "lately made for Dr. Crookes, F.R.S." recorded in Catalogue of 1877 Manchester Exhibition.

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The Catalogue of the Royal Jubilee Exhibition at Manchester in 1877 includes, in details of the exhibits by Howard Grubb, F.R.S., Rathmines, Dublin, "Large Half-compound Prism, intended for spectroscopy similar to that lately made for Dr. Crookes, F.R.S."

Ex0103 SPECTROSCOPE

(H. Grubb and Spencer & Son)

L 630. c1877. R.

Binocular; SM 1900-141; see details under Spencer Ex0104 in general out-of-Ireland section.

C.E. Burton, Proceedings of the Royal Irish Academy, 2, 1877, 42-45.

See also Burnett 1989, 94 & 110.

Ex0256 SPECTROSCOPE

(Howard Grubb Dublin)

No measurements available. Pre 1880. R.

Six prism; first to Prof. Young of America; then to others; parallel telescope and collimator.

With many improvements by Young; one motion of pinion head focuses both telescope and collimator simultaneously; two half and four entire prisms of 60° angle; as pencil of light travels through twice, it is equivalent to 10 prisms, though it can be reduced in a moment to 8, 6, 4, or 2 by altering position of last prism, to which is attached the prism of reflection for sending the ray back to the collimator; price £70:0:0 plus £12:0:0 for mounting.

Grubb 1885, 19; Grubb 1880b, 364.

Ex0148 SPECTROSCOPE

(Howard Grubb Dublin)

No measurements available. 1882. R.

Compound prism spectroscopy; for Dun Echt, Aberdeen-shire; Burnett 1989, 114.

Ex0255 SPECTROSCOPE

(Howard Grubb Dublin)

No measurements available. Pre 1885. R.

Two prism; supplied to Dr Huggins for stellar work; to Royal Observatory, Brussels; etc.

Intended principally for astronomical purposes, but equally applicable for laboratory purposes; supplied with two compound prisms of five square inches of base, and constructed on the automatic principle devised by the late T. Grubb F.R.S., giving accuracy of observation almost equal to a one prism spectroscopy, with the advantages of equal definition of the lines in all parts of the spectrum, and the full breadth of pencil used in all cases; £40:0:0; Grubb 1885, 18.

Ex0254 SPECTROSCOPE

(Howard Grubb Dublin)

No measurements available. Pre 1885. R.

One prism; to Melbourne, Dr Huggins, Earl of Crawford, Brussels, and Professor Pritchard.

Required motion obtained with a screw, sector, and micrometer head, intended for observations of great accuracy; supplied with one compound prism of five square inches of base, Price £25:0:00; to Melbourne Government and Royal Observatory, Brussels, also to Earl of Rosse; Grubb 1885, 18.

Ex0184 SPECTROSCOPE

(Howard Grubb Dublin)

No measurements available. c1900. R.

"Spectrograph and siderostat"; Kodaikanal Observatory, Palani Hills, Madras, India; Burnett 1989, 116.

Ex0175 SPECTROSCOPE

(Howard Grubb Dublin)

No measurements available. c1905. R.

Twelve prism; Cartuja, Granada, Spain; listed in Burnett 1989, 117.

Ex0140 TELESCOPE - REFLECTING

(Howard Grubb Dublin)

D 610 (24"). 1872. R.

Royal Observatory, Edinburgh; designed by Grubb & C.P. Smyth; installed 1873; again 1886; Burnett 1989, 114.

Advice on mirror obtained from Rev. Henry Cooper Key; telescope and dome unusable in 1873, returned to Grubb, and reinstalled in 1886; moved to Blackford Hill 1896.

Glass 1990, 2 notes that it was a 24" Newtonian reflector "Originally at Calton Hill Observatory. Later moved to Blackford Hill." and gives reference: Publications of the Astronomical Society of the Pacific 10, 69, 1898 (includes illustration)

Glass also refers to H.A. Brück & M.T. Brück, "The Peripatetic Astronomer - The Life of Charles Piazzi Smyth", Hilger, Bristol, 1988, which gives much detail about the instrument (especially pp167ff) and the dispute between Smyth and Grubb about its operation; it is noted on p170: "There have frequently been disagreements between scientists and the makers of their instruments, but the story of the Edinburgh equatorial was a major tragedy. Piazzi Smyth had waited 26 years for his great peripatetic telescope only to find a largely useless instrument in the observatory for his remaining 16 years in office. The disappointment from which he never quite recovered was all the greater as the telescope had promised to be a unique instrument of advanced design with a silver-on-glass mirror larger than any other in the United Kingdom. Apart from David Gill nobody had questioned the particular feature of movability which was to be one of the reasons for its ultimate failure. Howard Grubb and his engineers had also obviously under-estimated the complexity of their task."

Ex0142 TELESCOPE - REFLECTING

(Howard Grubb Dublin)

D 330 (13") 1874. R.

Dun Echt, Aberdeenshire, Newtonian/Cassegrain; metal and silver-glass mirrors; parts in RMS; Burnett 1989, 114.

Used by Lord Lindsay on Transit of Venus expedition to Mauritius; transferred to former Corporation of Edinburgh in 1896.

Ex0347 TELESCOPE - REFLECTING

(Supplied by Howard Grubb Dublin)

Scale 3/4" to 1'. c1876. R.

"Model of the Great Melbourne Reflector, completed by Messrs. Grubb & Son in 1868"; SM, 1876 Loan Collection.

"Diameter of great mirror, 48 inches. Focus, 30 feet 6 inches. Form, Cassegrainian. The ventilated tube formed of steel lattice bars."

The model was not found in the Museum in 8:1993, but a photograph remains 1876-1012, acquired from the School of Military

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Engineering in 1876, located in Blythe House B/T26C/2H/PP02/03.
No.1791 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877.

Ex0147 TELESCOPE - REFLECTING

(Howard Grubb Dublin)

D 610 (24"). 1881. R.

W.E. Wilson, Daramona, Co. Westmeath; remounted 1892; now at National Museums Merseyside; Burnett 1989,114.

Moved from Daramona to Mill Hill Observatory before going on to Liverpool.

Glass 1990,2 records: "Mounted originally on the stand of Wilson's 12-inch reflector. New mount purchased 1892. In use after 1929 at Mill Hill Observatory (University College, London). 10.5ft f.l." Reference - Journal of the History of Astronomy 19,146,1988.

Grubb 1899, back page, shows a photo of the Orion Nebula taken with this 24" reflector.

In "Astronomical and Physical Researches Made at Mr Wilson's Observatory, Daramona, Westmeath", 1900. Wilson records that a small observatory was built in the garden of Daramona in 1871 with a 12" equatorial reflecting telescope by Sir Howard Grubb. In 1881 he built a new and large observatory for which he obtained a 24" silver on glass mirror of 10 feet 6 inches focus from Grubb. This was erected on the old mounting, but it was not satisfactory, so Grubb remounted the 24" mirror in 1892, provided with his best form of driving clock and electrical control.

Grubb 1899,11 includes Mr Wilson as a recipient of one of his standard equatorials (he was not so listed in 1885). These were refracting telescopes, but Mr Wilson makes no mention of a refractor in his 1900 report, so perhaps it refers to the mounting of the 24" reflector?

Alan J. Bowden (PC 30:1:92) of the National Museums and Galleries of Merseyside reported that he was getting advice as to whether the 24" reflector "a massive instrument" could be displayed in the new Astronomy Gallery being developed there.

Holbrook 1992,146 lists the telescope in Liverpool Museum "Loan from University College London. (BAR11)."

Ex0427 TELESCOPE - REFLECTING

(Howard Grubb Dublin)

D 419 (16½"). c1887. R.

Poona College of Science Observatory, India; with 4" refractor; to 20" in 1896 - see Ex0168.

Glass 1990,4 notes that a 17" reflector / 8" refractor shown in the Manchester Exhibition c1887 was possibly made up only for the Exhibition, but the reflector could have become this 16½" at Poona; on page 3, he notes that it started life as a Newtonian, became a Cassegrain in 1894, and a 20" with a mirror by A.A. Common in 1896 - see separate entry, reflecting telescope Ex0168; Dreyer 1911,960 records this 16 inch silvered glass reflector by Grubb, with a 6 inch refractor by Cooke. Dreyer also records a 12 inch siderostat by Cooke with a 9 inch lens by Grubb; he notes that the Observatory was founded in 1888.

Glass 1990,4 gives reference: Observatory 11,438,1888.

Ex0168 TELESCOPE - REFLECTING

(Howard Grubb Dublin)

D 508 (20"). c1887-1896. R.

Maharaja Takhtasingji Observatory, Poona, India; Grubb mounting, spectrographs, etc., Burnett 1989,116.

"Mounting only: mirror by A.A. Common, Ealing, London. Cassegrain equatorial, with spectrographs, polarising prism and positional micrometer by Grubb".

Glass 1990,3 gives c1887 date (Burnett 1989,116 gives [1898-1907]) and notes: "F/33.5 Cassegrain. Started life as a 16½-inch Newtonian. Became a Cassegrain in 1894. In 1896 became a 20-inch with mirror by A.A. Common. Moved to Kodaikanal 1912 but installed only in 1951. Now in Leh, North India (1989)."; he gives references: R.K. Kochar, Indian Inst. Ap. Newsletter 5,6,1990; D.M. Salwi, Journal of the British Astronomical Association 98,189,1988; H.P. Hollis, Observatory 27, 245,1914; Observatory 11,438,1888.

See also entry for reflecting telescope - Ex0427.

Glass 1990,10 also notes that Grubb supplied an 8" lens to the Cooke 12" siderostat in Poona - reference Observatory 18,339,1895.

Ex0164 TELESCOPE - REFLECTING

(Howard Grubb Dublin)

D 915 (36"). 1895. R.

Lick Observatory, University of California; "Crossley reflector" by A.A. Common, refigured by Grubb.

Above details from Burnett 1989,116.

Glass 1990,1 notes: "Originally by Calver and commissioned by Common, this telescope was purchased by Crossley and later presented to Lick. Grubb re-figured mirror B in 1890 or 1891. This was the mirror used from 1896 on. 17.5 ft f.l."; Glass also notes the Grubb involvement in the designs for a 36" refractor at Lick, reference The Engineer 42,21,1886; other references: Observatory 22,135,1899 and 23,355,1900; Astrophysics Journal 16,121,1977; Grubb-Parsons Publication No.1,1926; Stone, R.P.S. 1979; Sky & Telescope 58,307, 1979.

The latter reference records that Andrew Ainslie Common (1841-1903) received the Gold Medal of the Royal Astronomical Society in 1884 for his photographs of nebulae.

The Catalogue of the Royal Jubilee Exhibition at Manchester 1887 refers to the exhibit by Howard Grubb of a "Glass case containing Design Model for Lick Observatory, California; all the motions worked by electricity."

Ex0422 TELESCOPE - REFLECTING

(Howard Grubb Dublin/St Albans)

D 1016 (40"). 1925. R.

Pulkovo Observatory, Simeis, Crimea, Russia, Burnett 1989,117; Glass 1990,1 notes also 32ft Dome.

Glass notes: "Finishing touches possibly by Grubb-Parsons.", and gives the references: Journal of Scientific Instruments 2,1,1924; Nature 113,550,1924; G. Shajn, Bulletin de L'Observatoire Central de Russie à Poulkova 10,450,1926; Glass also notes that the mechanical, but not optical, parts of a 41" refractor were completed by Grubb-Parsons for Poulkovo, but never installed - references: Sky & Telescope 50,370, 1975; Grubb-Parsons 1926a & 1926b.

Illustrated in Grubb-Parsons 1926b,27&28.

Ex0139 TELESCOPE - REFLECTING & REFRACTING

(Howard Grubb Dublin)

D 457 & 381 (18" & 15"). 1870. R.

Tulse Hill, London; Cassegrain reflector; metal mirror; purchased by Royal Society; Burnett 1989,114.

Lent to William Huggins; given to Solar Physics Laboratory, Cambridge, in 1910; the type is illustrated in Grubb 1899,16: "For the convenience of some who desire to use two Telescopes of different sizes, or different forms, SIR HOWARD GRUBB has constructed the above, or "Twin" form of Equatorial as used by Dr. Huggins and Dr. Roberts, and as exhibited in the late Manchester Exhibition. The motion of each Telescope is quite independent of the other."

Grubb 1899,16 gives reference to Engineering, December 16, 1887; see also King 1979,292.

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Glass 1990,4 notes that the telescopes were originally interchangeable, but were placed on the same mount in 1882; he notes also a drum-type roof, and that the telescopes were in Cambridge until 1954; with the references: H.C. King, *The History of the Telescope*, Charles Griffin & Co., 1955; F.J.M. Stratton, *Annual of the Solar Physics Observatory* Cambridge 1,1949.

It seems likely that the refractor in this twin was the Standard Equatorial (Dr. Huggins) noted in Grubb 1885, 8, which is thus not listed separately.

Dreyer 1911,956 records that in 1870 an equatorial mounting was mounted with a 15 inch refractor and a Cassegrain reflector of 18 inch aperture, both made by Grubb for the Royal Society, at Sir William Huggins's Observatory, Upper Tulse Hill, London.

The Catalogue of the Royal Jubilee Exhibition at Manchester gives details of Grubb's "New form of Twin Equatorial Telescope, as constructed for the observatory of Dr. W. Huggins, F.R.S., London", see Entry Ex0575.

Ex0150 TELESCOPE - REFLECTING & REFRACTING

(Howard Grubb Dublin)

D 508 (20"); D 178 (7") 1885. R.

Maghull, near Liverpool; 7" refractor on 20" mounting; Crowbridge, Sussex, 1890; SM 1936-231; Burnett 1989, 115 - bought (from Maghull) by Isaac Roberts.

Glass 1990,3 notes that the telescope had a focal length of 8.2ft, that it was moved to Crowborough in 1885, and to Norwich in 1930 - he gives references: Observatory 53,311,1930, and H.P. Hollis, Observatory 27,245,1914.

Grubb 1899,11 lists a standard equatorial for visual observations at Magull.

Dreyer 1911,956 records the 20" silvered glass reflector with a 7" refractor, used for photography of nebulae and clusters, 1890-1904, at Dr Isaac Robert's Observatory at Crowborough, Sussex. Entry Ex0575 gives details of the twin Reflecting and Refracting Telescope exhibited at the Manchester Royal Jubilee Exhibition in 1887 "as constructed for Mr. J. Roberts, F.R.A.S., Liverpool"; it is assumed that this is a duplicate of these telescopes, and not this actual pair, thus deserving a separate entry.

Grubb 1899,16 illustrates "The Twin Equatorial...as used by Dr. Roberts".

The Science Museum computer lists this as: "'Twin Equatorial' Telescope, 1885. Made by Sir Howard Grubb for Dr Isaac Roberts, F.R.S., consisting of a 20in Reflecting Telescope and a 7in Refracting Telescope (by Cooke) mounted together on one equatorial stand. With Grubb electric control gear, spectroscope, additional 20in mirror and other accessory pieces." Purchased for £100 from W.L.N. Bower, 1935 or 1936. Now mounted in the roof Observatory, with the following information: "...By a weight-driven clockwork controlled by a governor the two telescopes rotate together round the polar axis of the earth at the same rate as the earth itself is rotating. The stars are thus kept continuously in the field of view of the telescopes. The refractor was made by Cooke for Dr Isaac Roberts in 1883, and two years later Sir Howard Grubb made the reflector and the mounting to take the pair of telescopes. In 1890 the telescopes were moved from Maghull, near Liverpool, to Crowbridge in Sussex. Dr Roberts produced many excellent photographs of nebulae and stars and published a selection of them in 1893. On his death in 1904 the telescopes were acquired by Mr J.G. Bower of Earlham House, Norwich and were purchased by the Museum in 1936.

Computer gives date of receipt 2:12:1935; negatives 500/56,233/69,AST049; mounting cradle purchased 17:1:62.

Ex0166 TELESCOPE - REFLECTING & REFRACTING

(Howard Grubb Dublin)

D 762 & 660 (30" & 26"). 1896 & 1897. R.

Royal Observatory, Greenwich; reflector and photographic refractor; "Thompson Equatorial"; Burnett 1989,116.

Given by Sir Henry Thompson; reflector mirror by Common; instruments mounted together while at Greenwich; in Dome A.

Glass 1990,2 notes: "Photograph in album 'Miscellaneous Telescopes', Tyne & Wear Archives - with 30-inch grating. Refractor of 22½ft f.l."

Grubb 1899,3 notes that: "The new 26-in Photographic Equatorial presented to the Royal Observatory, Greenwich, by Sir Henry Thomson, F.R.S., is now complete, and in working order..", and shows illustrations of "COUPLING TOGETHER THE TUBES OF THE GREENWICH 26-in. TELESCOPE." and "LIFTING ON THE GREAT CROSS-HEAD OF THE GREENWICH 26-in. TELESCOPE" - both "Copied by permission of 'Strand Magazine'" on page 14; on page 17, he notes: "With a view to removing the one valid objection which is urged against the use of the German type of Equatorials for photographic purposes, SIR HOWARD GRUBB has devised for the new Greenwich and Capetown instruments, a modification of the form shown on page 18, and which permits of circumpolar motion without sacrificing the general rigidity and stability of the instrument."

The Encyclopaedia Britannica, eleventh edition 1910-11 (article by J.L.E. Dreyer under "Observatory"), notes a 13 inch photographic refractor with a 10 inch visual object glass by Grubb; 28 inch refractor by Grubb; 26 inch photographic refractor by Grubb, with the old 12.8 inch refractor as guiding telescope; 9 inch photographic refractor by Grubb, and 30 inch silvered glass refractor by Common, the last four being on one stand, the 26 inch and the 9 inch being presented by Sir H. Thompson. Glass 1990,2 gives reference: Observatory 20,439,1897.

Ex0232 TELESCOPE - REFLECTING & REFRACTING

(Howard Grubb Dublin)

305 (12") & 203 (8"). 1899. R.

Manchester Technical School; Glass 1990,8; assumed to incorporate the standard equatorial of Grubb 1903,7.

Glass notes that there is a photograph in the album "Miscellaneous Telescopes", Tyne & Wear Archives, and that the combination is probably that illustrated in Grubb 1903,17 "EXAMPLE OF TWIN TELESCOPE CARRYING REFRACTOR AND NEWTONIAN REFLECTOR".

Ex0435 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 178 (7"). 1872. R.

Woolwich, England; Royal Artillery Institute; listed in Glass 1990,11-12.

Glass quotes: "I came over here [London] to erect an Equatorial for the Artillery Institute at Woolwich but have come to a complete standstill the pier they have built being about 25° [underlined with !!!] out of the meridian and the stones cracked so badly that it would be absolutely dangerous to mount the instrument on them." (H. Grubb to G.G. Stokes, 21:8:1872, G482 Stokes Correspondence, Cambridge University Library.)

Glass 1990,12 gives reference: Report of the British Association p30,1872.

Ex0141 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 381 (15"). 1873. R.

Dun Echt, Aberdeen; Royal Observatory, Edinburgh 1894; reconditioned by Grubb Parsons 1929; Burnett 1989,114.

Given to the Royal Observatory by the Earl of Crawford; presumably the Grubb standard equatorial ("Earl Crawford and Balcarres") in Grubb 1885,8.

Glass 1990,4 gives size 15.1"; illustrated in Publications of the Astronomical Society of the Pacific 10,69,1898.

Dreyer 1911,956 confirms that the Earl of Crawford's Observatory was at Dunecht[sic], Aberdeenshire.

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Ex0183 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 311 (12.25"). 1875. R.

University Observatory, Oxford; listed in Burnett 1989,114; Glass 1990,7 gives focal length 14.7ft.

The Savilian Professor at Oxford wrote: "I cannot refrain from recording my admiration of the admirable manner in which Mr Grubb has much more than fulfilled his contract..English [sic] opticians have at length overtaken their eminent brother artists on the Continent.."; Charles Pritchard, Monthly Notices of the Royal Astronomical Society,36,1875-6,1-5, quoted in Burnett 1989,101.

This is presumably the standard equatorial (Rev. Professor Pritchard) of Grubb 1880,11.

Glass 1990,7 gives reference: Astr. Reg. 12,4,1874.

Ex0348 TELESCOPE - REFRACTING

(Supplied by Howard Grubb Dublin)

Scale 1" to 1'. c1876. R.

"Model of the Great Refracting Telescope..for the new Imperial Observatory at Vienna"; SM 1928-725.

"..of 27 inches aperture..now in course of construction at Mr. Howard Grubb's new Astronomical Works, Rath-mines, Dublin... In this instrument the reading of all circles, right ascension as well as declination, is accomplished from eye end of great telescope.

Also quick motion in right ascension}

" quick motion in declination - } All available

" slow motion in right ascension } from eye end

" slow motion in declination - } of telescope

" clamping in right ascension - }

" clamping in declination - - }

The one lamp hanging in end of declination axis illuminates -

Upper right ascension circle.

Declination circle on two opposite sides.

Bright and dark fields of micrometer.

Position circle of micrometer.

Field of 4-inch finder.

A second right ascension circle is available for reading from ground floor (south end), where also is a handle for quick setting, right ascension, and a sidereal clock face. The base of the instrument forms a chamber about 12 feet by 4½ feet, in which is contained the clock.

The model, seen at Blythe House 8:1994, was listed on the computer: Scale 1:12 (in need of repair and a few details missing); Regd Papers - 786/1/7; Acquisition - loan Grubb H., Parsons & Co. 1928; Dimensions - L 720, W 180, H 1000; Location - B/T26C/4Q/KD15.

A photograph is also listed 1876-1011, acquired from the School of Military Engineering in 1876, location B/T26C/2H/PP02/03.

A card with the model reads: The telescope was made by Grubb for the Vienna Observatory in 1860. It was the largest refractor in existence at the time. In 1894 Grubb made the 28-inch refractor for the Royal Observatory Greenwich. Other large refractors subsequently made were those at Lick (36-inch, 1888) and Yerkes (40-inch 1897), both made by Alvan Clark. Sir Howard Grubb, Parsons & Co made a 41-inch refractor for Nikolaieff Observatory South Russia."

No.1792 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877.

Ex0202 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 203 (8"). 1877. R.

Royal Observatory, Potsdam, Burnett 1989,114; standard equatorial Berlin, Potsdam, Dr H. Vogel, Grubb 1880,11.

Burnett 1989,114 notes an 8" refractor at Potsdam "pre 1882".

Grubb 1880,11 lists a standard equatorial supplied to the Observatory of Berlin, Potsdam "(Dr. H.C. Vogel)"; these are presumed to be the same instrument.

Dreyer 1911,957 records that the Astrophysical Obser-vatory at Potsdam was founded in 1874, and lists the 8 inch aperture refractor by Grubb.

Glass 1990,11 gives date 1877, and size 7½", and references: Astronomical Register 15,189,1877 and 20,209,1882.

Ex0433 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 229 (9"). 1877. R.

Dresden, Germany, Dr von Englehardt; later exchanged for 12" (Ex0169); focal length 3.3m.

Glass 1990,10 notes that it is located at the original Observatory, Leibniz Strasse 2.

Ex0351 TELESCOPE - REFRACTING

([Howard] Grubb, Dublin)

TuL 1118; LeD 102. Fourth ¼ 19 C. G.

Painted brass; finder; cast-iron equatorial stand, motor drive; tripod; Christie 14:6:84, Lot 317, £2-400.

"A 4-inch refracting telescope of painted brass with finder, folding wood tripod and cast-iron equatorial stand with gravity motor drive by 'Grubb, Dublin'."

Ex0169 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 305 (12"). 1880. R.

Dr Englehardt's Observatory, Dresden; to Imperial University, Kazan, Russia in 1899; Burnett 1989,116.

Presumably the standard equatorial noted in Grubb 1880,11.

Glass 1990,7 notes that this telescope replaced an 8" refractor by Grubb (Ex0433); the micrometer by Grubb had unsatisfactory lighting and was replaced in 1882 by a Repsold one; the telescope was given in 1897 to the Imperial Russian Observatory Kasan; it was mentioned in the Astronomical Almanac for 1982 as being at Kazan R.S.F.S.R; the illustrations in von Englehardt, Observations Astronomiques, Dresden, 1886, show a well-appointed private observatory of the time.

Encyclopaedia Britannica, eleventh edition 1910-11 (article by J.L.E. Dreyer under "Observatory"), records this 12 inch refractor by Grubb (mounted 1880), used for observations of comets and double stars, presented to Kasan Observatory in 1897.

Glass 1990,7 gives references: Observatory 14,353, 1891 & 20,429,1897.

Ex0456 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

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D 76 (3"). c1881. R.

Kilgrew, Kimberley, South Africa; ordered by Gill in letter to Grubb 12:7:1881; Glass 1990,15.

Ex0145 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 686 (27"). 1878-1882. R.

Vienna; second largest Grubb telescope; was world's largest refractor; Burnett 1989,114; Grubb 1885,8 and 1899,14.

Howard's largest was the 40" refractor for the Simeis Observatory in the Crimea, put into commission in 1928, two years after he had retired; he also supplied the 28" refractor object glass for the mounting at Greenwich made in 1859 by Ransome & Simm.

Presumed to be the standard equatorial "(Dir Von Littrow and Dr. Weiss)" in Grubb 1885,8; three observatory domes also provided at Vienna.

Glass 1990,2 gives date 1878, and reference: Engineering 29,114,1880 (start of series).

Dreyer 1911,957 records that the Grubb 27 inch refractor was mounted in 1882. Illustrated Grubb 1889,14 (telescope in dome) and 15 (breech-piece).

Ex0236 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

152 (6"). 1882. R.

Royal Observatory, Cape of Good Hope; originally a "Transit of Venus" telescope; Glass 1990,13.

Mounting replaced in 1886 by another designed for an 8-inch telescope; lens broken during 1970s and replaced; drive electrified 1980s; clockwork in SAAO museum.

Ex0180 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 203 (8"). 1882. R.

New Observatory, Durban; portable equatorial; Grubb 1885,7; Glass 1990,10 gives size and date.

Glass notes also the dome and transit room, and that the Observatory was closed in 1913 - he gives references: Monthly Notices of the Royal Astronomical Society 73,263,1913 (closure), and an unpublished history of Natal Observatory by M.A. Gray.

Type Illustrated and described in Grubb 1885,7.

Ex0227 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 153 (6"). 1882. R.

Spanish Government for San Fernando; portable equatorial; type described and illustrated in Grubb 1899,8.

Glass 1990,12 gives the size, and suggests "Probably before 1885"; the telescope is illustrated in Bull SIS, No.36,1993,22 which gives its date as 1882.

Glass 1990,13 gives reference: Anales del Instituto y Observatorio de Marina de San Fernando, 1907.

Ex0437 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 152 (6"). 1882. R.

Tacubaya, Mexico; transit of Venus type; listed in Glass 1990,12.

Glass gives reference: G.B.Y. Puga, "Description del Observatorio Astronómico N. de Tacubaya", Mexico, Secretaria de Fomento.

Ex0149 TELESCOPE - REFRACTING

(Howard Grubb Dublin 1878)

D 204 (8"). 1882. R.

Yale University Observatory, New Haven, Connecticut; "Reed Telescope"; Burnett 1989,114; Grubb 1885,8.

Dorrit Hoffleit reports that the refractor was ordered by H.A. Newton, first Director of the Observatory; it was built in 1878 (date on the pier) and delivered in 1882; it was immediately used to photograph the sun during the transit of Venus on 6:12:1882; funds for it were anonymously donated by Edward Mordecai Reed; now mounted at 135 Prospect (from Canner Street); photograph photocopy available.

Assumed to be standard equatorial in Grubb 1885,8.

Glass 1990,10 notes also two 15ft domes, and gives references: Astronomical Register 22,235,1884, and Annual Report of Yale College Observatory 1881-2.

Dreyer 1911,959 records this 8 inch refractor by Grubb at the Winchester Observatory of Yale College, New Haven.

Ex0501 TELESCOPE - REFRACTING

GRUBB DUBLIN 1883

D 114-127; L 1270. 1883. S.

Angled wood stand; cast-iron base with drive for equatorial tube and counterweight; Woollongabba, Queensland.

The base, on four screw feet, leads to a cube from which the counterweight hangs on a conical arm on one side and the tube bracket on the other; the tube has a short finder near the eyepiece. Bill Kitson, Museum of Lands, Mapping and Surveying, Woollongabba, Queensland, Australia, has provided a photograph, and indicates that the instrument came via the instrument importing firm of H.W. Valle of Brisbane who were active from 1900-1920s; he has another photograph of the instrument in use in 1921 along with a camera taking star trail photographs; a further photograph of the workshop of H.W. Valle shows another "GRUBB DUBLIN" telescope of similar or slightly larger size on a conical cast iron base, rather than a wood stand, but the date on the instrument cannot be read.

Ex0452 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 114 (4½"). Pre 1884. R.

Liverpool Astronomical Society; photographic; listed in Glass 1990,14.

Glass 1990,15 gives references: Espin 1884 (no further details); Observatory 7,247,1884.

Ex0583 TELESCOPE - REFRACTING

GRUBB DUBLIN 1884

PvH 1560; Ap 152 (6"). 1884. D.

Grey-painted metal and brass; conical pillar to pivot; block for telescope and counterweight; SM 1985-1470.

Above the pivot is the clock-drive, on the end of which is the cubic block to which the tube and counter-weight are attached; there is a small brass finder; and the eyepiece, focused by rack and pinion, is angled.

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The computer records that it was purchased for £5175 from the Old Clock Shop 15:7:1985; negatives AST103, 860/86; location B/T26C/1Q/FS.

Ex0445 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 153 (6"). 1884. R.

Constantinople [Istanbul], Turkey; with dome; noted in letter from Grubb to Gill 17:12:1884; Glass 1990,13.

"Complete Iron Framework for Observatory" as supplied for Constantinople in Grubb 1885,21.

Ex0071 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). Pre 1885. R.

Belgian Government for Texas and Santiago Transit Exhibitions; portable equatorial(s).

Grubb 1885,7 gives type illustration and description; two right ascension and one declination circles, divided on silver; right ascension circles arranged for differential readings; declination circle read by two opposite verniers, one viewed from eye-end by microscope; bright field illumination for micrometer; transparent position circle; improved breech piece and eye-end, containing quick and slow motion; clockwork of best construction; etc.

Ex0231 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. Pre 1885. R.

Chapultepec, Mexico; standard equatorial; noted in Grubb 1885,8.

Ex0224 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). Pre 1885. R.

H.M. Lords of the Admiralty for Capetown; portable equatorial; illustrated and described in Grubb 1885,7.

Ex0200 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). Pre 1885. R.

Mexican Government for Chapultepec; portable equatorial; type illustrated and described in Grubb 1885,7.

Ex0223 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). Pre 1885. R.

Spanish Government for Havana; portable equatorial; type illustrated and described in Grubb 1885,7.

Ex0447 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D c153 (6"). Pre 1885. R.

Springfield Observatory, Gomersal, England (Mr Cooke); with 15" dome; listed in Glass 1990,14.

Ex0189 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). Pre 1885. R.

Government Observatory, Sydney, New South Wales; portable equatorial; type illustrated and described in Grubb 1885,7.

Ex0449 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 133 (5¼"). 1885. R.

J.M. Offord (presumably Private Observatory); listed in Glass 1990,14 - who gives reference: Observatory 8,78,1885.

Ex0439 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 152 (6"). 1885. R.

Wellington[?], New Zealand; referred to in Gill-Grubb correspondence (SAAO Archives); Glass 1990,12.

Glass suggests: "Probably Wellington instrument mentioned in Grubb's catalogues".

Ex0151 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 229 (9"). 1886. R.

Royal Observatory, Cape of Good Hope; photographic; 6" Dallmeyer lens; 5" visual guider; Burnett 1989,115.

Objective presented by James Nasmyth; guider mounted by Grubb to design by H.M. Astronomer; Dallmeyer rapid rectilinear lens.

Glass 1990,9 notes that this telescope is mounted on the Grubb stand of 1879 owned by Gill, and gives reference: I.S. Glass, Monthly Notes of the Astronomical Society of Southern Africa, 48,29,1989.

This seems likely to be the Standard Equatorial listed in Grubb 1899,11, but not in Grubb 1885,8?

Ex0442 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 153 (6"). 1887. R.

Cartuja, Spain; focal length 2.2m; appears to antedate Observatory - possibly second-hand.

Glass 1990,13 gives reference: SAAO Pamphlet Collection 104, No.19 - Observatorio de Cartuja 1902-1927, Recuerdo del XXV Aniversario.

Ex0459 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. Pre 1888. R.

Peking, China; small equatorials for Pekin - reference Engineering 46,571,1888 - Glass 1990,16.

Ex0199 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 203 (8"). c1888. R.

Caracas, Venezuela; standard equatorial; in Grubb 1899,11 but not Grubb 1885; size - Burnett 1989,115.

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Glass 1990,10 gives date c1888, notes a 15ft dome, and gives reference: Engineering 46,571,1888.
Burnett 1989,115 gives date c1890.

Ex0430 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 228 (9"). 1888. R.

Sir H. Thompson's Observatory, Hampton, England; listed in Glass 1990,9, who gives reference: Engineering 46,571, 1888.

Ex0226 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). 1885-1899. R.

British Empire Transit Expeditions; portable equatorial(s) illustrated in Grubb 1899,8; not in Grubb 1885.

Grubb 1899,8 gives type illustration and description; double right ascension and declination circle, divided on silver; right ascension circle arranged for differential readings; declination circle read by two opposite verniers, one viewed from eye-end with microscope; position circle; breech-piece and eye-end of improved form, containing quick and slow motion for position angle; clockwork of best construction; quick motion in right ascension, etc.

Ex0157 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 330 (13"). 1889. R.

Tacubaya, Mexico; for Carte du Ciel; with 11" visual guider; Burnett 1989,115.

Grubb 1899,17 lists a standard equatorial at Tacubaya specially constructed for the International Photographic Survey.

Glass 1990,6 gives the 1889 date, notes the 18ft dome, and the fact that the mounting was used for "twin Einstein cameras" during the solar eclipse of 2:3:1970; he gives references: Engineering 46,571, 1888; Sky & Telescope 39,280,1970.

Ex0440 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 153 (6"). Pre 1890. R.

Eastbourne, England, Northfield Grange Observatory, Mr Chambers; focal length 7'6".

Glass 1990,13 gives reference: G.F. Chambers, Handbook of Astronomy, 4th Ed, Vol.2, Plate X, Oxford, 1890.

Ex0153 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 330 (13"). 1890. R.

Royal Observatory, Greenwich; Dome D; for Carte du Ciel; 11" guider; Burnett 1989,115; Grubb 1899,17.

The equatorial mount is now (9/88) in store at the NMM, photographs C70,5&6.

Glass 1990,6 notes that the telescope was moved to Herstmonceux, and later re-mounted by Grubb Parsons.

Dreyer 1911,955 records this 13 inch photographic refractor with a 10 inch visual object glass by Grubb.

Ex0154 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 330 (13"). 1890. R.

Melbourne; for Carte du Ciel; with 11" visual guider; Burnett 1989,115.

Grubb 1899,17 lists a standard equatorial at Melbourne specially constructed for the International Photographic Survey.

Ex0158 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 330 (13"). c1890. R.

University Observatory, Oxford; for Carte du Ciel; 11" visual guider; Burnett 1989,115.

Grubb 1899,17 lists a standard equatorial at Oxford specially adapted for the International Photographic Survey.

Dreyer 1911,955 records this 13 inch photographic refractor by Grubb attached to the 12¼ inch, used for photographic zone work.

Ex0428 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

330 (13"). 1890. R.

Sydney Australia; lens only for the astrographic telescope; Glass 1990,6.

Dreyer 1911,960 records a 13 inch photographic refractor by Grubb, acquired later than the 1879 Simms meridian circle.

Glass 1990,6 gives reference: Description of the Star Camera at the Sydney Observatory, 1892.

Ex0230 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 381 (15"). 1890. R.

Tacubaya, Mexico; standard equatorial for visual observations; listed in Grubb 1899,11; not in Grubb 1885.

Glass 1990,5 gives the 15" measurement and a focal length of 15ft, with a 24 ft dome; he gives the date 1880 but, since this is not listed in Grubb 1885, it is assumed for the moment to be a misprint for 1890.

Dreyer 1911,960 records this 15 inch refractor, and notes that the National Observatory at Tacubaya was erected in 1882.

Glass 1990,5 gives reference: G.B.Y. Puga, Descripción del Observatorio Astronómico N. de Tacubaya, 1893.

Ex0190 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 380 (15.4"). 1890. R.

Equatorial; National Mexican Observatory, Tacubaya; with 11" visual guider; listed in Burnett 1989,115; for Carte du Ciel project.

Ex0155 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 330 (13"). 1891. R.

Royal Observatory, Cape of Good Hope; for Carte du Ciel; 11" guider; Burnett 1989,115.

Grubb 1899,11 lists a standard equatorial at Capetown specially constructed for the International Photographic Survey; his Frontispiece reproduces a photograph of eta-Argus and surroundings "taken at the Royal Observatory, Cape of Good Hope, 1892, March 26th-30th, Aperture 13 inches. Exposure, 12h 12m." - on page 5, he refers to the "13-in. Photographic Object Glass of the Cape Town Observatory" which was used for the photograph.

Glass 1990,6 gives the precise date, notes that it no longer possesses its original drive, and gives the reference: D. Gill, "A History and Description of the Royal Observatory, Cape of Good Hope", HMSO, London, 1913.

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Ex0178 TELESCOPE - REFRACTING

[Howard] GRUBB DUBLIN [can't distinguish date]

D 153 & 203 (6" & 8"). 1891. R.

Photographic equatorial for Madrid Observatory; 8" photographic and 6" visual object glasses; Grubb 1903,5.

Caption of photograph in Grubb 1903,5: "Photographic Equatorial of the Madrid Observatory carrying an 8-inch Photographic Object Glass, 6-inch Visual Object Glass with Guiding Micrometer at eye-end, and a 6-inch Photographic Doublet."; there is also a photograph of the double dome "New Pavilion of the Madrid Observatory"; these photographs are not shown in Grubb 1899.

Glass 1990,9 gives date 1891 - photograph in "Miscellaneous Telescopes", Tyne & Wear Archives.

Another photograph in Grubb-Parsons 1926b,21.

Ex0469 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

229 (9"). 1891. R.

Uccle, Belgium; photographic; recorded in Dreyer 1911, 959.

In his entry for the Royal Observatory, Brussels, Dreyer records that a new Observatory was erected at Uccle in 1891, with the instruments from Brussels, a 9 inch photographic refractor by Grubb, and a 13 inch photographic refractor by Gautier; since these latter are not listed among the instruments at Brussels, it is assumed that they were newly purchased.

Ex0160 TELESCOPE - REFRACTING

Unsigned but by Howard Grubb Dublin

D 711 (28"). 1893. R.

Royal Observatory, Greenwich; object glass; mounting by Ransom & Simm; Burnett 1989,115.

Two illustrations of the Greenwich 28" are given in Grubb 1899,14, one as used for visual work, the other for spectroscopic work.

Legend with instrument (9/88) notes it is largest refractor in UK, 7th largest in world, made in 1893 by Howard Grubb, L 28 ft(8M), wt 1.4 tons; objective crown and flint glass D 28" (711mm), wt 102 Kg, finder has focal length 2.4M, aperture 165mm, eyepiece normally X300; in "onion" Dome F; Ransom & Simm mounting made in 1859; photos C70,7-10.

Glass 1990,2 gives reference: Observatory 16,401,1893.

Grubb 1899,3 notes that the 28-in: "has proved the value of Sir George Stokes' suggestions for a form of object glass capable of doing the best work both visually and photographically. Some of the Photographs taken with this Object Glass of very close double stars point to the possibility of a new field of work in the very accurate measurements of such objects by this means."

Ex0161 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 381 (15"). 1893. R.

Maidenhead, Berkshire; photo doublet; Hepple Woodside, Northumberland, 1926; Burnett 1989,115; dome and lifting floor also by Grubb.

Grubb 1899,17 notes Maidenhead as one of the places which were equipped with a standard equatorial specially constructed for the International Photographic Survey.

Glass 1990,5 notes that the 15" refractor was in Dunn's Observatory, Maidenhead: "There was a visual refractor of 1893 and a photographic one of 1894. The latter was probably the 'portrait lens' of 15 inches aperture and 89 inches focal length referred to [in Observatory 20,155,1897]. Grubb also supplied a hand-operated rising floor. Later at Hepple Woodside, Northumberland. A photograph exists in the album 'Miscellaneous Telescopes', Tyne & Wear Archives. Marked 'Later Mr W. Hall's'."

Glass refers also to Grubb-Parsons Publication 1,45,1926, and to the Grubb-Gill correspondence in the SAAO Archives, Cape Town.

Ex0162 TELESCOPE - REFRACTING

[Howard] GRUBB DUBLIN

D 381 (15"). 1893. R.

University of Mississippi Observatory; with 9" photographic refractor; Burnett 1989,115.

Mississippi is listed for both a standard equatorial for visual observations and a standard equatorial especially constructed for the International Photographic Survey in Grubb 1899,11.

A photograph from John Briggs of Los Gatos, California, shows these mounted together at the Kennon Observatory, University of Mississippi; photo negatives available from Prof. Gordon E. Baird, Dept of Physics and Astronomy, Mississippi 38677.

Glass 1990,5 quotes the focal length of the 15" refractor as 15ft, and gives reference: E.S. Holden, Publications of the Astronomical Society of the Pacific 4,155,1892.

John Briggs gives the 15" as f/12, and the 9" side-mounted photographic telescope as about f/10; he notes that the physicists now in charge of the 15" suspect that its optical performance may suffer from some mis-assembly, and he hopes to visit to help diagnose the problem.

Ex0163 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 381 (15"). 1894. R.

Stoneyhurst College, Lancashire; in memory of Father Perry, S.J.; Burnett 1989,115; Perry died in British Guiana on the Total Solar Eclipse Expedition, 22:12:1889.

Glass 1990,4 notes that it was erected on 6:11:1894.

Dreyer 1911,955 records that the 15 inch Perry memorial refractor by Grubb was mounted in 1893, and was used chiefly for solar work.

Glass 1990,5 gives reference: Observatory 17,116,1894.

Ex0177 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 152 (6"). c1894. R.

Chamberlin Observatory, Denver, Colorado; portable equatorial; now used as a finder.

Grubb 1899,8 gives type illustration and description.

John Briggs of Los Gatos, California, reports that the 6" refractor is now a finder on the Observatory's 20" Clark refractor, and the Grubb mounting carries a 12" reflector; the mounting has been heavily modified in recent years, and "much of its historical charm has been lost".

Glass 1990,13 gives date 1894?, mounting only, lens by Brashear, dismantled 1944.

Dreyer 1911,959 lists the 6 inch refractor by Grubb, noting that the Observatory was founded in 1891.

Glass 1990,13 gives reference: T.J. Bartlett, Sky & Telescope 9,51,1950.

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Ex0467 TELESCOPE - REFRACTING

(GRUBB DUBLIN 1895)

LD 152 (6"). 1895. S.

With presentation plaque to Cecil West Darley, Sydney 1:7:1895; School of Physics, University of Sydney.

In full, the presentation legend reads: "PRESENTED TO/ Cecil West Darley, M. Inst. C.E./on his retirement from the office of/ENGINEER IN CHIEF FOR HARBOURS & RIVERS/New South Wales, Australia./By the Officers & Workmen of his Department/SYDNEY 1st JULY, 1895" information (26:3:90) from Julian Holland, Curator of Technology at the Macleay Museum of the University of Sydney, New South Wales, Australia.

Ex0165 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 305 (12"). 1895. R.

Tunbridge Wells, Kent; for Frank McClean; 10° objective prism; gifted to Exeter; Burnett 1899,116, who notes that the telescope was subsequently gifted to Sir Norman Lockyer's Observatory at Silcombe Regis, Exeter, and mounted with a 9" refractor.

Glass 1990,5 lists this as a 12" photographic refractor and a 10½" visual refractor; he gives the focal length as 11¼ft, and notes that there is a photograph in the album "Miscellaneous Telescopes" in the Tyne & Wear Archives - it went to the Norman Lockyer Observatory in 1913; Glass lists the references: Observatory 17,344,1894 and 18,320, 1895; A.R. Hutchings, Journal of the British Astronomical Association, 93,25,1982.

Grubb 1899,11&17 lists a standard equatorial for visual observations and a standard equatorial specially adapted for photographic observations at Tunbridge - it is assumed this entry encompasses both.

Dreyer 1911,956 records a photographic 12 inch refractor and object glass prism by Grubb used for photos of star spectra, 1894-1904, at Mr F. McClean's Observatory, Rusthall House, Tunbridge Wells.

Ex0167 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 254 (10"). 1897. R.

Coats Observatory, Paisley; still in situ; bifilar micrometer now in RMS T.1984.22 (Ex0045); Burnett 1899,116.

Presumed to be the standard equatorial listed for Paisley in Grubb 1899,11.

Ex0195 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 318 (12.5"). 1898. R.

Cambridge Observatory; siderostatic coudé; "Sheepshanks Telescope"; illustrated in Grubb 1899,10.

Grubb 1899,10 prints photographs of this "SIDERO-STATIC EQUATORIAL" both outside the Observatory and inside, the latter showing the "CLOCK-WORK, BREECH-PIECE, Etc.", and gives the description: "In the instrument above shown the mirror is placed between the object glass and the eye-piece; and is so mounted that it moves exactly half the angle through which the tube carrying the object glass moves, and thus the optical axis is made to coincide with the polar axis, at upper end of which the eye-piece, or the photographic plate is attached. For full description, see Sir H. Grubb's paper in 'Transactions of the Royal Dublin Society.'" (3,61,1884).

Burnett 1899,116 calls this a 12.5" Coudé for the Solar Physics Observatory, Cambridge 1899: "Triple photo-graphic/visual; objectives by Cooke & Sons, York; mirror by Common. Design and mounting by Grubb. Known as the 'Sheepshanks Telescope'."

Glass 1990,7 gives 1898 date and notes: "Lens was a triple apochromat by Cooke, later replaced by a photographic doublet. Used by H.N. Russel for determining some of the stellar parallaxes which were used in the construction of his first Colour-Magnitude diagram."; he gives references: Sir R. Ball, Observatory 59,152,1899; F.J.M. Stratton, Annals(?) of the Solar Physical Observatory Cambridge 1,1949; D.W. Dewhirst, Journal of the History of Astronomy 13,119, 1982.

Ex0235 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

311 (12½"). 1898. R.

Mecca; standard equatorial; in Grubb 1899,11; not in Grubb 1885; date and size from Glass 1990,7.

Glass notes that there is a photograph in the album "Miscellaneous Telescopes", Tyne & Wear Archives.

Ex0234 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

229 (9"). 1885-1899. R.

Ballarat; standard equatorial; in Grubb 1899,11; not in Grubb 1885; later to Mount Stromlo, Glass 1990,9.

Glass notes that it was given, on the death of Col. Oddie [presumably the owner] to what is now Mount Stromlo Observatory - there is a photograph in the album "Miscellaneous Telescopes", Tyne & Wear Archives; he gives reference: C.W. Allen, Records of the Australian Academy of Sciences 4,27,1978.

Ex0186 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 508 (20"). 1885-1899. R.

Bombay; standard equatorial in Grubb 1899,11 but not in Grubb 1885; measurement from Burnett 1899,117.

Burnett 1899,117 gives c1905 date.

Ex0233 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. 1885-1899. R.

Crowboro'; standard equatorial; in Grubb 1899,11; not in Grubb 1885.

Presumably this was at Dr Isaac Robert's Observatory, Crowborough, Sussex, as listed in Dreyer 1911,956.

Ex0198 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. 1886-1899. R.

National Observatory, Edinburgh; standard equatorial in Grubb 1899,11 but not Grubb 1885.

Ex0179 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. 1885-1899. R.

Melbourne; standard equatorial for visual observations; in Grubb 1899,11; not in Grubb 1885.

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Ex0173 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. 1885-1899. R.

Radcliffe Observatory, Oxford; standard equatorial for visual observations; Grubb 1899,11.

Ex0425 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

No measurements available. 1885-1899. R.

Perth, Western Australia; standard equatorial listed in Grubb 1899,11; not in Grubb 1885.

The Government Observatory at Perth is described as "new" in Grubb 1899,4.

Ex0228 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 165 (6½"). 1885-1899. R.

St Sofia, Bulgaria; portable equatorial; type illustrated and described in Grubb 1899,8, not in Grubb 1885.

Glass 1990,12 gives the lens size, and notes that there is a photograph in "Miscellaneous Telescopes", Tyne & Wear Archives.

Ex0156 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 330 (13"). 1897. R.

Perth, Western Australia; for Carte du Ciel; with 11" visual guider; Burnett 1989,115.

Grubb 1899,17 lists a standard equatorial at Perth specially constructed for the International Photographic Survey; at page 4 he notes: "the new Government Observatory at Perth, Western Australia, has been completed and fitted up with an Equatorial of the Standard Photographic Survey type, Chronograph, Transit Room, Equatorial Room, etc."

Ex0453 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 102 (4"). Pre 1899. R.

Coats Observatory, Paisley, Scotland; siderostatic tele-scope; listed in Glass 1990,15.

Ex0258 TELESCOPE - REFRACTING

[Howard] GRUBB DUBLIN

D c210. Late 19 early 20 C. G.

Mounting now carrying 1930 8½" refractor; brought from Europe by E.M. Weil and sold to Gary Tous, California.

Photograph supplied by John Briggs, Los Gatos, California, showing the mounting in the Observatory of Emmanuel Weil; objective of present telescope signed "Watson-Conrady #2247, September 1930"; Weil shipped it across the Atlantic around 1960.

Ex0170 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 407 (16"). 1900. R.

Heidelberg; photographic doublet; Schott, Jena lenses; finished by Brashear, Pittsburg; Burnett 1989,116.

The gift of Miss Bruce; mounted by Grubb with a 10" visual refractor by Pauly.

Grubb 1899,4 notes: "An Equatorial of the Siderostatic type, as described by me in the "Transactions of the Royal Dublin Society", has been just completed for the Cambridge Observatory; one of the English form, to carry two large Photographic Doublets of 15-in. aperture, for Dr. Max Wolf, of Heidelberg..has just been commenced.."

Glass 1990,4 gives reference: Vierteljahrsschrift der Astr. Gesell. 35,121,1900.

Ex0471 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

LeD 127 (5"). 1900. R.

City University, London; originally presented to W.H. E. Thornthwaite, then to Northampton Institute, 1901.

A paper in the City University magazine, "THE N'ION", January 1959, "The College Observatory", by Dr C.A. Padgham" of the Department of Applied Physics, gives a description and the history of the telescope. It is equatorially mounted with a driving clock; it has three Kellner-type eyepieces giving magnifying powers of 65X, 130X, and 260X, and has a small finder telescope of 1¼ inch aperture, with cross wires; it is equipped with circles divided on silver on the two axes, and has a sliding distant-reading auxiliary telescope to allow either circle to be read from the eye-end of the telescope; it is located on the South-East corner on top of the Skinners Library, mounted there in 1956, with a flat roof which can be made to slide completely off on rails. The telescope was originally presented to William Henry Emilien Thornthwaite (1850-1908), a founder of the firm of Horne, Thornthwaite and Wood, Newgate Street, Opticians to the Queen, later Horne and Thornthwaite of the Strand, on 31 May 1900, in recognition of his services to the Worshipful Company of Spectacle Makers: "We beg your acceptance of the 5 inch Equatorial Telescope, which has been specially manu-factured and is presented as a specimen of the art of the British Optician". Signatories included Sir Robert Ball and The Earl of Rosse. Thornthwaite offered the telescope on loan to the Northampton Institute in 1901, and in 1907 he transferred it for permanent retention for the sum of £100. However, it was not mounted until 1956.

Ex0182 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 203 (8"). c1900. R.

Equatorial; Private Observatory, Louvain, Brussels; listed in Burnett 1989,116.

Glass 1990,11 notes that this was the Observatory of Terby; the instrument is mentioned in a letter to Gill (in SAAO Archives) dated 13:9:1885.

Ex0181 TELESCOPE - REFRACTING

GRUBB DUBLIN 1882

D 203 (8") c1900. R.

Equatorial; The Peninsula, Windsor, New South Wales; Private Observatory of John Tebbutt; founded 1864; Burnett 1989,116.

Julian Holland, Curator of Technology of the Macleay Museum of the University of Sydney, who records that the telescope was for many years in New Zealand, and was recently (letter 26:3:90) returned to Windsor, has supplied a photocopy of pages 44-47 of the "Astronomical Memoirs" by John Tebbutt (1986 reprint of the 1908 edition, published by Hawkesbury Shire Council), which includes a photograph of the telescope, and refers to the very important addition made to the Observatory by the arrival on May 20, 1886, "of a new equatorial refractor of eight inches aperture and 115 inches focal length, constructed in 1882 to the order of Dr. W. Bone of Castlemaine, Victoria, by Grubb of Dublin. On the death of Dr.

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Bone the instrument was purchased by me for the sum of £400, which was, I believe, about two-thirds of the original cost."; the telescope was permanently mounted on June 16, 1886; Tebbutt then goes on to give more details of the instrument. Glass 1990,10 gives further references: Observatory 11,62,1888; W. Orchiston, *Southern Stars* 29,215,1982; *Sky & Telescope* 69,160,1985.

Ex0470 TELESCOPE - REFRACTING

GRUBB DUBLIN

LeD 102 (4"). c1900. PC.

Red painted cast iron equatorial mount; white tube; rack and pinion eyepiece focus; private ownership.

Now mounted on a modern tapering cross section stand, the telescope has obviously been restored; the white tube is in three parts: a shield beyond the objective, the main tube, and a narrower tube at the bottom, which has a brass knob at the side, presumed to be for rack and pinion focus of the brass eyepiece tube; towards the bottom of the main tube, and attached to a bracket from the mount, are knurled brass knobs, presumably for fine position adjustment; the owner notes that it is a Class B equatorial c1900, and was found on a scrap heap in Birmingham about 20 years ago (letter undated c1988); he has written about it in the *Journal of the British Astronomical Association*, Volume 87,63-65,1976. The two-element object glass is f/14.5; the main tube is of steel, the optical-glass cell and focusing head of gun metal, and the draw tubes of brass; there is a finder of 32mm diameter with crosswires which are adjustable by four set screws on the finder body.

Ex0222 TELESCOPE - REFRACTING

[Howard] GRUBB DUBLIN 1900 [date not very clear]

D 203 (8"). 1900-1903. R.

Spanish Government for Madrid; portable equatorial; photo in Grubb 1903,5; type described Grubb 1903,4.

Photograph caption in Grubb 1903,5: "8-inch Visual Equatorial of the Madrid Observatory, fitted with Bifilar Micrometer, Electrical Illumination, and every modern improvement."; there is also a photograph of the: "New Pavilion of the Madrid Observatory, with Domes covering the two instruments shown below." - and of the Madrid Photographic Equatorial (Ex0178). Glass 1990,16 notes also a spectro-heliograph in Madrid "Presumably with coelostat (before 1903)".

Dreyer 1911,958 records an 8.75 inch refractor by Grubb at the Royal Observatory, Madrid.

Glass 1990,10 gives reference: *Astronomical Almanac* 1982.

Ex0171 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 610 (24"). 1901. R.

Cape of Good Hope; photographic, 18" visual refractor, spectrographic apparatus; both refractors mounted together, given by Frank McClean, known as the "Victoria" telescope, Burnett 1989,116; Grubb 1899,17 notes that: "With a view to removing the one valid objection against the use of the German type of Equatorials for photographic use SIR HOWARD GRUBB has devised for the new Greenwich and Capetown instruments a modification ...which permits of circumpolar motion without sacrificing the general rigidity and stability of the instrument."; on page 3-4 he notes: "A new Equatorial carrying a 24-in. Photographic and an 18-in. Visual Object Glass has been dispatched to the Cape Town Observatory, and furnished with a 24-in. Prism for Spectroscopic Observations."

Glass 1990,2 gives focal length 22½ft. D. Gill, and reference "A History & Description of the Royal Observatory, Cape of Good Hope", HMSO, 1913 (Glass 1990,2).

Ex0172 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 610 (24"). 1902. R.

Radcliffe Observatory, Oxford; equatorial; 24" photo-graphic and 18" visual objectives; it was moved to Mill Hill in 1931; Grubb provided a 32 foot dome and rising floor; Burnett 1989,116.

Four illustrations in Grubb 1903,15

Grubb 1899,4 notes: "An Equatorial of the German form, to carry a 24-in. Photographic and an 18-in. Visual Object Glass, has just been commenced for the Radcliffe Observatory, Oxford."

Glass 1990,3 gives reference: *Engineering* 82,819,1906.

Ex0225 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). Pre 1885-1903. R.

Portable equatorials to "many Private Observatories": England, Belgium, U.S., S. Africa, Australia, Turkey.

Identified portable equatorials are listed separately, but both the 1899 and 1903 catalogues note the supply to private Observatories in the above countries "etc.", which are not individually identified; the 1885 catalogue lists England, S. Africa, Turkey, etc., only.

Grubb 1885,7; Grubb 1899,8; Grubb 1903,4.

Ex0174 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 381 (15"). 1903. R.

Nizamiah Observatory, Hyderabad, Pakistan; listed in Burnett 1989,116.

Glass 1990,5 notes that it was donated by Nawab Zafer Jung to the Nizamiah Observatory, now part of Osmania University; there is a photograph in "Miscellaneous Telescopes", Tyne & Wear Archives; he gives the reference: Nizamiah Observatory, Platinum Jubilee Souvenir 1908-1983.

Glass 1990,8 notes also a 12" Grubb lens at Hyderabad, of focal length 3.4m, dated c1913, for the guide telescope of the Nizamiah astrograph (see S.R. Srinivasan, *Journal of the British Astronomical Association* 96,339,1986).

Ex0229 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D between 153-254 (6"-10"). 1899-1903. R.

Tokio, Japan; portable equatorial; type illustrated and described in Grubb 1903,4; not in Grubb 1885 nor 1899.

Ex0346 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

L 915; LeD 76. Early 20 C. PC.

Brass?; cast-iron altazimuth mount; eyepiece focus by rack and pinion; SothebyBE, 6:2:81, Lot 114, £150-250.

"A 3IN HOWARD GRUBB REFRACTING TELESCOPE, the tube 36in; 91.5cm long, with eye-piece tube focusing by rack and pinion, and sighting telescope at side, on cast-iron altazimuth mount, together with three eye-pieces marked 40, 100, and 170, another in [sic] 8in; 20cm brass tube, and right-angle prism attachment, Irish, early 20th century." - illustrated.

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Ex0187 TELESCOPE - REFRACTING

[Howard] GRUBB DUBLIN

D 127 (5"). Pre 1907. R.

Equatorial; Students' Astronomical Observatory, State University of Iowa.

John Briggs of Los Gatos, California, acquired a small equatorial head from the University of Northern Iowa; he knows little of its history, but knows it was at UNI for at least a couple of decades; it carried a modern telescope tube when he found it; a photo was supplied.

Likely to be the 5" equatorial listed in early but not final draft of Burnett & Morrison-Low 1989, which noted that the Observatory was founded in 1892.

Ex0188 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 152 (6"). Pre 1907. R.

Equatorial; Newcastle, New South Wales; in early but not final draft of Burnett & Morrison-Low 1989.

Ex0454 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 102 (4"). Pre 1907. R.

San Fernando, Spain; listed in Glass 1990,15; reference: Anales del Instituto y Observatorio de Marina de San Fernando, 1907.

Ex0191 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 165 (6½"). Pre 1907. R.

Equatorial; Sydney, New South Wales, Private Observatory, E.H. Beattie; in early draft of Burnett & Morrison-Low 1989.

Ex0429 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 228 (9"). 1907. R.

Transvaal Observatory, South Africa; on Grubb mount of 1879 donated by Sir David Gill; Glass 1990,9.

Glass notes that the mount was originally for a Repsold heliometer - the lens was reworked in 1908; he gives references: J. Hers, Monthly Notes of the Astronomical Society of Southern Africa 46,39,1987, and R.T.A. Innes, Observatory 71,315,1911.

Ex0185 TELESCOPE - REFRACTING

(Howard Grubb Dublin & Repsold)

D 160 (6.3"). Pre 1907. R.

Tashkent; made by Grubb & Repsold; noted in early but not final draft of Burnett & Morrison-Low 1989.

Ex0431 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 229 (9"). 1909. R.

Escobar - district of Buenos Aires, Argentina; listed in Glass 1990,9.

Photograph in "Miscellaneous Telescopes", Tyne & Wear Archives.

Ex0443 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 153 (6"). 1909. R.

Valencia, Spain; noted in Tyne & Wear Archives; listed in Glass 1990,13.

Ex0450 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 127 (5"). c1911. R.

Royal College of Science, England; equipped with prism; lens by Zeiss; listed in Glass 1990,14; - reference: Monthly Notices of the Royal Astronomical Society 71,303,1911.

Ex0444 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 153 (6"). 1912. R.

Castro-Urdiales, Spain (de Ocharan); with two photographic telescopes attached; listed in Glass 1990,13.

Photograph in "Miscellaneous Telescopes", Tyne & Wear Archives, marked 1912; two 4 3/4" cameras, with 24" and 39" focus.

Grubb-Parsons 1926a,18.

Ex0436 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 178 (7"). 1913. R.

"Panjab"; (Punjab, India?); photograph in "Miscellaneous Telescopes", Tyne & Wear Archives; Glass 1990,12.

Ex0441 TELESCOPE - REFRACTING

(Howard Grubb Dublin/St Albans)

D 153 (6"). Pre 1919. R.

Barcelona, Spain; listed in Glass 1990,13 - reference: Boletín del Observatorio Fabra I Sección Astronómica, 1,1919.

Dome illustrated in Grubb-Parsons 1926b,29.

Ex0582 TELESCOPE - REFRACTING

(Grubb, Dublin, 1919)

L 755; TuD 60. 1919. S.

"Variable power telescope" No.1 Mk.1 No.257; oxidised brass tubing, with lenses, half cut-away; SM 1922-38.

"A variable power telescope is one which holds an image in focus when its magnification is changed. It was the forerunner of the zoom lens...Production model by Howard Grubb Dublin 1919. The magnification can be varied from 7 to 21."

The computer records that it was sectioned in 1958; registered papers 22/77; purchased for £4.00 on 17:1: 1922.

Ex0197 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 401 (16"). 1920. R.

Astronomical Observatory, Madrid; listed in Burnett 1989,116; Glass 1990,4 gives 1920 date - signed 1912.

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Glass notes that the telescope had a spectrograph and bifilar micrometer - it is illustrated in "Miscellaneous Telescopes" in Tyne & Wear Archives, with a manufacturer's plate marked 1912.

The bifilar micrometer with position circle is illustrated in Grubb-Parsons 1926b,24.

The objective end of this telescope is illustrated in Bull SIS No.42,1994,6 - during the visit of the Scientific Instrument Society to the Observatorio de Madrid in May 1994.

Ex0446 TELESCOPE - REFRACTING

(Howard Grubb Dublin/St Albans)

D 153 (6"). 1924. R.

"Sykes" (Private Observatory?); photo in "Miscellaneous Telescopes", Tyne & Wear Archives; Glass 1990,14.

There is a village "Syke" in East Germany and a "Sykesville" in Maryland, USA, but both are tiny, which suggests that "Sykes" is the surname of the Observatory owner.

Ex0176 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 610 (24"). 1925 (ordered 1909). R.

National Astronomical Observatory, Santiago, Chile; also 45 foot dome and rising floor.

Glass 1990,3 notes that the telescope was ordered in 1909, but gives installation date 1925; the dome was finished around 1913 (Grubb-Innes correspondence in CSIR Archives, Pretoria); it was illustrated under construction in Grubb Parsons 1926b,29; the telescope was moved from Santiago to Cerro Calan in 1956; references - F. Rutlant, Information Bulletin Southern Hemisphere 4,1963; F. Rutlant, Sky & Telescope 16,474,1957.

Also noted in Burnett 1989,117 with date c1905.

Ex0424 TELESCOPE - REFRACTING

(Howard Grubb Dublin/St Albans)

D 661 (26"). 1925. R.

Union (now Republic) Observatory, Johannesburg, South Africa; Burnett 1989,117.

Glass 1990,2 gives 26½", and references: F. Robbins, Nature 112,104, 1923; J. Hers, Monthly Notices of the Astronomical Society of South Africa 46,75,1987.

Ex0432 TELESCOPE - REFRACTING

(Howard Grubb Dublin/St Albans)

D 229 (9"). Pre 1926. R.

Castro-Urdiales, Spain (de Ocharan); listed in Glass 1990,9; illustrated in Grubb-Parsons 1926a,18.

Ex0192 TELESCOPE - REFRACTING

(Howard Grubb Dublin/St Albans)

D 127 (5"). Pre 1926. R.

Coimbra Observatory, Portugal; "Astrographic"; illustrated in Grubb-Parsons 1926b,21.

Glass 1990,14 notes that "Miscellaneous Telescopes", Tyne & Wear Archives, illustrates this as a 6" photographic equatorial with a 6" prism.

An early, but not the final, draft of Burnett & Morrison-Low 1989 listed a spectro-heliograph at Coimbra, Portugal, dated 1890.

Ex0434 TELESCOPE - REFRACTING

(Howard Grubb Dublin)

D 203 (8"). Undated.

Sao Paulo, Brazil; Instituto Astronomico e Geofisico de Sao Paulo; listed in Glass 1990,11.

Glass 1990,11 gives reference: Information Bulletin of the Southern Hemisphere 11,1967.

Ex0575 TELESCOPE - REFLECTING & REFRACTING

(Howard Grubb Dublin)

D 432 (17"); D 203 (8"). 1887. R.

Manchester Exhibition 1887; new form of twin equatorial telescope; with all recent improvements.

The "Catalogue of the Royal Jubilee Exhibition, Manchester 1887" (John Heywood, Printer) describes this new form of "Twin Equatorial Telescope" as constructed for the Observatory of Dr W. Huggins, F.R.S., London, and that of Mr J. Roberts, F.R.A.S., Liverpool, carrying an 8in. refractor for general star-gazing and micro-photography, and a 17in. reflector, especially fitted for Stellar photography, furnished with all recent improvements, electrically-centralised [sic] clock, electric illumination for circles, verniers, &c., the reflecting telescopes having independent motion in declination."

Grubb 1899,16 illustrates the twin telescopes, as "used by Dr. Huggins and Dr. Roberts, and as exhibited in the late Manchester Exhibition. The motion of each telescope is quite independent of the other. This construction is fully described in 'Engineering' of December 16th, 1887."

See also entries Ex0139 (Dr Huggins) and Ex0150 (Dr Roberts) - it is not clear whether the references to Dr Huggins and Dr Roberts refer to the telescopes described in these entries, or whether Grubb made new twin telescopes for them.

Ex0569 TELESCOPE MIRROR

(Grubb, Parsons & Co.)

No measurements available. 1937. R.

Sample of a plain mirror, silvered with aluminium, presented by Sir Howard Grubb, Parsons & Co, MHSO 37-11.

The mirror, presented in 1937 by the manufacturers, is "silvered" with aluminium "after the manner of the great Reflecting Telescope that they have on order for the Radcliffe Trustees in South Africa".

Information from Tony Simcock.

**INSTRUMENTS LOCATED OUTSIDE IRELAND
WITH IRISH SIGNATURES
(EXCEPT THOSE SIGNED BY THE GRUBB FIRM)**

The instruments are listed in alphabetical order of the name of the maker/supplier, and then in order of the name of the instrument.

Many of these records were supplied by Alison Morrison-Low, and this assistance is gratefully acknowledged.

Abbreviations used in the listing:

BM - The British Museum, London

MHSO - Museum of the History of Science, Oxford

NMAH - National Museum of American History, Washington, D.C.

NMM - National Maritime Museum, Greenwich

NM Merseyside - National Museums of Merseyside

NMS - National Museums of Scotland

RMS - Royal Museum of Scotland, Edinburgh

SAAO - South African Astronomical Observatory, Cape Town

SM - Science Museum, London

Whipple - Whipple Museum, Cambridge

Christies, Philips, Sothebys, etc. refer to well-known auction houses, and the dates to auction dates. ChristieNY refers to New York; SothebyBE to Belgravia, SothebyCH to Chester, SothebySU to Sussex, and SothebyNY to New York. For other references, see the Bibliography.

Historical Technology refers to the instrument catalogues of the late Saul Moskowitz of Massachusetts. Tesseract refers to the instrument catalogues of David and Yola Coffeen of New York.

Signatures in brackets have not been seen.

Ex0570 APOGRAPH

(Invented & Made by W. & A. Smith) (Sold by M.H. & J.W. Allen. Dame St. Dublin)

No measurements available. 1838-1840. R.

Reported as identical to Apograph Ex0047 (see under Mason); MHSO 31-6/93; presented by Royal Astronomical Society in 1931 RAS 93.

The Allens are not listed in Burnett & Morrison-Low 1989, and were presumably just retailers.

Information from Tony Simcock; dates for William and Andrew Smith, London, (1838-1840), from Clifton 1995,257.

Ex0498 BAROMETER - ANGLE

[Calendar] Published by JNo ALMENT MARY'S ABBEY DUBLIN

W 580. c1771. S.

Mahogany backboard, broken pediment; angle/stick baro-meters; thermometer; hydrometer; Philips 19:2:91, 108.

The rectangular backboard has a small carved urn on a platform between the pediment sides, and curved cisterns for the barometers at the bottom of each; the angle barometer rises from the left-hand side, with the silvered scale running at a rising angle along the top of the backboard, inscribed with the weather predictions, including "RAIN" "MORE RAIN" "FAIR" and "VERY DRY"; the thermometer rises beside the stem of the angle barometer; it appears to be glass-mercury with a silvered scale; the stick barometer rises from the cistern on the right-hand side of the backboard; it also has a silvered scale, with a sliding marker, 27-31", from "RAIN" to "FAIR"; in the centre, between the tops of the barometer tubes, is the brass-bound glazed circular hygrometer, with, on either side, carved four-hole lattices in the backboard, that on the right being larger, allowed by the rise in the angle tube; most of the backboard is covered in a printed perpetual calendar entitled: "A Perpetual Regulator of Time", which has columns of figures, and artistic engravings of sparsely-clad figures.

The barometer was offered in the Poly Peck (42 Berkeley Square) Sale by Philips, and the catalogue entry, under a colour photograph, reads: "108 A late 18th Century Watkins Type Angle Barometer, the rectangular mahogany backboard with a broken pediment, turned finial and Greek key moulding, the angle barometer with silvered scale inscribed...DUBLIN, and with

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thermometer and hygrometer, and with a printed card Perpetual Calendar inscribed 'Published by JNo ALMENT MARY'S ABBEY DUBLIN', 58cm. (1ft.11in.) wide £6000-10,000

The Watkins family working in various partnerships were particularly noted for the production of such barometers after their introduction by Francis Watkins in 1752, the year in which the Gregorian calendar was adopted in England. A similar barometer, now in the Museum of the History of Science, Oxford, is illustrated in N. Goodison, *English Barometers 1680-1860*, 1969, pp.245-249, pls. 151 and 152."

(In the 1977 edition, this is featured on pp.269-273, pls.185-187, the plate on p.270 showing detail of the Perpetual Calendar.) The instrument fetched £15,000 in the sale (£18,975 including premium and VAT).

The dates of Easter Day appear to be listed from 1772, hence the c1771 date; Morrison-Low 1989,120 gives dates 1767-88; John Alment had been a foreman to John Margas; he died in 1787, aged 47, although his name appears in the Directory for 1788.

Ex0320 DIAL - HORIZONTAL PEDESTAL

J. Alment Dublin Fecit Isaac Glenny 1771

W 184. 1771. S.

Brass; octagonal; gnomon with scroll support; Christie 19:11:87, Lot 323; Historical Technology 132,1989,190.

Christie describes this: "A brass sundial of octagonal form signed 'J. Alment Dublin Fecit' and further engraved 'Isaac Glenny 1771', the gnomon with scroll support". - £80-120.

Historical Technology illustrates the dial, and gives a fuller description: "IRISH REPUBLICAN BROTHERHOOD (The FENIANS) ASSOCIATED SUNDIAL - Irish, 18th c, with three inscriptions: 'J. Alment Dublin Fecit'. 'MEMENTO MORI JOSEPH BIGGAR ARDRE, 1878 TEMPUS FUGIT', and 'Isaac Glenny, 1771'. The age darkened bronze dial has a 7¼" octagonal base and a 4¼" gnomon for 53° latitude. It is in very fine weathered condition, the well engraved base, for the most part, clear and sharp. The 1st and 3rd inscriptions appear to be in the same hand, thus dating the dial to 1771. The 1878 inscription gives the impression of being 100 years later and by a less skilled engraver....The DNB lists Joseph Gillis Biggar (1828-90) as an Irish politician from Belfast. Although born a presbyterian, he joined the Fenians in 1875 and was soon afterwards elected to their supreme council. But in August 1877, having refused to be bound by a resolution of the executive to break off all connection with the parliamentary movement, he was expelled from the body. This all in the same year that he converted to the Catholic religion. Thus the inscription on this sundial undoubtedly is a satirical comment on the politics of Joseph Biggar. However, it is not clear if it is a Republican commentary on his break with the Fenians or an Orangeman's commentary on his break with Protestantism." - \$595.

Ex0464 SECTOR

Jno. Alment * DUBLIN Fecit.

MxL 305. 1767-1788. F.

"EARLY IRISH SECTOR, third quarter 18th century, signed 'Jno. Alment*DUBLIN Fecit'. Made of ivory, 12" long open, the sector has a full complement of mathematical scales, with somewhat individualistic lettering and nomenclature (e.g. 'Leg' instead of the commonly used 'L' or 'Lin' for the Line of Lines)." - Tesseract 30,1990,17, \$420, illustrated.

Dates from Morrison-Low 1989,120.

Ex0499 TELESCOPE - REFLECTING

[Trade Label] John Alment Optician at ye Sign of ye Spectacles in Marys Abbey Dublin

LeD 63 (2½"); L 451; MnH 362; C 431x178x102.

1767-1788. R.

Brass; folding cabriole legs; private ownership.

The three legs hold a turned pillar with a swivel and pivoted bracket on top; this attaches to the tube with two large wing nuts; the eyepiece detaches from the telescope tube (L356) for storage; focus is by a screw rod from the eyepiece end to the secondary mirror; the instrument is in an oak case with the John Alment Trade label inside the lid (see Ex0500).

The present owner can trace the telescope to John Alment's grandson, Edward Johnstone Alment (1830-1917), and he gives the following details: "The original lacquer (gilding?) is considerably scratched on the barrel and stand, but the eyepiece is almost pristine. The latter has the red glass affix, but I believe a swinging cover may be missing. The three screws attaching the stand swivel cover are not original, nor are some in the box hinges. The wood screw alternative to the legs is much rusted. The main mirror needs some polishing."

Dates from Morrison-Low 1989,120.

Ex0500 TRADE LABEL

John Alment Optician at ye Sign of ye Spectacles in Marys Abbey Dublin. Makes Optical Philosophical & Mathe-matical Infruments. Viz Spectacles, Concave Glafs, Telefcopes, Microfcopes, &c Reading & Opera Glaffes, Air Pumps, Electrical Machines, Barometers, Thermo-meters, With Variety of Drawing & Surveying INSTRUMENTS.

The Label, on the lid of the reflecting telescope Ex0499, includes illustrations of a horizontal pedestal dial; a universal equinoctial ring dial; a telescopic level or plain theodolite on a raised arc rack above a tripod stand; spectacles; a Cuff-type microscope; a reflecting telescope; a three-draw marine telescope; a stick barometer; and an etui of drawing instruments.

The Label is in private ownership.

Morrison-Low 1989,120 gives dates 1767-1788.

Ex0631 BALANCE - EQUAL ARM

[Trade label] (William Archdall 1, Darby's Sq Dublin, who sells all sorts of Money Scales)

No measurements available. 1737-1751. R.

Only known coin scale by William Archdall, swan-neck ends; curved box; Crawford-Hitchins 1994,1758.

The label is very worn, but the wording can be reconstructed as above; the pans on the scale are stamped "S D"; the box contains seven weights, five having the date 1737, so the balance would date between this and Archdall's death in 1751; he is recorded at Skinner Row in 1736, and also at Darby Square, Werburg Street; Archdall was Warden of the Goldsmiths' Company of Dublin from 1709-1713, and Collector of Revenue in the Country of Ireland, Assay Master, Receiver of the Duties on Plate, and Maker of Weights for all Foreign Coin current in Ireland from 1736, and is known for his surviving weights, whose accuracy was not good! - he was succeeded by Henry Archdall, working between 1747 and his death in 1790, who also produced weights.

Ex0496 KALEIDOSCOPE

(P.K. Arm, Ltd, 1 Clarence St. West. Belfast.)

H 241. c1920. PC.

Sheet brass, on wood base with rotating platform, fixed and rotatable mirrors; Tesseract 31,1990-91,56.

"THE POLYANGULAR 'VICTOR DESIGNOSCOPE' ...Standing 9½" tall, made of simple sheet brass above a solid wood base with rotating platform, the instrument has one fixed and one rotatable plane blue glass mirror, adjustable for a wide range of multiplicities of symmetry of the image. It represents a revival of Brewster's 'polyangular' kaleidoscopes, and is the only example of this form we have seen." - in original cardboard box, illustrated, \$850.

Maker/supplier not listed in Burnett & Morrison-Low 1989.

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Ex0302 GLOBE - TERRESTRIAL

(E.J. ARNOLD & SON LTD, LEEDS, GLASGOW & BELFAST)

D 305 (12"). Early 20 C. G.

Twelve coloured paper gores; half meridian circle; turned wooden stand; Christie 12:11:92, part of Lot 7.

Ex0558 GLOBE - TERRESTRIAL

(E.J. ARNOLD & SON LTD LEEDS, GLASGOW & BELFAST)

D 305 (12"). Early 20 C. G.

"A 12 inch diameter terrestrial table globe with 12 coloured paper gores, half meridian circle on turned wooden stand" - Christie 22:12:92, part of Lot 261, £100-150.

Ex0321 BALANCE - POSTAL

(Austin, Dublin)

No measurements available. 1818-1820. F.

"A postal balance by Austin, Dublin, with weights, on mahogany base."; Christie 7:1:82, Lot 127.

Morrison-Low 1989, 120 lists John Austin, Mathematical Instrument Maker, 2 Essex Quay, 1818-1820 - assumed to be him.

Ex0323 SINGING FLAMES APPARATUS

(Supplied by Professor W.F. Barrett)

No measurements available. c1876. R.

"Stand & Burner for Sensitive Flames The sensitive flame is an illustration of resonance. The vibrations accepted by the flame are those which the flame itself would emit when roaring. A flame to be sensitive must be brought to the verge of roaring by a proper adjustment of pressure on the gas supply. The flame is then in unstable equilibrium, and a feeble sympathetic vibration will then produce the same effect on the flame as a slight increase in the gas pressure. The flame to be extremely sensitive must be fed with gas which flows smoothly and freely to the orifice. A bell gas holder is far better than a gas bag for obtaining the necessary pressure. The gas cocks must be fully open and the pressure adjusted by altering the weights on the gasholder. The stand shown allows the gas to flow smoothly, and the best burner is a steatite 'jet photometer' burner carefully enlarged till it gives the tallest possible flame under a pressure just short of roaring. Such a flame with good gas can be had 2 feet high, shrinking down under the influence of a sound to less than one half this height. With similar burners and pressures the quality of different specimens of coal gas is accurately determined by the degree of sensitiveness of the flame. See Phil. Mag., March and April 1867."

No.697a in the Catalogue of the 1876 Loan Collection at South Kensington. Not found in Museum 8:1993.

Ex0324 SINGING FLAMES APPARATUS

(Supplied by Professor W.F. Barrett)

No measurements available. c1876. R.

"Set of glass tubes for illustrating singing flames With paper sliders for adjusting the pitch of any tube. The only novelty here is the paper sliders, which enable the pitch of the note to be readily adjusted, and were originally suggested by the exhibitor." No.697 in the Catalogue of the 1876 Loan Collection at South Kensington. Not found in Museum 8:1993.

Ex0325 SINGING FLAMES APPARATUS

(Supplied by Professor W.F. Barrett)

No measurements available. c1876. R.

"Suitable source of Sound for experiments with Sensitive Flames This is simply a loud ticking watch enclosed in a padded case with a movable cover, and mounted on a sliding stand."

No.697b in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0326 SINGING FLAMES APPARATUS

(Supplied by Professor W.F. Barrett)

No measurements available. c1876. R.

"Practical application of Sensitive Flames By using a suitable burner a sensitive flame can be made to spread out sideways into a fish-tail flame under the influence of sound. Under such conditions the flame can be made to touch a compound metallic ribbon, which curves by unequal expansion, closes an electric circuit, and rings an electric bell. An arrangement of this kind could be adapted to detect burglars, or to act as a self-recording phonoscope." First exhibited [by WFB] at the RDS, January 1868.

No.697c in the Catalogue of the 1876 Loan Collection at South Kensington. Not found in Museum 8:1993.

Ex0327 SOUND CYLINDERS

(Supplied by Professor W.F. Barrett)

No measurements available. c1876. R.

"Set of Resonant Tubes By suddenly and successively withdrawing the stopper, the resonance of the air within the series of tubes will give the notes of the common chord."

No.698 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0213 CIRCUMFERENTOR

(Barry Cork fecit)

No measurements available. 1824. FL.

Reported in Bull SIS 1,1983,7.

Fennell 1963,3 lists Joseph Barry as a watchmaker in 1824

Ex0262 DIAL - UNIVERSAL EQUINOCTIAL RING

JOHN AND PHIL BATE (Fecit, Dublin, 1763, No.176)

D 150. 1763. S.

"The meridian ring engraved with degree scale, pivoted with hour ring and centre bridge with cursor and pin-hole sliding over calendar and sun sight."; illustrated - SothebyCH, 30:11:88, Lot 381, £600-800.

Morrison-Low 1989,120 lists John Bate FL 1750-63, and Philip Bate in 1761 and 1762 Directories.

Ex0322 DIAL - HORIZONTAL PEDESTAL

P. Bate Fecit No 1234

152x152. 1761-1762. W.

Brass; square; gnomon with scroll support; hours IIII-VIII; outer double circle with roman hours divided into eighths; hours with circle below; double circle with decoration inside this; undecorated double circle near centre; signature illustrated - Christie 27:11:86, part of Lot 217, £100-150.

Philip Bate listed from 1761-2 in Morrison-Low 1989,120.

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Ex0588 OCTANT

(BENNETT CORK)

R 270. Early to mid 19 C. G.

"AN EBONY AND BRASS OCTANT, English [*sic*], early 19th century, signed on the ivory plaque BENNETT CORK, with ivory scale and vernier, brass index arm, set of coloured filters, fore and backe [*sic*] sights...in shaped oak case £250-350" - Sotheby 16:7:1993, Lot304.

Burnett & Morrison-Low 1989,144 list Thomas Bennett from 1810-1867.

Ex0516 OCTANT

(* BENNETT * CORK *)

AR 356 (14"). 1810-1846. F.

Ebony ivory and brass; curved T-insert frame; window vernier; three mirrors; three shades; Christie 18:6:92 Lot 315.

"An 18th-Century ebony and brass octant, signed on the makers plaque * BENNETT * CORK * with double 'pin-hole' sight and slide, back sight, mirrors and three shades, the brass index arm 14 inch radius, with framed vernier scale, the main arc divided 0°-100° on three turned brass feet in fitted stepped mahogany case with trade labels." - colour illustration, suggested price £400-600; part of the Sale of Saul Moscovitz property.

Dates from Burnett & Morrison-Low 1989,144.

Ex0050 QUINTANT

(Bennett, Cork)

R 203. 1810-1867. F.

Ebony; label in box: "H.G. Blair & Co. 53 James Street, Cardiff"; Town Docks Museum, Hull.

See Burnett & Morrison-Low 1989,85&144-5.

Ex0319 SEXTANT - BOX

(Bennett Cork)

D 75 (3"). 1810-1867. F.

"A Brass Box Sextant, English, mid 19th century, with silver scale and vernier, magnifier, two coloured filters and telescope, in brass case with retailers name engraved on lid 'Bennett Cork',... in leather case" - Sotheby 5:10:89, Lot 402, £250-350.

Dates from Burnett & Morrison-Low 1989,144-5.

Ex0641 TELESCOPE - REFRACTING

(Bennett CORK)

TuD 63; L 170-370. Early to mid 19 C. R.

Mahogany tube with brass ends; three brass draw tubes; push fit shade with dust slide at objective end; erecting lens.

In Handels og Sofartsmuseet, Kronberg, 3000 Helsingør; Denmark; recorded in Andersen 1995,71 (No.353).

Dates from Burnett & Morrison-Low 1989,144-4.

Ex0034 BAROMETER - MARINE

T Bennett Cork

No measurements available. 1810-1867. F.

Mahogany; on gimbal mount; square top; thermometer on hinged plate beside plates 0-120°; ring support; date given c1820; illustrated Banfield 1985b,166.

Ex0125 BAROMETER - STICK

(F. Bennett Cork [almost certainly a misprint for T.])

H 990. 1810-1867. F.

"A late George III mahogany Stick Barometer, the silvered plate signed F. Bennett Cork and with vernier and thermometer, in a moulded chevron-veneered case with a broken pediment and turned cistern cover." - Sotheby 21:7:83. Lot 175, £250-350.

Dates from Burnett & Morrison-Low 1989,144-5.

Ex0049 DIAL - HORIZONTAL COMPASS

(T. Bennett, Cork)

No measurements available. 1810-1867. F.

From the Lewis Evans Collection; Evans purchased it from J. Lowe Wardour in 1903; MHSO 183 M26.

Dates from Burnett & Morrison-Low 1989,144-5; information from Tony Simcock.

Ex0126 OCTANT

(T. Bennett of Cork Trade Label)

R 248. 1810-1867. F.

"AN EBONY OCTANT, the 'T'-frame inset with 0°-100° ivory scale, brass index arm with vernier, clamping and tangent screws and set of three coloured filters, ..in shaped mahogany case with one telescope, the lid applied with T. Bennett of Cork trade label, probably English, early 19th century." - Sotheby 20:9:83, Lot 98, £220-300.

Dates from Burnett & Morrison-Low 1989,144-5.

Ex0048 TRADE LABEL

(T. Bennett, 124 Patrick Street, Cork)

No measurements available. 1858. D.

On back of J.S. Hobbs "A Chart of the Cattegutt, the Baltic or East Sea" 1858; NMM negative B8959.

"T. Bennett, optician and manufacturer of mathematical, nautical & philosophical instruments, 124 Patrick Street, Cork"

Noted in Burnett & Morrison-Low 1989,75; firm at 124 Patrick Street from 1844-1867, p.144-5.

Ex0335 MEDICINE CHEST

(Bewley & Evans, Lower Sackville St., Dublin)

W 305. Mid to late 19 C. G.

"A good 19th Century mahogany and brass mounted Domestic Medicine Chest, the lid rising to reveal an eighteen-bottle compartment, most with labels of Bewley & Evans...with glass mixing slab, the drawer below containing six further bottles, scales, pestle and mortar, ornaments, etc., the chest with inlaid handles at each side and on drawer front." - illustrated - Philips 8:5:85, Lot 37, £700-1200.

Ex0016 BAROMETER - BANJO

(V. Bianchi, Dublin)

D 305.

Mahogany; scroll pediment; clock set above dial; Goodison 1977,302.

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Ex0333 DIAL - UNIVERSAL EQUINOCTIAL RING

(John Birnie)

No measurements available. 1775-1785. FL.

Bigger Collection; Birnie from Co. Antrim given dates 1775-1785 FL; information from A. Morrison-Low.

Fennell 1963,4 lists a longcase clock dated 1785 by John Birnie, Templepatrick.

Ex0110 MICROTOME

(BOOTH BROTHERS DUBLIN)

B 162x57. c1900. PC.

Wood block; sloping ledges for blocks; one with steel knife; other with brass clamp; Whipple 15.

Spare knife; knife has brass screw clamp; sprung brass clamp tightened by steel screw with knurled brass head; presented by R.S. Whipple.

Brown 1986,90 illustrated.

Ex0334 LEVEL - TELESCOPIC

(BUCKLEY DUBLIN)

No measurements available. 1832-1859. F.

"A 19th century lacquered brass surveying level signed 'Buckley Dublin' the telescope with rack and pinion focusing, level and cross bubble, lens hood and dust slide, on four screw tripod attachment and a brass and mahogany tripod." - Christie 20:8/19:11:87, Lot 237/338, £120-150/80-120.

Same description in both catalogues, with reduced price in latter, indicating that it did not sell in the first offer.

Dates from Morrison-Low 1989,121.

Ex0329 LEVEL - TELESCOPIC

(Buckley, Dublin)

No measurements available. 1832-1859. F.

Four screw mounting; spirit level under main tube; eyepiece gone; wood case; Christie 4:9:80, Lot 63.

Dates from Morrison-Low 1989,121.

Ex0328 OCTANT

(Buckley, Dublin)

No measurements available. 1832-1859. F.

Ebony; silvered scale and nameplate; coloured filters; peep-hole sight; Philips 20:8:80, Lot 33.

Dates from Morrison-Low 1989,121.

Ex0478 PANTOGRAPH

(Buckley Dublin)

L 705. 1832-1859. F.

"A 19th-century brass pantograph signed 'Buckley Dublin', with accessories in shaped mahogany case"; offered again on 27:9:90, Lot 216, £120-150 - Christie 29:3:90, Lot 170, £120-150.

Dates from Morrison-Low 1989,121.

Ex0332 PROTRACTOR

(Buckley Dublin)

D 305 (12"). 1832-1859. F.

"Chart Protractor"; brass; semi-circular frame; arc en-graved with three degree scales; Sotheby 11:6:85, Lot 218, £120-200.

Dates from Morrison-Low 1989,121.

Ex0314 PROTRACTOR

(Buckley, Dublin)

W 303 (12"). 1832-1859. F.

Brass; vertical arms with scales 0-40° and horizontal scale; Christie 28:8:89, Lot 232, £200-300.

The same instrument (presumably) was again offered in the Christie's sale of 14:12:89, Lot 160, £150-200, with an illustration in the catalogue, which shows it to be semicircular, with two arms, at right-angles to the wide diagonal scale, to the semicircular arc.

Dates from Morrison-Low 1989,121.

Ex0460 PROTRACTOR/PLOTTING SQUARE

Buckley Dublin

W 305. 1832-1859. F.

Brass; half-circle with two columns; wide diagonal, vertical and horizontal scales; Tesseract 29,1990,49 \$650.

"UNUSUAL PROTRACTOR/PLOTTING SQUARE.... This large plotting rule is 12" wide, engraved with vertical and horizontal scales of equal parts (20 parts per inch), interpolation grids, and degree scales divided every half-degree. It is an uncommon, attractive and functional form with the two vertical columns nicely shaped in brass. Condition is very fine, noting two minor edge nicks." Offered again in Tesseract 40,1993,36 \$895.

This could be the same instrument as Ex0314.

Dates from Morrison-Low 1989,121.

Ex0525 SEXTANT

(Buckley Dublin)

R 102 (4"). 1832-1859. F.

"Four inch sextant in box (cleaned)" reported as on sale from Paul Hamilton, 245/253 King's Road, Nov.'92; £450.

Information from Alison Morrison-Low.

Dates from Morrison-Low 1989,121.

Ex0331 BAROMETER - BANJO

(J. Buckley Dublin)

H 105; SPD 254. 1832-1859. F.

Rosewood; cresting gone; hygrometer, thermometer; silvered plate; spirit level; in shaped case -Sotheby 28:2:80, Lot 237.

Dates from Morrison-Low 1989,121.

Ex0330 OCTANT

(J. Buckley, Dublin [Label]) (J.W. Norie & Co., London)

R 292. 1832-1859. F.

Ebony and brass; peep-hole sights; one set of filters; oak case with Buckley label; Christie 21:10:82, Lot 53.

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Instrument signed by J. W. Norie, but case has a (detached) Buckley label, so it was presumably supplied by Buckley.
Dates from Morrison-Low 1989,121.

Ex0564 TELESCOPE - REFRACTING

(CAHILL OPTICIAN 13 WELLINGTON QUAY DUBLIN)

No measurements available. Late 19 early 20 C. R.

"Small three-draw terrestrial telescope", owned by a cataloguer in the Power House Museum, Perth; recorded in a letter from Julian Holland to John Burnett 22:4:87.

Patrick Cahill is recorded at this address from 1898-1904, Patrick K. Cahill from 1905-1907, Patrick Cahill Ltd from 1908-1918, and Patrick Cahill from 1919-1922 (Morrison-Low 1989,121).

Ex0207 COIL - INDUCTION

(Made by Nicholas Callan 1799-1864)

BrL 610; WiL 61000 (200 ft.) 1836-7. R.

Two coils wound on straight iron bar; one connected via repeater to battery; shock handles; Downshire College.

McLaughlin 1965,72-3 writes: "In his [Callan's] earliest shock machine, he had two equal coils, each two hundred feet in length, wound on a straight bar of iron two feet long. One of the coils was connected via his repeater to a battery, while shock handles were fixed to the ends of the total length of wire in the two coils. When the repeater was operated, there was a shock of great intensity. In Callan's phrase, he had generated an intensity current of electricity.

This was the world's first induction coil, and it was later presented to Downshire College in England (May 1837).

Ex0054 HYDROMETER

(Joseph Cappel 24 Portland St., Belfast)

No measurements available. 1858. A.

In Snowhill Manor, Gloucestershire; information from A. Morrison-Low.

Date from Burnett & Morrison-Low 1989,146.

Ex0017 BAROMETER - BANJO

(A. Casartelli, 2 Fade St., Dublin)

D 254. No date recorded.

Mahogany; scroll pediment; mirror set above dial; Goodison 1977,308.

Ex0116 CIRCUMFERENTOR

(Cave, Dublin)

D 356. 1729-1749. FL.

Mounted on a bar pivoted at the centre, ending in two folding sights; Sotheby 11:3:63, Lot 115, £26.00.

Outer rim engraved with scales of degrees, one side with two additional scales; socket on the back to take a staff.

Dates from Morrison-Low 1989,122.

Ex0264 CIRCUMFERENTOR

(Thos. Cave * Dublin Fecit)

HsD 140; BL 343; VasH 116. 1729-1749. FL.

Brass; silvered compass; two screw-on vanes on long base; Historical Technology 123,1982,154.

"The compass is bright brass, restored lacquer finish, silvered compass dial within 5½" d housing which is attached to a 13½" long base. The screw-on vanes are 4 5/8" h each. The brass compass cover is graduated 90°-0°-90° so that the compass may be used for elevation sightings." - illustrated, \$995 with a surveyors chain and marker pins in an oak case; one vane had been broken off and repaired by soldering on a brass plate over the break.

Set offered again, Historical Technology 125,1983,187 for \$995, and 127,1984,118 for \$995.

Ex0052 CIRCUMFERENTOR

Thos. Cave + Dublin Fecit

No measurements available. 1729-1749. . FL.

Brass; upper scale only 10-360°; fleur-de-lys and seven compass points; NM Merseyside 8.2.83.1.

No needle; no place for clamp; two lugs at sides.

Holbrook 1992,147 lists this in Liverpool Museum - "in circular brass box with lid".

Illustrated in Burnett & Morrison-Low 1989,24; dates from Morrison-Low 1989,122.

Ex0051 DIAL - HORIZONTAL COMPASS

(Thos. Cave Fecit)

P 52x88; CpD 21. 1729-1749. FL.

Brass; oval dial plate; hours IV-XII-VIII; folding gnomon; inset compass; shagreen case; Whipple 1044.

"Brass. Oval dial plate 52x68mm. Calibrated IV to XII, I to VIII by I, Folding pierced style [for 52°N]. Inset compass 21mm dia. 8 point compass rose. Shagreen covered case. Probably the instrument mentioned by Clay & Court (1932) p241. Purchased from the estate of T.H. Court." - description from Bryden 1988,7 (Entry No.9).

Dates from Morrison-Low 1989,122; R.S. Clay & T.H. Court, The History of the Microscope, London 1932.

Ex0617 DIAL - HORIZONTAL PEDESTAL

THOs. CAVE - Dublin Fecit A Perpetual Almanack [sic] for ye Year 173... for Ever

D 380; GnH 267. c1730. S.

Bronze; hours IIII-XII-VIII; central compass; gnomon has insert with human head; Vernay & Jussel, New York.

"A George II bronze sundial: the maker's name engraved at the South point "Thos. Cave - Dublin Fecit" and below which is engraved "A Perpetual Almanack [sic] for ye Year 173... for Ever"; the innermost ring is engraved with compass points, then outwards towards the rim with an equation table, a chapter ring (for time) and with longitudes of the various principal cities of the world marked on the outermost edge. The gnomon is very well engraved and is supported by pierced rococo scrolling incorporating a mermaid motif, which is engraved as well."

Offered for sale for \$6800.

Ex0336 BAROMETER - BANJO

(Cetti & Gatty Belfast)

H 890[?]; DID 203. c1815. D.

Satinwood; scroll top, urn; hygrometer, thermometer, dial, level; SothebySU 19:7:88, Lot 1417, £600-800.

Silvered dial; alcohol thermometer and spirit level; case with ebony stringing and inlaid shells; "A good satinwood Wheel Barometer, circa 1815"; illustrated.

Goodison lists Cettis & Gattys, but none in Belfast, though Andrew & Joseph Gatty in Dublin 1786-1824.

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Ex0618 MUSIC BOX

(John Chancellor, Dublin)

No measurements available. c1811. D.

Rosewood case containing clockwork cylinder mechanism; Philips, Bayswater 13:9:94; illustrated Irish Times 10:9:94.

"This rare automatic mechanical musical instrument was made by the noted maker, John Chancellor in Dublin around 1811.

Enclosed in a rosewood and brass case, it plays six different tunes and is expected to sell for between sterling £10,000 and £12,000 when it comes under the hammer at Philips of Bayswater in London next Tuesday." (Irish Times).

Fennell 1963,8 records that John Chancellor patented a musical clock (No.3487) in 1811.

Ex0035 BAROMETER - FORTIN

(Chancellor & Son 55 Lower Sackville Street Dublin)

No measurements available. 1899-1922. F.

Standard barometer on mahogany(?) back plate; central thermometer; illustrated in Banfield 1985b,187.

Date given c1830 does not match signature. A better photograph of the same barometer is published in Banfield 1976,86 where the date assigned is c1820; it is described: "The circular metal case is painted black, with brass rings and screws, with the cistern formed from a glass cylinder so that the mercury inside can be seen. A conical piece of ivory is fixed on top of the inside of the cistern with the point of the cone facing downwards. The point is set to coincide exactly with the zero of the scale and before taking a reading the mercury in the cistern is raised or lowered by the adjustable screw operating against a leather base, until it just touches the ivory. This system allows very accurate readings to be taken and was adopted and retained with little alteration for a hundred and fifty years."

Ex0291 DIAL - HORIZONTAL PEDESTAL

(EDWD CLARKE 10 Lower Sackville St. DUBLIN)

178-178; GnH 116. 1819-1821. A.

Brass; hours IIII-XII (at one corner of the square) -VIII; Historical Technology 106,1973,78.

"Irish, 19th c, signed 'EDWD CLARKE/10 Lower Sackville St./DUBLIN'. Brass garden dial 7" sq base, fine English style skeletonised gnomon 4 5/8" h.; the dial is illustrated, and has a central compass design; it is unusual in that the XII hour is at a corner of the dial square plate, and not in the centre of one side.

Dates from Morrison-Low 1989,122.

Ex0121 DIAL - UNIVERSAL EQUINOCTIAL

(Edwd. Clarke, no. 18 Lower Sackville Street, Dublin)

No measurements available. 1810-1812. A.

"Brass Universal Equatorial Dial"; silvered compass rose; needle lock; in fitted case; Sotheby 26:7:65, Lot 115, £35.

Dates from Morrison-Low 1989,122.

Ex0220 TELESCOPE - REFRACTING

(Edwd Clarke - Dublin)

L 1829; TrH 1829. 1817. D.

Brass; mahogany and brass tripod; two-part barrel screwed together; in private ownership in London (1988).

Fitted with small finder; lens cap has three swivel plates; large tripod with cradle holding telescope rigid, vertical half circle worm drive below; another worm drive rotates telescope horizontally, and these drives can be used on or off by means of a spring release and universal turning rods; three stabilisers to tripod; part of hand-written card, dated 1817, discovered when being restored.

Ex0088 BALANCE - EQUAL ARM

D.C. (Mastersign of Daniel Crosby, Scalemaker at the Sign of the Crown & Scales, 36 Pill Lane, Dublin.)

No measurements available. 1753-1785. R.

Metal beam; 1751 Watson Tables; Sotheby 18:6:86.

The Tables are headed "The New TABLE of COIN: Since 8 July 1751. Calculated by JOHN WATSON, Bookfeller".

Watson published "The Gentleman and Citizen's Almanack" from 1729 onwards; he used to publish annually the equation of time to derive apparent solar time from mean solar time; his Almanack was superseded in 1844 by "Thom's Irish Almanack and Official Directory" which continued to 1934.

Balance details and photograph from M. Crawford.

Crawford-Hitchins 1994,1763 illustrates two more equal-arm scales, each with a trade label: "DANL CROSBY Scale Maker to the BANK OF IRELAND, No.36 Pill Lane, Dublin"; one of these is ascribed to the Jerry Katz collection; the Bank was founded in 1783, only two years before Daniel Senior's death, so the label could also have been used by Daniel Junior; David Pickering was scalemaker to the Bank from 1796-1798.

She also gives line drawings of five boxes and comments: "The distinctive feature of Daniel Crosby's coin scales was the glossy, highly polished, cut-from-solid mahogany boxes, nicely lined in thick green baize. Although no two seen have an identical profile, they are easily noticed because of their curved outlines and rounded-off edges, both on the lids and bases. Where the lid met the base, the wood was filed away, to allow a thumb-nail to be inserted to open the box easily... The beams were very fine, with oval box-ends. One had shears almost half the length of the beam, an Irish characteristic in the late 18th and early 19th century. One had round sight-hole shears of unusually small diameter, another Irish characteristic, and a very neatly made pendant. Most have DC stamped in the pans".

Watson information from Wayman 1987,127; dates of Daniel Crosby Senior from Crawford-Hitchins 1994,1762.

Ex0053 BALANCE - EQUAL ARM

[Trade label] DANL CROSBY No 36 Pill Lane Dublin

BmL 215. 1785-1804. R.

Steel beam; brass pans stamped DC; rounded wood case; label in lid; Whipple 427; presented by R.S. Whipple.

Box beam ends; self locating knife edges; ring bearing in gallows with double aperture; pans circular; shaped case with two slots for nested weights (none extant); Dublin Directories list Daniel Crosby in 36 Pill Lane as a Brazier & Scale Maker from 1783-1804 (Brown 1982b,25). Diana Crawford Hitchins 1994,1760-2 lists Daniel Crosby Senior from 1753-1785 (when he died), and Daniel Crosby Junior from 1785-1804 (both at 36 Pill Lane), and attributes this label (which has been trimmed from a rectangular one) to Daniel Senior.

Ex0337 DIAL - HORIZONTAL PEDESTAL

(Made by John Cruise..1843) ([Gnomon] YEATES DUBLIN)

D 425; GnH 305. 1843. S.

Slate; cast bronze gnomon 55°; central compass rose; 25 places added; Historical Technology 122,1981,146

"VERY LARGE IRISH GARDEN DIAL - Signed and dated 'Made by John Cruise, Castletown Kilpatrick In The Year Of Our Lord 1843' marked 'CASTLETOWN Lat 53°38' and the gnomon is stamped 'YEATES/DUBLIN'. The base is an engraved slate disc 16 3/4"d with an attached cast bronze gnomon for latitude 55° standing 12" high. The elaborate dial has a compass rose at the centre, then a circular equation of time chart, followed by a ring with positions for high noon at 25 different locations

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around the world, and then the chapter ring divided in 5 minute intervals on the inside edge and 1 minute intervals on the outside. There is some edge chipping and wear to the slate dial and two long cracks which have been glued back together. Yet most of the engraving is clear and sharp and the gnomon without any damage so that overall condition can be rated fine to very fine." - illustrated, \$395; it is speculated that Cruise may have made this from a Yeates kit. Offered again Historical Technology 124, 1982, 121, \$345; and in Historical Technology 132, 1989, 183, \$445. This is presumably the same dial offered by Christie 18:6:92, Lot 219, the Sale of Saul Moscovitz property, although the signature given in the Sale catalogue has the date 1845 rather than 1843 - suggested price £200-300.

Ex0305 CRITICAL STATE APPARATUS

J.A. CUMINE, PHIL. INST. MAKER. 57 ARTHUR STREET, BELFAST
H 1320. 1852-1881. F.

Metal bases for single and double tubes; made for Thomas Andrews (1813-1885); SM 1876-1047.

Black painted cast-iron bases and vertical supports, only the double one signed; brass bosses hold vertical copper pipes, with brass fittings on top leading to glass cylinders; the display includes biographical details of Andrews, who was born in Belfast; he is best known for his discovery of the critical temperature of a gas - above which it cannot be liquefied by pressure alone.

A.A. Mills has had a paper accepted by "Endeavour" (now published Endeavour 1995, 19(2), 69-75) "The critical transition between the liquid and gaseous conditions of matter", in which he considers the work of Andrews. He comments: "From the point of view of fundamental science, Andrews' apparatus (made by Cumine in Belfast) is arguably the most important ever made in Ireland".

The paper records: "In a classic series of experiments (Andrews Philosophical Transactions of the Royal Society Vol. 159, 575, 1869) he measured the change in volume with pressure of a sample of carbon dioxide trapped above mercury in a calibrated glass capillary, the temperature being held constant during each run by surrounding the tube with a thermostatted water bath... Andrews realised that carbon dioxide could only be liquefied below a temperature of 31°C - its critical temperature - and suspected that a similar situation would apply to the so-called permanent gases... As a result of his experiments, Andrews re-defined the previously loosely-synonymous terms vapour and gas. A gas he defined as the state of any substance above its critical temperature, where liquefaction is impossible. A vapour, on the other hand, may be liquefied by pressure alone: it is below its critical temperature.... It will be noted that, according to these conditions, carbon dioxide at room temperature should strictly be described as a vapour rather than a gas."

Dates from Burnett & Morrison-Low 1989, 83; on display in Gallery 62 (Heat) 8:1993.

Ex0622 CIRCUMFERENTOR

Wm. Davis, No. 7 Portland Row DUBLIN
D 165. 1842-1860. F.

"A brass surveying compass, the engraved silvered-dial with bubble level and cross-bubble" - Christie 3:3:94, Lot 297; the dial has a needle and shaped needle clamp; with upper scale 10-360° and lower 10-80°(x4); it was offered with a later stand. This could be the same instrument as Ex0271, but the latter's diameter was given as only 150, and it was offered on an alidade and stand - this one is illustrated without an alidade, although this could have been screwed off to give a better photograph in less space.

A William Davis was a scale maker at 4 Bull Lane from 1842-1860 (Alison Morrison-Low, personal communication).

Ex0271 CIRCUMFERENTOR

(Wm. Davis, No. 7 Portland Row, DUBLIN)
D 150. 1842-1860. F.

"A Brass Circumferentor, English or Irish, circa 1790, signed on the silvered rose 'Wm. Davis, No. 7 Portland Row, Dublin', engraved with eight cardinal points and inset with two bubble levels 15cm.(6in.) diam., mounted on staff-head and alidade (lacking sights)", £300-500, illustrated - Sotheby 10:3:87, Lot 132, £300-500; sold for £286 - Sotheby Guide 1989, 505.

Date in catalogue c1790, but a William Davis was a scale maker at 4 Bull Lane from 1842-1860 (Alison Morrison-Low, personal communication).

Ex0266 BAROMETER

(James Del Vecchio, Dublin)

No measurements available. 1810-1838. F.

Burnett & Morrison-Low 1989, 28 note that a barometer is known to have been produced by James Del Vecchio.

Dates from Morrison-Low 1989, 123.

Ex0339 ALTIMETER

(Dixon & Hempenstall, Dublin)

D 64. Early 20 C. G.

In red leather case; no further details; Christie 10:7:80, Lot 131.

Ex0340 BAROMETER

(Dixon & Hempenstall)

No measurements available. Early 20 C. G.

Alison Morrison-Low records an enquiry to the Royal Scottish Museum from owner in Inverness, May 1985.

Ex0037 CLOCK/BAROMETER

DONEGAN DUBLIN

No measurements available. c1840. R.

Mahogany long case eight-day clock; circular barometer dial; alcohol thermometer °F; Banfield 1985c, 139&142.

Clock has painted face; siphon tube contained in box fixed to back of clock door and has usual pulley, thread and glass weights arrangement; tube has iron tap near bottom of short limb; weight-driven anchor escapement on clock; illustrated; notes John Donegan recorded as having two shops in Dublin in 1839.

Ex0599 VOLTMETER

EGAN & TATLOW DUBLIN VOLTS

B 281x278x31; H 312; CyHsD 168. Late 19 early 20 C. G.

Mahogany base and vertical support for glazed brass cylinder housing; silvered face and arc scale 0-10.

The base has three brass level screws, and the vertical support has two brass screw electric contacts; the needle extends from behind a brass semi-circular plate towards the top of the face. Sold to London dealer by North Monastery School, Cork. Makers/suppliers not listed in Burnett & Morrison-Low 1989.

Ex0203 COMPASS

(J. Eshelby, 5 Eden Quay, Dublin)

D 170; H 280. 19 C. PC.

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"A 19th Century brass Altazimuth Compass, the dial stamped on paper inset J. Eshelby, 5 Eden Quay, Dublin, 17cm. diam., with twin folding sights, the compass box on gimbal rings, mounted on turned mahogany stand, 28cm high overall." - Philips 17:7:85/26:2:86, Lot 60/84, £120-180.

Maker/supplier not listed in Burnett & Morrison-Low 1989.

Ex0503 AMPUTATION SET

FANNIN DUBLIN

CW 242. 19 C. G.

"A pocket amputation set by 'FANNIN DUBLIN', with inter-changeable bevelled ebony handle, saw blade, three other ebony flat handled instruments, and needle in plush lined fitted wooden case - 9½in wide, with one replacement instrument." - Christie 4:7:91, Lot 45.

Ex0092 SCOTOMETER(?)

(FANNIN & CO)

L 160; MxD 54. 1830-1890. PC.

Wood, paper and metal; hand revolved disc bearing small coloured discs; SM A680283.

Black wood; handle (with white cross on one side and on other circular depression) is attached to a circular wood disc; at the top of the disc is an aperture both front and back; coloured discs of paper appear by pressing a series of metal projections which revolve the main mechanism inside; the colours are pink, dark blue, light blue, dark green, light green, yellow, white, and red; presumed for testing colour perception.

Photograph photocopy and details from Heather Mayfield.

Ex0267 BAROMETER

(Alexander Feroni, Dublin)

No measurements available. 1809-1810. F.

Burnett & Morrison-Low 1989,28 note that a barometer is known to have been produced by Alexander Feroni.

Dates from Morrison-Low 1989,124.

Ex0055 OCTANT

(Made by Francis Fitton Cork For Captn Abel Orpin)

R 400. 1784. S.

Mahogany, brass, and ivory; index, horizon and half horizon mirrors; Peabody Museum, Salem, Mass-achusetts, M3275.

Frame of mahogany painted black with curved T insert; ivory scale -5-95° by 1° subdivided to 20', with both zenith and altitude numbering; flat brass index arm, with window vernier, reading to 1'; adjustable index mirror with two removable shades; horizon glass with lever adjustment and shades from index mirror; double peep sight vane; back sight with single peep; back horizon with lever adjustment; stepped mahogany case; 2" magnifier in horn folding case. Brewington 1963,14 - "Peabody Museum Collection of Navigation Instruments", illustrated, Plate XI.

Ex0259 OCTANT

(Made by William Fitton Corke for Thomas Hickman Esqr)

R 381. 1773. S.

Rosewood; inlaid ivory scale with vernier; in London antique shop, July 1988 - information from Peter Delehar.

Ex0341 SPECTACLES

(H. Flavelle, Dublin) - hallmarked Dublin 1830

L 122. 1830. H.

Silver gilt; folding; green shagreen case; in sale (no details).

Information from Alison Morrison-Low.

Ex0309 DIAL - HORIZONTAL PEDESTAL

(John Foster fecit Colerain. 1825)

D 260. 1825. S.

"An early 19th century Irish brass sundial signed, 'John Foster fecit Colerain. 1825', and engraved with a cartouche with monogram and crest, the centre with stylised sun inscribed "Me lumen vos lumbra regit", a calendar dial and signs of the zodiac, the gnomon set for 48°." - from the Time Museum Inventory No0222, illustrated - Christie 14:4:88, Lot 62, £200-300; elaborate curved gnomon insert.

Ex0342 BAROMETER - BANJO

Gardner & Dowling Belfast

H 1118; DID 254. c1840. R.

Mahogany; scroll top, urn; hygrometer; thermometer, side pillars; dial 28-31"; level; Banfield 1985c,103.

"Another form of decoration used for the squared case barometer was the addition of pillars, one on each side of the thermometer, as shown in Fig.115. The mahogany case is outlined with ebony stringing and brass pillars flank the mercury thermometer. The dial engraving is particularly fine, comprising a bowl of fruit with swags and floriate scrolls."; thermometer appears to have a curved glass cover; the signature is on the rectangular plate around the level.

Ex0308 MICROSCOPE - COMPOUND

(Gardner & Neal, Belfast)

MxH 315. 1809-1818. F.

"A brass Martin-type Microscope, signed on the fixed limb of the folding tripod base, 'Gardiner & Neal, Belfast', the tube attached to a sliding bracket with aquatic motion and focusing on a rectangular column by rack and pinion, fixed stage with wings for accessories, adjustable mirror below complete with fish-plate, live box, stage condenser, forceps, tweezers, etc." - Sotheby 20:5:74, Lot 21, £90.

Dates from Burnett & Morrison-Low 1989,147.

Ex0056 OCTANT

* Gardner & Neil * Belfast *

R 254. 1809-1818. F.

Ebony, brass and ivory; index, horizon and half-horizon mirrors; in Dept of Natural Philosophy, Univ. of Glasgow.

Formerly property of Lord Kelvin's father; ebony frame with curved T insert and pencil; ivory scale 0-100 with window vernier; brass index arm with tangent and clamping screws; only one set of three shades; two peep-sights.

Holbrook 1992,131 records that there is an anchor engraved on the ivory degree arc.

Illustrated in Burnett & Morrison-Low 1989,80; dates p.147.

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Ex0343 CHRONOMETER

(Gardner & Co. Dublin)

No measurements available. 19 C. G.

"A chronometer marked 'Gardiner & Co. Dublin' is owned by the National Maritime Museum."

Recorded in Brewington 1963,127.

Ex0627 BALANCE - EQUAL ARM

[Trade card] SAML. GATCHELL, BEAM & SCALE MAKER, AND IRONMONGER. N0.87 Pill Lane, DUBLIN.

PasD 400. 1799-1835. R.

Large brass pans; in made-up oak box with attractive trade label - in a private collection.

Recorded by Crawford-Hitchins 1994,1769, who suggests that the large pans could be used for medicines or coins.

She describes the trade label: "He had a magnificent trade-card engraved in the Bewick style, and full of symbolism. Justice is sitting prettily on a rock holding her scales up high so that they could swing freely. She holds her sword as if it were a bunch of flowers, and obviously she is not expecting to use it. She had two large parcels by her feet full of good things, and an Irish harp against her knee, being proud to be an Irish woman. A galleon sails serenely over the sea, taking Irish goods to other lands....It has to be one of my favourite trade-cards".

The engraving for this trade-card was altered after the firm became Samuel Gatchell & Sons, and Crawford-Hitchings 1994,1798 illustrates this, with the new name of the firm and the addresses "Pill Lane & 9 Mountrath St. DUBLIN"

Gatchell worked from 1791-1835, at Pill Lane from 1799-1835, and as Gatchell & Sons from 1835-1862 (*Loc. cit.* 1768,1798).

Ex0345 STANDARD VOLUMES - IMPERIAL

(Samuel Gatchell & Sons, Dublin, No.487 1835)

Half-gill to gallon. 1835. S.

"SEVEN BRASS COUNTY OF WEXFORD IMPERIAL MEASURES"; Sotheby 20:9:83/28:2:84, Lot 188/122; £800-1200/4-600.

"A SET OF BRASS IMPERIAL MEASURES, No.487, by 'Samuel Gatchell & Sons of Dublin', comprising measures for a gallon, half-gallon, quart, pint (by 'Bate of London') half-pint, gill and half-gill, each stamped with proof marks on the rim, dated 1835." - illustrated, the gallon measure with two side handles.

Ex0632 BALANCE - EQUAL ARM

S. GATCHELL & SONS DUBLIN

BmL 850. 1835-1861. R.

Iron trade beam; oval box ends with hooks; shears and pointer; recorded in Crawford-Hitchins 1994,1799.

The central bearing has a protruding collar to protect the full length of the knife edges; the cheeks covering the end bearings are much thinner than normal, but seem adequate for the job. The extensions to the cheeks, which attach the box-ends to the beam, were slightly less well-finished than normal...The paint has been removed...[revealing] the method of fixing the cheeks to the box end bearings. A shiny line of brass shows over the top of the curve of the box..."

Ex0269 BAROMETER - STICK

(Josh Gatty)

No measurements available. 1801-1814. F.

Mahogany; broken pediment top; hygrometer; glazed register plates, thermometer; shallow turned cistern cover; Goodison 1977,325.

Assumed to be Joseph Gatty of Dublin, as the only Joseph Gatty listed (among many Gattys) is in Dublin.

Burnett & Morrison-Low 1989,28 note that barometers are known, signed by Andrew & Joseph Gatty - location not given.

Ex0268 BAROMETER - BANJO

(Gilbert, Belfast)

H 985; DID 203. Mid to late 19 C. G.

"A MOTHER O' PEARL INLAID ROSEWOOD WHEEL BAROMETER, the eight inch silvered dial signed 'Gilbert, Belfast' contained in a rosewood veneered case with moulded edges, the throat with inset spirit thermometer, hand setting knob beneath the dial and inlaid with mother o' pearl scrolls and birds at the top, above and below the dial." - Lawrence 26:3:87, Lot 186.

Not listed in Burnett & Morrison-Low 1989.

Ex0128 BAROMETER - STICK

(G. Giocomelli Belfast)

No measurements available. Mid 19 C. G.

"Recorded in an antique shop in Edinburgh, May 1987"; Burnett & Morrison-Low 1989,87.

Ex0344 BAROMETER - STICK

(Gray Belfast)

H 1040. Late 18 early 19 C. PC.

"A George III Mahogany Stick Barometer, with an exposed tube, the brass scale with a vernier, a thermometer and signed 'Gray Belfast', the case with a glazed door, broken pediment centred by an urn finial and a turned cistern cover." - illustrated

- SothebySU, 19:7:88, Lot 106, £1000-1500.

George III reigned from 1760-1820.

Ex0515 CLOCK - REGULATOR

P.F. GULBRANSEN BELFAST

H 1625; DID 229 (9"). 1860-1862. R.

Mahogany case; glazed front; silvered dial; brass, steel and mercury pendulum; Sotheby 2:10:92, Lot 443.

"...the hours and seconds dials contained within the minutes ring, substantial movement with inverted train, deadbeat escapement with jewelled pallets, high-count train, maintaining power, concealed weight running down the back of the case, and double winding arrangement, (a) by conventional key on winding square at centre of hour hand, (b) by a pull string through the side of the case attached to a pulley on the rear of the winding arbour, separately suspended brass and steel pendulum with barometer-type mercury tube at the centre and two mercury jars forming the bob, the rectangular glazed case bordered with convex moulding." - illustrated, suggested price £3000-4000.

The catalogue records that Paul Gulbransen moved from Glasgow to Belfast, where he worked from 1860-62.

Ex0352 DIAL - ALTITUDE RING

(W.H. Dublin, 1741)

D 51. 1741. S.

Brass; in a lot with three other ring dials; Sotheby 30:11:59, Lot 99.

The signature details are: "'W.H. Dublin, 17412', but the last '2' is clearly a miss-type for '."

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Alison Morrison-Low (6:6:94) records that the Musée International d'Horlogerie, La Chaux-des-Fonde, Switzerland, has a ring dial (Inv. No. V40) with the signature "W.H. Dublin 1741" - perhaps this is the same instrument?

Ex0354 TELESCOPE - REFRACTING

(W.A. Hackett 38 Patrick St. CORK)

LeD 26. 19 C. PC.

"A 19th century four-draw brass one inch telescope"; Christie 11:8:88, part of Lot 16, £40-60.

Not listed in Burnett & Morrison-Low 1989.

Ex0609 BATTERY - LECLANCHÉ

INDIA-RUBBER, GUTTA-PERCHA, & TELEGRAPH WORKS CO., Limited, SILVERTOWN, ESSEX.

HANDLEY & SHANKS, CORK

Hs 231x190x190. 23:1:1901. S.

Hinged mahogany housing for 20 pitch-topped cells.

There are three brass screw electric contacts on the front of the housing, and one each on the left and right hand sides; on top of the housing is a brass hinged handle; the electrodes are set solidly in pitch in the bank of 20 cells; the housing has an ivory plaque: "HANDLEY & SHANKS, ELECTRICIANS, CORK."; inside the lid is hand-painted: "492 1901 23d 1 2532", and it is assumed the date is 23:1:1901; inside the lid is a paper label: "PATENT LECLANCHÉ MEDICAL BATTERY. DIRECTIONS FOR USE....", with instructions and the signature: "Sole Manufacturers INDIA-RUBBER, GUTTA-PERCHA, & TELEGRAPH WORKS CO., Limited, SILVERTOWN, ESSEX. London Warehouse-100 Cannon Street. E.C."; below this label are two indents, with brass hooks, for the missing electrodes.

Sold to London dealer by North Monastery School, Cork.

Ex0493 DIAL - HORIZONTAL COMPASS

Harrison Lat 52:16.

D 67; H 19. Mid to late 18 C. R.

Brass; inset compass; folding gnomon; domed lid; Tesseract D.1983,24, \$950.

"HANDSOME HORIZONTAL COMPASS-DIAL BY HARRISON, English, c.1800. This well-made brass sundial in 2 5/8" in diameter, 3/4" high with the original domed lid. The decorative hinged gnomon is mounted between a sunburst design and graceful supporting arms, over a glazed compass rose, 2 1/2" needle, and needle arrester of unusual design. The engraved chapter ring carries the signature 'Harrison' in script, and the latitude 52°16' [sic]. The quality is much finer than that of the common English pocket dials of the period. The maker is presumably not the famous chronometer maker John Harrison, but rather a C. Harrison who, according to Taylor, lived from 1725-1810. One other instrument by this maker is known, that [sic] a very similar compass-dial in the prestigious Lewis Evans collection at Oxford. The latitude of 52°16' is, interestingly, that of Warwick Castle. This special dial is in very fine condition."

Taylor does not give an address for C. Harrison, and it seems likely that it is Charles Harrison of Limerick who is listed as a clockmaker, watchmaker, and maker of gold weights and scales, with a sundial also noted by Westropp, in Fennell 1963,18, who gives dates 1766, 1776, 1786; the latitude also supports this, since other Harrison instruments are made for the Limerick (52°40') area and include 52°25" (0737), and 52°30" (Ex0316); a similar dial (Ex0306), actually signed "Harrison, Limerick" was offered at Christies 5:7:71, Lot 41.

For information about Charles Harrison see the entry for Ex0494 and the report by Charles Mollan, Bull SIS 30,1991,29.

Ex0306 DIAL - HORIZONTAL COMPASS

(Harrison, Limerick)

D 75. Mid to late 18 C. R.

"A PORTABLE BRASS SUNDIAL, signed: 'Harrison, Limerick', the circular base inset with a magnetic compass, with folding brass gnomon, in turned circular brass case." - Christie 5:7:71, Lot 41, 90 guineas.

Ex0494 DIAL - HORIZONTAL COMPASS

(Made by C. Harrison in his 85th year, his gift of love to his Grand Daughter Rosetta Hughes 1810.)

No measurements available. 1810. S.

MHSO 150; also signed (C Harrison Latitude 51d.31m.) Lewis Evans Collection; listed in Taylor 1966,207.

Harrison's dates inferred from this instrument c1725-c1810, would agree with those given by Fennell, 1766, 1776, 1786; while Taylor notes that "A family of Hughes were well-known instrument-makers at this time", it may be relevant that Hughes is an anglicised version of the Gaelic surname MacAodha, more usually anglicised to McHugh (MacLysaght 1972,185).

Evans bought this from Percy Webster - information from Tony Simcock.

Ex0316 DIAL - HORIZONTAL PEDESTAL

Chas. Harrison LIMERICK LATITUDE 52D.30M NORTH

D 350. Mid to late 18 C. R.

"An early 19th century brass horizontal sundial, signed 'Chas Harrison, LIMERICK', the gnomon with scroll support set for 52°30' North, engraved with equation of time table and tulip decoration."; illustrated - Christie 29:6:89, Lot 183, £250-350.

Ex0353 SEXTANT

(Hayes Brothers, Derry Docks)

R 159. Second 1/2 19 C. G.

"A sextant by 'Hayes Brothers, Derry Docks', with three eyepieces, scale microscope and mahogany case - radius 6 1/4 in." - Christie 6:11:80, Lot 75.

Not listed in Burnett & Morrison-Low 1989.

Ex0355 CALCULATOR

(Supplied by Professor Hennessy FRS)

No measurements available. c1876. R.

"Calculating machine, for performing complex arithmetic operations..invented by M. Thomas of Colmar."

No.26 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0358 DYNAMOMETER

(Supplied by Professor Hennessy)

No measurements available. c1876. R.

"Dynamometer, graduated up to 100 kilogrammes by intervals of 200 grammes and showing dynams in kilogrammetres up to 981, each interval measuring two dynams nearly in absolute measure. Dynamometers similar to these are [sic] employed at the Royal College of Science.[sic] Dublin, as referred to in the College Directory for 1876-77, page 17. 'The dynam or unit of force commonly employed throughout the course is one kilogramme moving through one metre in one second of time.'"

No.429 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Ex0359 DYNAMOMETER

(Supplied by Professor Hennessy)

No measurements available. c1876. R.

"Dynamometer graduated up to 10 kilogrammes, and giving absolute dynams in kilogrammetres up to 98, each interval measuring nearly one dynam in absolute measure."

No.430 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0357 LAND CHAIN

(Supplied by Professor Hennessy)

L a millionth part of earth's axis. c1876. R.

"Steel Chain, of fifty links, whose length is the millionth part of the earth's axis, or very nearly 500.5 English inches. It is nearly equal to the half chain of two perches in Irish plantation measure."

No.233 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0356 STANDARD LENGTH

(Supplied by Professor Hennessy)

L the fifty millionth part of earth's axis. c1876. R.

"Standard of Length, derived from the earth's polar axis which is unique and common to all terrestrial meridians. This standard, proposed by Professor Hennessy, is a bronze bar, which, at 15° of temperature centigrade, is equal to the fifty millionth part of the earth's axis."

No.232 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0642 OCTANT

(MADE BY THOS HICKS DUBLIN)

R 500. 1784-1799. R.

Mahogany frame; one vertical strut and bowed horizontal strut; boxwood scale 0-90° in 20 min divisions, transversals to 2 min. The fifth line is extended beyond the scale ends, and ends in three points forming a triangle. Wooden bracket with forward and reverse mirrors, pin-hole for reverse sighting, two shades in square brass frames for index mirror, slot for shades in reverse position. Mahogany index arm with clamping screw. Nameplate missing.

In Aero Museum, 5970 Aeroskobing, Denmark; recorded in Andersen 1995,301 (No.1973).

Dates from Morrison-Low 1989,127.

Ex0018 BAROMETER - STICK

(Hunt, Cork)

No measurements available. 1792-1828. F.

Mahogany; bulb cistern; broken pediment; register plates protected by glass; Goodison 1977,331.

Burnett & Morrison-Low 1989,149 list Thomas Hunt I (1792-1812) or Thomas II (1820-1828).

Ex0565 QUADRANT

(Henry Hunt, Cork)

No measurements available. 1850. PC

Ebony frame; ivory arc; two telescopes; eyepiece; brass arm; vernier scale; Power House Museum, Perth.

Julian Holland, in a letter to John Burnett 22:4:87, reported an entry in the records of the Power House Museum (strictly the Museum of Applied Arts and Sciences) "H 5724 Quadrant by Henry Hunt, Cork, Ireland, 1850, ebony frame, ivory arc, inverting and erecting telescopes, also simple eye-piece, brass arm and vernier scale, boxed"; presumably this is an octant, but the description "quadrant" is here preserved.

Burnett & Morrison-Low 1989,149 list Henry Hunt from 1844-1884.

Ex0020 BAROMETER - BANJO

(Thos Hunt)

D 203. 1792-1828. F.

Mahogany; rounded top; case inlaid with paterae of coloured woods; listed in Goodison 1977,332.

Burnett & Morrison-Low 1989,149 list Thomas Hunt I (1792-1812) or Thomas II (1820-1828).

Ex0019 BAROMETER - MARINE

(T. Hunt, Cork)

No measurements available. 1792-1828. F.

Listed in Goodison 1977,332 - but with no further details.

Burnett & Morrison-Low 1989,149 list Thomas Hunt I (1792-1812) or Thomas II (1820-1828).

Ex0524 COMPASS - MARINE

T. HUNT. MATHEMATICAL INST. MAKER CORK [Hand-written] Rep by Thos Hunt Cork Feby 3 1824

CpRoD 178; C 286x286. 1792-1824. SR.

(Unoriginal) mahogany case supports brass gimbals for bowl containing compass rose; Arthur Middleton 9:11:92.

The rose has a fleur-de-lys and seven large triangle directions, with eight further thin diamond directions and sixteen small triangle directions; inside the signature, around the rose support, are masonic symbols of square and compasses, the former inscribed with the word "MANUFACTURER"; inside the brass bowl are two more pencil signatures: "F. ***und Bristol Decr 18th 1822" and "Rep by ***** 1824"; under the rose is inscribed in sepia ink: "Rep by Thos Hunt Feby 3 1824"; the needle has been balanced using a piece of card with printing, including the date "16th May, 1811", and the hand-written initials "ME"; on the pivots of the gimbals are two vertical sights.

Information and photographs kindly supplied by Arthur Middleton 9:11:92.

Burnett & Morrison-Low 1989,149 record Thomas Hunt I 1792-1812 and Thomas Hunt II 1820-1828.

Ex0263 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

Edw. Hunter Fecit (Jas Heron, Newtown, Trade label)

R 85. Late 18 early 19 C. G.

"Compass rose with centrally mounted latitude arc and hinged equinoctial hour-ring with scale divided to ¼-hour divisions, together with hinged pinhole and sun spot limb connected to geared minute scale...contained in shaped fruitwood case, the lid applied with retailer's trade label printed 'Jas Heron Clock & Watch Maker in Newtown'" - illustrated - Sotheby 25:2:86, Lot 108, £1000-1500.

This is presumed to be Irish as it is like similar Irish instruments, but the maker and retailer are not yet identified; the Sotheby Guide 1988,475 gives a good illustration, and gives the price obtained as £1870.

Illustrated in Morrison-Low 1989,3; Fennell 1963 gives Jas Hunter Belfast 1789, Alex. Heron Newtownards 1824.

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Ex0474 TELESCOPE - REFRACTING

(J. & B. BELFAST)

MxL 798; LeD 51 (2"). Mid 18 C. PC.

"A mid 18th century 2 inch single draw telescope signed 'J. & B. BELFAST' bearing a polygonic shaped mahogany outer tube with disc cover, lacking object lens" - £50-80 - Christie 17:4:86, Lot 234.

Ex0628 BALANCE - EQUAL ARM

[Trade card] HENRY JACKSON in Pill-Lane, oppofite Bull-Lane, Dublin. [Pans] H.J

BmL 120. 1769-1794. R.

Box ends to the beam; long pointer; mahogany case; illustrated in Crawforth-Hitchins 1994,1804.

The trade card reads: "All Sorts of MONEY SCALES, Dutch, Englifh, and Wheel-Form Beams, Manufactured by HENRY JACKSON, at his Iron-Monger Ware-houfe, in Pill-Lane, oppofite Bull-Lane, DUBLIN. Said Jackson has laid in a large Affortment of Iron-Mongers Ware, for ready Money, which enables him to fell on fuch Terms as muft be agreeable to the Buyer. N.B. All due Encouragement for ready Money."

Crawforth-Hitchins notes: "Henry Jackson's coin scales were extremely finely made, almost in the London style, but shaped in an exaggeratedly elegant way, with a very thin beam with the narrowest of 'wrists'. The pointer was almost as long as half the beam, in the characteristically Irish way...The collars each had a fine band each side of the bulge...the box was a straight-sided, cut-from-solid, mahogany box with rounded ends, but the corners were polished off, and the front edge of the box was filed off, to allow access of a thumb nail easily...yet another Irish characteristic".

Ex0127 BAROMETER - MARINE

(Jones, Dublin)

H 930. 1840-1861. F.

Rosewood; ivory plates; thermometer on stem - Philips, 11:11:81, Lot 4.

Illustration looks identical to that in Banfield 1985b,169; description: "A 19th Century rosewood Ship's Barometer by 'Jones, Dublin', the ivory plates with engraved scales and mounted with a thermometer."

Dates from Morrison-Low 1989,127.

Ex0036 BAROMETER - MARINE

JONES DUBLIN

No measurements available. 1840-1861. F.

Mahogany; round top; glazed plates; vernier with rack-work; thermometer in box on trunk; Banfield 1985b,169.

"By about 1840 the round-top marine barometer was introduced, as illustrated in Fig. 214. The ivory register plates are protected by glass, which is fixed, and a vernier with rackwork is necessary. The thermometer is contained in a separate box on the panelled trunk; it too has ivory Fahrenheit scales. Jones of Dublin is the maker."

Dates from Morrison-Low 1989,127.

Ex0261 PANMETRON

Presented by the Royal Dublin Society to James Jordan

No measurements available.

Bought from Peter Delehar by Science Museum; information from Jon Darius.

Ex0587 OCTANT

(William King. Maker. Dublin J-- Farr-- [defaced] 1771)

H 495. 1771. S.

Ebony, brass and ivory; T-insert with convex top; index, horizon and half horizon mirrors; stepped case.

Reported by David Coffeen, New York, 9:1993: "Framed in ebony (with rosewood?), the octant has a flat brass index arm, double peep, interchangeable set of two filters, back peep sight, and three mirrors. The inset ivory scale is divided every 20 arcminutes (0° to 90°) and has the very rare additional reverse calibration in zenith distance (90° to 0°) rather than elevation, a feature known on early instruments by Benjamin Cole. The ivory vernier has centre zero and reads to one arcminute. The index is engraved with a wonderful assembly of instruments - we note dividers, rules, sector, backstaff, octant, globe, etc. etc. Condition is very fine throughout, noting a few old small shrinkage cracks and chips to the ebony. The brass has a dark finish. Included is the stepped keystone shaped case of oak and pine, in good condition." Photographs supplied.

This instrument was offered for sale in the Tesseract Catalogue 44,1994,27 for \$4850.

William King on ivory scale; J-- Farr-- 1771 on ivory nameplate appears to use same set of punches.

Ex0115 OCTANT

(Made by Willm King Dublin for Mr Iohn Jackson 1784)

D 127. 1784. S.

Mahogany; boxwood scale divided diagonally; private owner in Massachusetts; information from Peter Delehar.

Noted in Morrison-Low 1989,128

Ex0485 PROTRACTOR

(W. King Fecit)

W 133. 1767-1772. F.

"An 18th century brass protractor and combined scale rule"; Christie 5:3:87, Lot 361, £100-150.

Dates from Morrison-Low 1989,128.

Ex0003 GLOBES - CELESTIAL & TERRESTRIAL

(Kirkwood Dublin [?])

No measurements available.

Philips 6:85; information from Michael Kenny.

Kirkwood was in Dublin street directories as an engraver and bookbinder.

Ex0360 POSITION FINDER

(McCombie's Patent M. LAMBERT DUBLIN 71)

RiD 140; AsL 394; C 521x165x76. 1898. PC.

"OF IRISH INVENTION - McCombie's Angle And Position Finder, Dublin, 1898...This combined sextant-station pointer...is designed to replace the two instruments and the necessity of reading out the angles on the sextant and setting them into the station pointer. A clever linkage converts the double angle motion of the index mirror into the true angle needed for the station pointer aspect of the instrument. In the original mahogany case...with original instruction booklet." - Historical Technology 104,1972,181.

Morrison-Low 1989,128 lists Michael Lambert, Optician, at 47 Rathmines Road in 1881.

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Ex0363 TELESCOPE - REFRACTING

(Lee, Belfast)

No measurements available. 1835-1849. F.

"A 19th Century brass single draw Telescope by 'Lee of

Belfast"; Philips 27:2:80, part of Lot 94.

Burnett & Morrison-Low 1989,150-1 list Joseph Lee, Belfast, from 1835, succeeded by Lee & Son in 1850.

Ex0619 BAROMETER - ANEROID, PORTABLE

(Lee & Son Belfast)

No measurements available. 1850-1870. R.

A "pocket aneroid barometer by Lee & Son Belfast" - part of Lot 134, Christie 1:7:93.

Dates from Morrison-Low & Burnett 1989,150.

Ex0315 SEXTANT - BOX

(Lee & Son, Belfast)

D 76 (3"). 1850-1870. F.

"A 19th century lacquered brass box sextant, signed above the silvered scale 'Lee & Son, Belfast', with vernier, magnifier, and two shades, the screw-on cover forming the base" - Christie 29:6:89, Lot 165, £100-150.

Dates from Burnett & Morrison-Low 1989,150.

Ex0365 TRADE LABEL

(Lee & Son, High St., Belfast) (T. Mason, Dublin)

No measurements available. 1850-1870. F.

In case of Culpeper microscope signed: "T. Mason, Essex Bridge, Dublin"; Philips, 21:5:86, Lot 152.

See entry under Mason.

Dates from Burnett & Morrison-Low 1989,150.

Ex0364 TELESCOPE - REFRACTING

(Lee and Sons, Belfast)

MxL 940. 1850-1870. F.

"A single-draw telescope by 'Lee and Sons, Belfast', marked 'Customs'; Christie 3:9:81, Lot 150.

Burnett & Morrison-Low 1989,150 list Lee & Son, Belfast, 1850-1870.

Ex0112 CIRCUMFERENTOR

(Johann Lewis Dublini Fecit 1693)

No measurements available. 1693. S.

Listed in Westropp; information from Morrison-Low 1989, 128.

Ex0502 DIAL - HORIZONTAL PEDESTAL

Johans Lewis Dublini Fecit Latt 53d 20m ano 1684

No measurements available. 1684. S.

"An attractive dial decorated with rosettes, a sun emblem and an hour glass; the gnomon is pierced and engraved. The hour scale is divided to five minutes and there is a subsidiary hour scale at the centre. An unusual feature is the 16 point windrose, with 32 compass directions indicated by their initials set at the south point of the gnomon and read in conjunction with the scale of degrees engraved between the hour and minute scales. Christie, Manson & Wood Ltd." - Britten 1977,16 - illustrated. At the other end of the gnomon from the windrose is an engraving of the sun, with eyes, nose and mouth - it has eight triangular points and eight more flares, corresponding to 16 compass points - with wording outside: "Ecce Appropin quai Hora[?]" - it has another device like an hour glass at one side of the gnomon: "Volat tempus", with another engraving on the other side (partially hidden): "Sic Vestvila[?]".

This may be the same dial as is listed as Ex0113 - but the minimal description in the latter source does not do justice to the dial, and they are thus assumed to be different.

The reference ascribes the dial to "Johans Lenns", and indeed the signature looks more like this than "Lewis" - however, there is a clear dot over what would be the "i" in Lewis, and there is no doubt that the dial is made by Lewis not Lenns.

Ex0113 DIAL - HORIZONTAL PEDESTAL

(Johans Lewis, Dublini fecit, latt 53d 20m, anno 1684)

273x273. 1684. S.

"A BRASS SUNDIAL...the square base engraved with roses in the corners, the gnomon pierced and cast with the crowned cypher CR." - Charles II (1660-1685) - Christie 12:10:65, Lot 7.

Noted in Morrison-Low 1989,128.

Ex0111 DIAL - HORIZONTAL COMPASS

(Johannes Lewis Dub)

No measurements available. 1679-1693. FL.

Reported by A.J. Turner as being in private ownership; information from Burnett 1989,18.

Ex0060 MAGNET

William Lewis FECIT Kinsale 1843

H 150; W 70; De57. 1843. S.

Permanent magnet in arched brass mounting; wire handle on top; Whipple 970; illustrated in Burnett & Morrison-Low 1989,78.

"William Lewis seems to have been an amateur scientist. He appears in a variety of directories between 1844 and 1870, under the heading 'Gentry and Clergy': most likely he was a minor landowner. In Griffith's valuation his address is given as 34 Compass Hill." - Burnett & Morrison-Low 1989,77-78.

Lyall 1991,128 (entry 471) illustrates the magnet and gives its dimensions; the description is: "Brass-cased steel horseshoe magnet, laminated, composed of 10 sections held together by four bolts. Carrying handle, rectangular keeper with brass handle."

Ex0361 BAROMETER - STICK

(Lizars, Belfast)

H 920. Late 19 C. G.

"A 19th century mahogany stick barometer the ivory plate stamped 'Lizars, Belfast', the case with hemi- spherical cistern cover thermometer and rounded top." - Christie 18:7:85 Lot 15, £180-220.

Burnett & Morrison-Low 1989,150 list firm from 1894-1921 - but such barometers are usually earlier?

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Ex0362 TELESCOPE - REFRACTING

(J. Lizars Belfast)

LeD 64. Late 19 early 20 C. F.

"A brass 2 3/4 inch refracting telescope by 'J. Lizars Belfast', with rack and pinion focusing on tapering pillar support and tripod stand incorporating a weight." - Christie 14:4:88 Lot 147, £150-200.

Burnett & Morrison-Low 1989,150 give 1894-1921 dates - branch of Glasgow-based firm.

Ex0461 BALANCE - ROCKER COIN

John Lort Maker Dublin

L 149; W 17. 1774-1782. R.

Wood scale; slider; grid for guineas/LSD; other side 1/4, 1/2, 1 guinea, Moydore, 1/2 Port Piece; private ownership.

The grid shows guineas from 1-9 and from 10-100, with LSD - 1/2/9 for 1, 113/15/0 for 100; it also has lines before and after the 1 to 9, each ending in the letter h - from 0/11/4h to 10/16/1h; the turned-over edges of the slider can be seen on this side; the solid slider with the signature is on the other side, which has lines for 1/4 Guinea (1.8.1/4), 1/2 Guinea (2.13 1/2), Guinea (3) (5.3 5.6 5.9), Moydore (6.22), 1/2 Port Piece (9.5).

This instrument is illustrated in Crawforth-Hitchins 1994,1825, where it is described as "a most interesting and rare piece. It is a 5 1/2 inch (135) long beam, with two pins protruding underneath, slightly off centre, and a brass sliding saddle moving right along the length of the rocker. Both top and bottom surfaces were curved. It was engraved underneath with a ready-reckoner for the Irish monetary values of the 1/4 guinea up to 100 guineas, as proclaimed in 1737. The top surface was engraved with lines against which the saddle was aligned, for the 1/4 Guinea 1.8 1/4; 1/2 Guinea 2 13 1/2; Guinea 5.3 (and lines for 5.6, 5.8 and 5.9); the Moydore 6.22 and the 1/2 Portuguese Piece 9.6. Because the Guinea lines include a line for 5.8, it was made after the Proclamation of the New Standard in 1774 which stated the least current weight at which Guineas of various ages could pass... This coin rocker was made during a flush of enthusiasm for new scales to weigh coins, triggered by the Great Recoinage, and the Proclamation of the New Standard of values for guineas in 1774".

Dates of Lort, a Mathematical Instrument Maker, from 1767-1782 from Morrison-Low 1989,128.

Ex0624 CALENDAR - PERPETUAL

MULTUM IN PARVO . Mare. Taylor 1778 . John Lort DUBLIN Fecit .

152x43. 1778. S.

Brass; stamped with Julian and Gregorian calendars; for 12th to 20th Centuries; D.G. & E.A. Squire, London.

Fair workmanship, with some double punching; provides a means of indicating the day of the week for any month for either the Julian or Gregorian calendars; range of centuries 13th to 18th for Julian, 17th to 20th for Gregorian.

The dealers give more details: Looking at the centre of the unsigned side, there is a table containing the sequences of the letters ABCDEFGH. This table is headed 'NEW STILE' (Gregorian) and the centuries 1600-1900. The base of the table is marked 'OLD STYLE' (Julian) and the centuries 1200-1700. The letter is selected by picking the century (new or old style) and the year within the century....Having selected the letter for the year, the rule is then flipped over to the signature side. This contains at its centre seven columns of days of the week headed by the letters A to G. The sequence for the column headed by A starts with Su, and that for column B Sa, and so on. At either side of the week table are the calendars for the individual months of the year (eight in all as some are shared, e.g. January and October). The month and date are selected, and the horizontal row followed to the year letter, which gives the day of the week of that date. Each of the week columns has a small hole bored through the brass, presumably to allow a pin to act as a place keeper for a particular year. January and February of leap years are allowed for with additional blank spaces above the relevant year; there is a six inch ruler at the top of one edge and the sides have tables showing the value in pounds of 1 to 20 guineas (1 guinea = £1 2s 9d).

The calendar was transcribed by Charles Mollan, and published in "The Irish Scientist", No.3, October 1995, p.20.

Morrison-Low 1989,128 lists John Lort from 1767-1782 at various Dublin addresses.

Ex0274 CIRCUMFERENTOR

(Lynch Dublin)

No measurements available. Late 18 early 19 C. F.

"In a private collection"; noted in Burnett & Morrison-Low 1989,37, but without further details.

Morrison-Low 1989,128-9 lists various Lynches from 1767-1844.

Ex0272 CIRCUMFERENTOR

Lynch * Dublin

240x170x25. Late 18 early 19 C. F.

Brass; lower scale 10-80 & 80-10°(x2); upper 10-360°; two spirit levels at right-angles; lid; RMS T.1923.22

Decorated compass rose; clamp for needle; two lugs at sides but no alidade nor sights; presented by Sir John Findlay, 3 Rothesay Terrace, Edinburgh.

Illustrated on back cover of Burnett & Morrison-Low 1989, who list (p128-9) various Lynches from 1767-1844.

Ex0216 CIRCUMFERENTOR

(Lynch * Dublin)

No measurements available. Late 18 early 19 C. G.

"Surveyor's plain compass" in NMAH; information from Deborah Jean Warner, May 1988.

Morrison-Low 1989,128-9 lists various Lynches from 1767-1844.

Ex0367 DIAL - HORIZONTAL COMPASS

(Lynch Dublin)

D 75. Late 18 early 19 C. G.

"A CIRCULAR BRASS POCKET COMPASS, 'by Lynch of Dublin' the silvered rose marked with the cardinal points, and surrounded by a scale of degrees, silvered chapter ring above with roman numerals and folding gnomon, the lid, with engraved crest." - Sotheby 13:6:80, Lot 14.

Morrison-Low 1989,128-9 lists various Lynches from 1767- 1844.

Ex0566 DIAL - HORIZONTAL PEDESTAL

LYNCH fecit DUBLIN

D 347; GnH 250. Late 18 early 19 C. R.

Weathered bronze; central compass; adjustments; cities; hours VIII-XII-III; gnomon 53°; Stuart Talbot, London.

"This is a most substantial bronze dial with both the engraved plate and serif-bracketed gnomon having splendid patination....Featuring a central eight-point Compass; ascanthus-leaf decoration; inner and outer radial Minute scales; January-December circular scale; 44x5mm incised Roman numerals with heavy etching interspersed by Fleur-de-Lys & diamond motifs."; the gnomon has a curved insert in the shape of an "h" with scroll ends; offered for sale 4:9:92.

Various Lynches dated from 1767-1844, Morrison-Low 1989,128-9.

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Ex0311 DIAL - HORIZONTAL PEDESTAL

(LYNCH DUBLIN)

W 248. Late 18 early 19 C. G.

"A bronze octagonal sundial signed 'LYNCH DUBLIN', the gnomon with scroll support" - Christie 11:10:86, Lot 239, £150-200.

Morrison-Low 1989,128-9 lists various Lynches from 1767 -1844.

Ex510 DIAL - UNIVERSAL INCLINING(?)

(Lynch, Dublin)

D 85. Late 18 early 19. G.

"A 19th Century brass Equinoctial dial signed on the hour ring 'Lynch Dublin', with silvered compass dial, 8.5 cm. diam., in a fitted red leather case" - Philips 17:12:91, £200-300.

Ex0090 MICROSCOPE - COMPOUND

(Lynch Dublin)

H 399; TuD 41. 1800-1825. PC.

Brass; stage positions marked with lines numbered 2-6; SM A600169; presented by Miss E.D. Fornelli 17:1:1949; location in 8:1993 - Microscopes B/T14/7A.

Morrison-Low 1989,128-9 lists various Lynches from 1767-1844; SM suggests 1800-1825.

Ex0312 MICROSCOPE - COMPOUND, CULPEPER

(Lynch, Dublin)

No measurements available. 1769-1844. F.

Brass; in original case; collection of eyepieces and slides; illustrated in Miller's Antiques Price Guide Professional Handbook, 1989, Cranbrook, p479, £450-500.

Morrison-Low 1989,128-9 lists various Lynches from 1767-1844.

Ex0368 MICROSCOPE - COMPOUND, CULPEPER

(Lynch, Dublin)

H 312. Late 18 early 19 C. G.

"A 19th century brass Culpeper-type compound monocular microscope signed, 'Lynch, Dublin' on the graduated draw tube, the body tube, stage and brass [sic] united by cabriole shaped supports with a set of four objectives, five sliders and other items in shaped mahogany case." - Christie 14:4:88, Lot 247, £200-300.

Morrison-Low 1989,128-9 lists various Lynches from 1767-1844.

Ex0465 CANNON SCRIBE OR GUNNER'S PERPENDICULAR

No.26 Made and Sold by JAMES LYNCH At the Sign of the Royal Spectacles in Capel St Dublin

H 150. 1784-1808. A.

Brass; steel feet; central transcriber; SM 1989-574.

A rectangular vertical brass plate, with an arched top, sits on a long thin horizontal bench, which has a brass spirit level on two short pillars above it, and, below it, two feet stretching sideways, with an brass arc rising from them to the vertical plate; the feet end in dove-tailed steel tips; in the centre of the instrument, from between the feet to above the plate, is an adjustable vertical steel transcriber with points on each end.

The instrument is in a mahogany case containing a Trade Label, which notes that James Lynch is a: "Mathematical Philofophical and Optical Instrument maker" (see Ex0466); the scribe was offered by Lawrence of Crewkerne at its sale on 20:7:89, and bought by Jon Darius for the Science Museum.

The instrument was on display in 8:1993, and the following information was given: "...The gunner's perpendicular became a common military instrument in the 18th century. Its steel inscriber was used to mark a series of points along the barrel of a cannon or mortar. Joining up these points created a centre line along which the gun was sighted. The instrument's name [viz. Gunner's Perpendicular] arose because the early examples used a plumb bob hanging down perpendicular to the barrel. The later type, introduced in the 1750s and shown here, had a spirit level instead. However, the established but now inappropriate name continued to be used."

Describing a similar instrument by Adams London, Tesseract 16,1987,47 notes that it was used to scribe a centre line on a cannon, by running along the top of the cannon while maintaining the scribe level from side to side - this centre line then permitted accurate placement of a gunner's quadrant to adjust the height of the piece, and therefore the range of fire.

Dates from Morrison-Low 1989,129; the firm became James Lynch & Son in 1808.

Ex273 CIRCUMFERENTOR

(Jas. Lynch, Dublin)

C 152x152. Late 18 early 19 C. F.

"Irish Surveyor's Compass...in mahogany case"; Sotheby 13:11:61, part Lot 65.

Morrison-Low 1989,128-9 lists various Lynches from 1767-1844.

Ex0554 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

James Lynch DUBLIN

D 159. Late 18 early 19 C. R.

"A rare lacquered brass mechanical equinoctial dial, signed on the silvered hour scale James Lynch DUBLIN, the scale divided III-XII-IX, with revolving alidade terminating with vernier, central latitude arc aperture, folding gnomon, minute dial calibrated in five minute intervals, with turned needle and folding pin-hole sight, pierced cover, the inclining plate with rackwork, the horizontal plate with folding latitude arc divided 20°-90°, with calendar and solar scales, inset compass box with silvered dial and blued needle, the scale divided quadrantly, with bubble level (lacking liquid), twin levelling screws, on three turned feet" - illustrated - Christie 6:5:93, Lot 127, £1500-2000.

Probably James Lynch II, 1784-1807, Morrison-Low 1989, 129.

Ex0288 THEODOLITE

(James Lynch, Dublin)

D 127. Late 18 early 19 C. G.

"A nineteenth-century theodolite by 'James Lynch, Dublin', on four screw mounting with telescope in wide mounting - diameter 5in., in mahogany case." - Christie 14:6:84, Lot 274, £300-500.

Morrison-Low 1989,128-9 lists various Lynches from 1767 -1844.

Ex0466 TRADE LABEL

No.26 Made and Sold by JAMES LYNCH Mathematical Philofophical and Optical Instrument maker At the Sign of the Royal Spectacles in Capel St Dublin.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

In the case of the canon scribe (Ex0455).

The instrument was bought from Lawrence of Crewkerne by the Science Museum on 20:7:89.

The firm of James Lynch was at Chapel Street (as it was later called) from 1784-1808, when it became James Lynch & Son.

Dates from Morrison-Low 1989,129.

Ex0146 TELESCOPE - REFRACTING

(Lynch & Co 36 Westmoreland Stt Dublin Day or Night)

No measurements available. 1841-1842. A.

"Terrestrial telescope"; in the Tebbutt Observatories, Windsor, New South Wales, Australia.

Information from Julian Holland (26:3:90), Curator of Technology, The Macleay Museum of the University of Sydney.

Ex0061 CLINOMETER

(Lynch & Son, Dublin)

No measurements available. 1808-1825. F.

Brass; Whipple 3363; from D. Stanley Antiques, Loughboro', 20:1:86, Lot 577.

Information Alison Morrison-Low.

Dates from Morrison-Low 1989,129.

Ex0286 DIAL - HORIZONTAL PEDESTAL

(Lynch & Son, Dublin)

D 305. 1805-1825. F.

"A good late 18th Century Irish brass Sundial signed 'Lynch & Son, Dublin'...engraved with various calendar scales, a monogram and a scroll gnomon." - Phillips 5:4:84, Lot 119.

Dates from Morrison-Low 1989,129.

Ex0205 DIAL - HORIZONTAL PEDESTAL

(Lynch & Son, Dublin M.K. 1824)

D 305. 1824. S.

"The circular dial engraved with scales for minutes, hours and calendar, centred by compass rose and mounted by shaped gnomon, engraved with boar amorial and initials and date 'M.K. 1824'" - Sotheby, 23:10:85, Lot 329, £2-300.

Ex0287 DIAL - UNIVERSAL EQUINOCTIAL RING

(Lynch & Son, Dublin)

D 305. 1808-1825. F.

"A RARE LARGE BRASS RING DIAL...With sliding suspension to meridian ring engraved with 0-90 degree latitude scale in each quadrant and with 0-90 degree altitude scale on the reverse, the equatorial ring engraved with roman chapters with quarter hour and minute divisions, with sliding pinhole sight to bridge, engraved with calendar and altitude scale with corresponding signs of the Zodiac." - illustrated - ChristieNY 17:6:86, Lot 60, \$6-8000.

Dates from Morrison-Low 1989,129.

Ex0204 GLOBE - TERRESTRIAL

(New Terrestrial Globe by Lynch & Son Dublin 1813)

D 77. 1813. S.

"A 3-INCH POCKET GLOBE signed on the terrestrial sphere 'New Terrestrial Globe by Lynch Son [sic] Dublin 1813' and marked with the voyages of Anson and Captain Cook, in original case covered in paper to simulate fishskin and lined with the celestial gores." - Sotheby 27:5:82, Lot 10, £3-400.

Ex0119 BACKSTAFF

(Made by Geo. McEvoy, Temple Bar, Dublin for John Pearson 1743.)

No measurements available. 1743. S.

Seen in antique shop by D.J. Bryden; information from Alison Morrison-Low.

Ex0063 BACKSTAFF

(Made by Geo McEvoy Temple Bar Dublin)

No measurements available. 1743. FL.

Museum of the Literary & Philosophical Society, Whitby; traditionally associated with Captain James Cook.

Listed in Holbrook 1992,216-7.

Backstaff Ex0119 is dated 1743.

Ex0062 BACKSTAFF

(Made by Geo. McEvoy Temple Bar Dublin)

R[of 30° arc] 610. c1743. FL.

Pearwood; Dick Institute, Kilmarnock; listed in Holbrook 1992,142.

Backstaff Ex0119 is dated 1743.

Ex0133 BAROMETER - BANJO

(Malacrida & Co. Dublin & in London)

L 116; DID 305. Early 19 C. PC.

"A Late George III Inlaid Satinwood Wheel Barometer with a hygrometer, thermometer, 12-inch plate and spirit level signed 'Malacrida & Co. Dublin & in London', the case crossbanded in kingwood, inlaid with two well drawn shell medallions and with a swan-neck pediment and rounded base." - illustrated, scroll top - Sotheby 14:5:87, Lot 226, £1500-2500.

Also illustrated in the 1989 Sotheby Guide,199 which records the price obtained as £2420.

Ex0021 BAROMETER - BANJO

(C. Malacrida & Co., Dublin)

D 203. Early to Mid 19 C. G.

Mahogany; broken pediment; Goodison 1977,308.

Firm not listed in Burnett & Morrison-Low 1989.

Ex0381 BAROGRAPH - ANEROID

(J. Malcolm Ltd., Belfast)

No measurements available. c1931. S.

"A barograph by 'J. Malcolm Ltd., Belfast' with enclosed bellows, in a glazed mahogany case with a presentation label dated 1931." - Christie 3:9:81, Lot 136.

Not listed in Burnett & Morrison-Low 1989.

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Ex0096 DIAL - HORIZONTAL PEDESTAL

(MARGAS, Dublin, Made for T. O'Connor, 1767)

No measurements available. 1767. S.

Recorded in Clay 1932,67.

Margas had been an apprentice of Nathaniel Adams; his own business in Rose Street, St Martin in the Fields, London, failed in 1758, after which he moved to Ireland.

Ex0095 MICROSCOPE - SOLAR

Jno Margas, DUBLIN

BP 123x122; TuL 20, MxD 42; Mi 183x48; C 223x149x74.

1761-1767. F.

Brass; base plate; tube screws into plate; mirror in brass frame; spring on top for slides; SM 1906-58.

The spring on top allows insertion of the three powers in a brass slide and the specimen slides; an outer sheath on the narrower part of the tube is raised by rack and pinion; a carved ivory cylinder contains broken glass tubes; two small boxes contain talcs and brass rings; there are also five glasses.

Margas moved his business from London where it had failed in 1758.

Whipple 826 is a compound microscope signed "Jno. Margas. LONDON" dated c1750.

The computer records that the microscope was purchased from J.C. Stevens, registered papers E6-1906, location B/T14/16A.

See Morrison-Low 1989,130; Taylor 1966,268; Brown 1986,29.

Ex0623 COMPASS

John Margas DUBLIN

D 76 (3"). 1761-1767. F.

"IRISH POCKET COMPASS...The compass is made of turned brass, 3" in diameter, with beautifully engraved decorative rose, fleur-de-lys, and 360° scale divided every degree. It is equipped with the original finely shaped needle and the original fishskin covered carrying case. Condition is very fine noting some rubbing of the silvering, and loss of the case hooks and hinge...A fine Irish example" - ", Tesseract 45,1994,55, \$650.

This could be the same instrument as Ex0382 offered by Christie 5:3:87, Lot 347.

Dates from Morrison-Low 1989,130.

Ex0382 COMPASS

John Margas DUBLIN

D 86. 1761-1767. F.

"A good late 18th century brass pocket compass, the finely engraved silvered dial signed 'John Margas DUBLIN' with blued steel needle, contained in a plush and embossed paper lined fishskin covered case." - illustrated - Christie 5:3:87, Lot 347, £120-150.

Dates from Morrison-Low 1989,130.

Ex0118 BAROMETER - FITZROY

MASON ESSEX BRIDGE DUBLIN

No measurements available. 1809-1883. A.

"Register plate: Printed paper. Ancillaries: Alcohol Fahrenheit Thermometer with wooden scale. Only one pointer operated by a slide mechanism with a knob on the side. Cistern: Not externally accessible. Collection: Buitendijk." - Bolle 1982,145, illustrated, who suggests date 1880-1900, but it can't be dated after 1883 - Morrison-Low 1989,130-1.

Ex0507 BAROMETER - STICK

Mason ESSEX BRIDGE DUBLIN

No measurements available. Mid 19 C. G.

Mahogany; round top; ivory plate 27-31" with thermometer; half sphere cistern cover; private ownership.

The glass mercury thermometer has scales 0-120° "FAHRT" and -10-40° "REAU" and is located on the left hand side of the scale plate; the latter has a manual slider; below the cistern hemisphere cover is a brass screw knob to adjust the mercury in the cistern.

Masons were at various addresses in Essex Bridge from 1809-1883, Morrison-Low 1989,130-1.

Ex0277 CIRCUMFERENTOR

(Mason, 6 Essex Bridge, Dublin)

DID 160. 1827-1844. A.

"A Mason Brass Dial, Irish, circa 1790, signed on the compass rose, 'Mason, 6 Essex Bridge, Dublin', the 16cm diameter dial inset with two bubble levels, engraved with two circles of degrees, flanked by two limbs (sights now missing), on mahogany tripod." - Sotheby 11:6:85, Lot 229, £150-220.

Dates from Morrison-Low 1989,130-1.

Ex0276 CIRCUMFERENTOR

(Mason 6 Essex Bridge, Dublin)

D 165; C 152x152. 1827-1844. A.

"With silvered dial finely engraved with the eight points, quadrantally and from 0°-360° with two spirit levels and screw-type lock for the needle, circular with removable brass lid and projecting lugs" - Sotheby 13:11:61, part Lot 65 - sold with Jas. Lynch circumferentor (Ex0273).

Dates from Morrison-Low 1989,130-1.

Ex0275 CIRCUMFERENTOR

(Mason*Essex Bridge Dublin)

(Label, C.G. KING, BOSTON)

No measurements available. 1841-1858. F.

"Surveying compass"; boxed with Trade Label for "C.G. KING..7 BROAD ST...BOSTON"; Harvard University 5158.

Label reads in full: "C.G. KING, MANUFACTURER & IMPORTER OF Mathematical and Engineering Instruments, No 7 BROAD ST., 3D STORE FROM STATE ST. BOSTON"; (the note of this instrument records "C.C. King", but this seems likely to be a mistake as Tesseract 21,34, Summer 1988, notes that "Charles Gedney King (1808-1858) worked on his own in Boston from 1841-1858", - presumably the son of Gedney King (1777-1839), in Boston by 1800, advertising in 1822, Warner 1989,104.

Tesseract 21,1988,34 for C.G. King dates; Morrison-Low 1989,130-1 - Masons at Essex Bridge 1809-1883.

Ex0377 DIAL - HORIZONTAL COMPASS

(Mason Dublin)

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No measurements available. Early 19 C. G.

"A circular silvered brass sundial, signed: 'Mason Dublin', the magnetic compass calibrated in degrees, the scales silvered, in circular plain brass case." - Christie 6:5:69, Lot 9.

Ex0376 DIAL - HORIZONTAL COMPASS

(Mason, Dublin)

D 73. Early 19 C. G.

"A brass equinoctial dial, signed 'Mason, Dublin', on the chapter-ring, with scrolled gnomon and compass (deficient) set in the base." - illustrated - Christie 8:12:76, Lot 81 - hours IV[?]-XII-VIII; gnomon set on two supports on a diagonal of the chapter ring.

Ex0374 DIAL - HORIZONTAL COMPASS

(Mason Fecit)

D 75. Early 19 C. G.

"A Mason Brass Pocket Sundial, English, early 19th century, the compass rose with four named points within engraved circle of degrees, chapter ring signed 'Mason Fecit' centred by hinged gnomon under brass cover." - illustrated - Sotheby 11:6:85, Lot 280, £150-220 - seven point and fleur-de-lys compass design; chapter ring hours IIII-XII-VIII, with two curved supports for hinged gnomon, latter open with S-shaped insert.

Mason firm established 1780 - Morrison-Low 1989,130; the use of "Fecit" suggests a fairly early date.

Ex0521 DIP NEEDLE

(Supplied by Mason, Dublin)

No measurements available. Late 19 early 20 C. G.

"A dip needle in case labelled 'Supplied by Mason, Dublin'", in W & F C Bonham, Chelsea, Auction, 5:11:92.

Ex0047 APOGRAPH

Invented & Made by W. & A. Smith. Sold by Mason, Parliament St., Dublin.

508x559. 1884-1895. A.

Brass; two arms and crossbar; pivot rest; RMS 1984.172.

Bought from Tesseract, Spring 1984, No.46; "SMITH'S EARLY EIDOGRAPH, English, c.1840. This all brass eidograph - an improvement on the pantograph - assembles into a rectangle 20"x22" with crossbar. Various reduction and enlargement ratios are given on the cross- bar (for setting the pivot), along one arm (for setting the pointer with handle), and along the opposite arm (for setting the pencil holder). The instrument is complete with pivot rest, sliding weight, wheels, and original mahogany case, noting that one wheel is a replacement, one screw and top case escutcheon lacking. This early eidograph is fully engraved with documentation of its origins: 'Invent & made by W. & A. Smith Sold by Mason, Parliament St., Dublin' and perhaps an owner's name 'F.W. Beaumont'. The case is stamped 'G.E. Clarke', possibly the case maker. Fine condition...\$495."

The instrument, however, differs from the eidograph, the latter instrument having been designed by William Wallace (1768-1843), Professor of Mathematics in Edinburgh, in 1821 - Hambly 1988,132. This instrument is described on a display card as an apograph, devised by Ayrshire inventor Andrew Smith in 1821.

Illustrated in Morrison-Low 1989,40; and in Tesseract, Spring 1984, No.46; dates from Morrison-Low 1989,131.

Ex0373 THEODOLITE - PLAIN

(Mason, Essex Bridge, Dublin)

H 235; CrD 127. Early 19 C. PC.

"A 5-INCH MASON BRASS PLAIN THEODOLITE...the sighting telescope with rack-and-pinion focusing and mounted with spirit level above vertical semi-circle of degrees and magnetic compass, the horizontal silvered ring of degrees with verniers and screw adjustment, on staff-head mount with four levelling screws...in mahogany carrying case,...early 19th century." - illustrated - Sotheby 28:2:84, Lot 258, £3-500.

Firm at Essex Bridge from 1809-1883, Morrison-Low 1989,130-1.

Ex0463 BAROMETER - STICK

(Jas. Mason, 14 Chapel Street, Dublin)

H 990. 1818-1822. G.

"An Irish mahogany and ebony strung stick barometer with gadrooned flat pediment above chamfered fluted trunk inset with cased thermometer and turned circular cistern, the silvered dial with vernier signed 'Jas. Mason, 14 Chapel Street, Dublin'; £300-500 - Christie 28:4:89, Lot 9.

A "Jas. Mason" is not listed in Burnett & Morrison-Low 1989 - could this be Jonathan Mason, listed at 14 Capel Street from 1818-1822?.

Jonathan Mason dates from Morrison-Low 1989,130.

Ex0290 OCTANT

(Crichton London sold by Mason Limerick)

R 265. 1822-1849. F.

"A Crichton Ebony Octant, English, first quarter of 19th century, the ebony "T" frame inset with ivory plaque engraved 'Crichton London sold by Mason Limerick' together with ivory -4°-100° scale, brass index arm, clamping and tangent screws, one set of filters and double peep, frame with small crack and chip lacking note plaque" - illustrated - Sotheby 25:9:84/20:2:85 Lot 115/74, £250-320/£180-220 - index arm reinforced, window vernier; index and horizon mirrors, but no half horizon mirror.

Jonathan Mason listed in Dublin to 1822, to Limerick on marriage, in business to 1849, Burnett & Morrison-Low 1989,151-2.

Ex0313 DIVIDERS - PROPORTIONAL

(J. & J. Mason, Dublin)

L 152. 1805-1817. G.

"A pair of silver proportional dividers, signed 'J. & J. Mason, Dublin', with steel points" - Christie 28:8:89, Lot 231, £200-300. Is signature a misprint for T. & J. Mason? Morrison-Low 1989,130 lists only one J. Mason - Jonathan, who was in partnership with Thomas in 1805-8 and 1813-17.

Ex0633 BAROMETER - BANJO

(S. Mason, Essex Bridge, Dublin)

H 960; W 285. Mid 19 C. R.

Oak case; Newarke Houses Museum, The Newarke, Leicester LE2 7BY.

Attributed to the Seacom(b)e Mason who was at Essex Bridge from 1838-1864 - Morrison-Low 1989,131.

Ex0638 CIRCUMFERENTOR

(Seacomb Mason, Dublin)

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No measurements available. Late 18 early 19 C. G.

Owned by the Association of Ontario Land Surveyors, Scarborough, Ontario, Canada; information from Randall C. Brooks.

Ex0064 CIRCUMFERENTOR

(SEACOME MASON 6 ESSEX BRIDGE DUBLIN)

L 478; D 162. 1838-1844. A.

Brass; silvered scale 0-90-0° twice and 0-360°; two spirit levels; slit and window sights; Whipple 1899.

Sights screwed to alidade with butterfly nuts; push fit lid; ball and socket attachment to tripod; illustrated in Brown 1982a,31, Bennett 1987,150, and Burnett & Morrison-Low 1989,26.

Dates from Morrison-Low 1989,131.

Ex0378 THEODOLITE - PLAIN

(S. Mason, Dublin)

No measurements available. Early 19 C. PC.

"An early 19th century brass theodolite signed 'S. Mason, Dublin' on the horizontal plate, the telescope with rack and pinion focusing [*sic*] and level, located in twin clamps over to [*sic*] vertical half circle supported in 'V' frames from the horizontal plate with compass box (replacement needle), two levels, chamfered silvered scale with tangent screw, clamp and twin verniers, on a four-screw tripod mounting." - illustrated [with spirit level above tube] - Christie 5:3:87, Lot 340 £4-600.

Ex0022 BAROMETER - STICK

(S. & T. Mason, 3 Essex Bridge)

No measurements available. 1810-1826. A.

Mahogany; scroll pediment; bow-fronted case; glazed plates; thermometer; urn-shaped cistern cover; Goodison 1977,340.

Morrison-Low 1989,130 give this address from 1810-26 but under the name of Thomas and Jonathan Mason.

Ex0372 ALTIMETER

(T. Mason, Dublin)

No measurements available. 1866-1922. G.

"Pocket altimeter"; Christie 13:3:80/4:9:80, Lot 71/ 176.

Assumed to be Thomas II - dates from Morrison-Low 1989,131.

Ex369 BAROGRAPH - ANEROID

(T. Mason, Dublin)

W 360. 1866-1922. G.

"A BAROGRAPH, by 'T. Mason, Dublin', the eight aneroid movement in a bevelled glass mahogany case with draw beneath." - Bonhams 6:12:85, Lot 78, £200-250.

Assumed to be Thomas II, dates from Morrison-Low 1989,131.

Ex0477 GLOBES - CELESTIAL & TERRESTRIAL

(Made & Sold by J & W Cary Strand & T. Mason, Essex Bridge Dublin)

D 305 (12"); H. 451. Early 19 C. G.

"A pair of early 19th-century 12 inch globes by J & W Cary: The Terrestrial: with label inscribed 'CARY'S NEW TERRESTRIAL GLOBE, DELINEATED From the best Authorities extant; Exhibiting the late Discoveries Towards the NORTH POLE and every improvement in Geography to the present Time, LONDON: Made and sold by J & W Cary Strand & T. Mason, Essex Bridge Dublin', the printed and coloured paper gores with tracks of navigators and explorers, printed horizon ring engraved brass meridian circle and hour ring, on mahogany stand the four baluster turned supports united by stretchers".

"The Celestial: with label inscribed 'CARY'S NEW CELESTIAL GLOBE ON WHICH are correctly laid down upwards of 3500 Stars Selected from the most accurate observations and calculated for the year 1800. With the extent of each Constellation precisely defined By MR GILPIN of the ROYAL SOCIETY. Sold by J & W Cary Essex Bridge Dublin [*sic*], the printed and coloured paper gores decorated with the constellations, zodiac signs, mythical beasts, figures, and scientific instruments, with similar brass meridian circle, hour ring and mahogany stand." - Christie 29:3:90, Lot 24, £5000-6000, with colour illustration.

Masons moved to Essex Bridge in 1809 - Morrison-Low 1989,130.

Ex0065 LEVEL - TELESCOPIC

(Thomas Mason Dublin)

No measurements available. 1866-1922. F.

"Surveyor's level"; four screw; bubble level; telescope; Royal Institution; listed in Holbrood 1992,170.

Date assumes Thomas Mason II, since address not given; dates from Morrison-Low 1989,131.

Ex0366 MICROSCOPE - COMPOUND, CULPEPER

(T. Mason, Essex Bridge, Dublin) (Lee & Son, Belfast)

CH 340. 1850-1870. F.

"An early 19th Century Lacquered brass Culpeper-type Compound Monocular Microscope, the circular base with swivel mirror, the scroll mounts supporting spring stage, one mount a.f., with draw-tube focusing, the body-tube signed 'T. Mason, Essex Bridge, Dublin', in pyramid-shaped mahogany case, applied with label, 'Lee & Son, High St., Belfast', 34cm. high, with a drawer of accessories including four objectives, stage forceps, four bone slides and fishplate." - Philips, 21:5:86, Lot 152, £4-600.

Burnett & Morrison-Low 1989,150 give Lee & Son dates, 1850-70, which have a narrower range than T. Mason, Essex Bridge.

Ex0109 PLANIMETER

(J. Amsler 61033) ([Trade Label] T. MASON OPTICIAN 5, DAME STREET DUBLIN)

L 170. 1900-1916. A.

Polar; brass/steel; label in fitted case.

Illustrated (instrument, not case) Turner 1983,279; dates from Morrison-Low 1989,131.

Ex0491 TELESCOPE - REFRACTING

(Thos Mason Dublin)

L 1070. Late 19 C. PC.

"A late 19th Century brass 2 3/4in. Refracting Telescope, signed 'Thos Mason Dublin', with rack and pinion focusing and spare eyepiece, on a turned support with folding steel tripod stand" - Philips 11:12:90, Lot 427, £300-500.

T. Mason II dates from 1866-1922, Morrison-Low 1989, 131.

Ex0371 TELESCOPE - REFRACTING

(Thomas Mason, Dublin)

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TuL 950. 1866-1922. G.

"A 19th Century brass Refracting Telescope by 'Thomas Mason of Dublin', the body tube 95cm. long, raised on a tapering column and folding tripod." - Philips 21:5:80, Lot 67.

Assumed to be Thomas Mason II - dates from Morrison-Low 1989,131.

Ex0370 TELESCOPE - REFRACTING

(Thomas Mason, 5 Dame St., Dublin)

Tu 920; LeD 76. 1900-1916. A.

"A late 19th Century brass 3in Astronomical Telescope, signed 'Thomas Mason, 5 Dame St., Dublin', with 92cm (3ft) long body tube, and rack and pinion focusing, on tapering pillar stand with folding cast-iron tripod base, with additional eyepiece lens and shade." - Philips 16:3:88, Lot 122, £170-220.

Dates from Morrison-Low 1989,131.

Ex0066 CIRCUMFERENTOR

T & J Mason, Essex Bridge, DUBLIN

D 163. 1805-1817. F.

Brass; silvered scale; upper 10-360°, lower 10-80°x4; glass covered; NMM Gabb Collection C.153/61-32C.

With brass lid; two lugs on sides of instrument, but no fittings below; no needle clamp; eight point compass; photograph C70,3.

Dates from Morrison-Low 1989,130.

Ex0278 LEVEL - TELESCOPIC

(Mason & Co., Dublin)

L 540. 1876. F.

"A 19th century brass surveyors level signed 'Mason & Co., Dublin' with level and cross-bubble, the limb with compass, with four-screw tripod attachment, in mahogany case - 21 1/4in. Wide." - Christie 5:2:87, Lot 75, £80-120.

Date from Morrison-Low 1989,131.

Ex0375 MICROSCOPE - COMPOUND

(Mason & Co., Opticians, Dublin R. Winkel, Göttingen)

No measurements available. 1876. F.

"UNUSUAL ELECTRUM METAL MICROSCOPE, second half 19th century, signed on the base 'Mason & Co., Opticians, Dublin' and on the apparently original objective 'R. Winkel, Göttingen'. This rare example is a bar limb design made entirely of the silvery nickel alloy, or, in the case of certain screws and slides, of brass plated to match. It seems to be designed primarily for use with opaque objects - there is no substage apparatus, and the entire stage assembly moves up and down by rack-and-pinion. The microscope has mechanical stage, rotatable slide platform, coarse and fine focus, one ocular and one objective. Undoubtedly a very rare design, in fine condition." - illustrated - Tesseract 10,1985,25, \$425 - Y base with trunnions.

Offered again in Tesseract 44,1994,16 at \$950.

Morrison-Low 1989,131 lists Mason & Co. only in 1876.

Ex0556 MICROSCOPE - COMPOUND

(W. Watson & Sons Ltd London No.66122) (ROBT. MAUDE & KEYS DUBLIN "KIMA")

H 336. Early 20 C. G.

"A black enamelled and chrome monocular microscope.... rack-and-pinion focusing, micrometer fine focusing, square stage, sub-stage condenser, replacement mirror, on Y shaped foot" - Christie 6:5:93, Lot 179, £100-150 - with two cases of microscope slides, from the estate of the late Alan Connolly.

Ex0002 DIAL - HORIZONTAL PEDESTAL

(RICD MELVIN 9 Lr Wellington St DUBLIN No 2662 A.D. 1871)

335x310x60. 1871. S.

"A Richard Melvin Slate Sun Dial, Irish, 1871, signed 'Richd Melvin, 9 Lr[sic] Wellington St., Dublin', for latitude 53 degrees, fifteen minutes, the main dial with brass gnomon, flanked by four subsidiary dials for Borneo, New Zealand, New York, Alexandria" - description in Sotheby 23:6:87, Lot 151, £200-300, from whom it was bought by the National Museums of Scotland - RMS T.1987,134.

The RMS inventory description gives the information: "Oblong horizontal pedestal sundial in slate, engraved for latitude 53° 51'....and with the mottoes 'Sol non occidat super iracundiam vestram Ephes. cap. IV. ver. 26', and 'Horas non numero nisi serenas' (Let not the Sun go down upon your wrath, I count the bright hours only). Central 32-point compass rose. four subsidiary dials for local time at New York, Alexandria, New Zealand and Isle of Borneo".

For details of Richard Melvin/Melville, see Clarke 1989,210-216.

Ex0307 BAROMETER - BANJO

(D. Milesio Fecit)

H 1000; DID 203. 1812-1825. F.

"A MAHOGANY WHEEL BAROMETER with a thermometer, the eight-inch brass register signed 'D. Milesio Fecit', the case with a broken pediment and inlaid with flower-heads and shells...early 19th Century." - Sotheby 2:12:77, Lot 36.

Dominick "Milessio" listed in Dublin 1812-25, Morrison-Low 1989,131 - the spelling seems to have varied.

Ex0023 BAROMETER - BANJO

(D. Milesio, Belfast)

D 203. Early 19 C. G.

Mahogany; broken pediment; case inlaid with paterae of coloured woods; Goodison 1977, 341.

Ex0024 BAROMETER - BANJO

(D. Milessio, Dublin)

D 203. 1812-1825. F.

Mahogany; broken pediment; case inlaid with patenae of coloured woods; Goodison 1977,341.

Dominick Milessio dates from Morrison-Low 1989,131.

Ex0025 BAROMETER - STICK

(D. Milessio, Dublin)

No measurements available. 1812-1825. F.

Mahogany; scroll pediment; glazed register plates; Goodison 1977,341.

Dominick Milessio dates from Morrison-Low 1989,131.

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Ex0479 ANEMOMETER - LOWNE

[Label] FRANCIS M. MOORE, Watch Maker & Optician, 102 HIGH St. BELFAST AND 23 EDEN QUAY, DUBLIN
C 108x108. 1870-1887. A.

"A late 19th-century mining air-flow meter, the black enamelled and lacquered brass frame with staff mounting, silvered dial and eight-bladed aluminium fan, with trade label for 'Francis M. Moore Belfast', in mahogany case" - Christie 29:3:90, Lot 178 - meter and label illustrated.

The trade label includes a lion and unicorn armorial above an elliptical buckled belt.

Dates from Burnett & Morrison-Low 1989,132&152.

Ex0635 OCTANT

(F.M. MOORE BELFAST)

305x148x83. Mid 19 C. R.

Listed in Brooks 1992,9; located in the Yarmouth County Museum, Yarmouth, Nova Scotia, Canada.

Eve Ruff provided the file details for the octant: "British [s/c], wooden frame, radius 10". Name plate ivory marked "F.M. MOORE BELFAST" inlaid in brace. Limb is of wood

inlaid with ivory scale (loose) graduated from -4° to 100° by 1° subdivided into 20'. Reinforced brass index arm has (Type B) vernier of ivory reading to 1' with tangent and screw to left. Adjustable index mirror has three movable shades. Horizon glass with thumb screw and lever (?) adjustments with three movable shades. Sight vane for telescope with single peep. Carved ivory topped pencil screwed into brace...NOTE this instrument was originally in a case."

F.M. Moore was active from 1854-1906, Burnett & Morrison-Low 1989,152 - this is probably early as he also made sextants.

Ex0380 SEXTANT

[Label] FRANCIS M. MOORE Watch Maker & Optician, 102 HIGH ST BELFAST AND 23 EDEN QUAY DUBLIN" - below Royal Arms

R 102. 1877-1905. A.

"A Georgian lacquered brass sextant of small size, unsigned, with telescope attachment, mirrors, seven shades and mahogany handle, the arc inset with silvered scale, the index arm with fine adjustment vernier and clamp, in shaped mahogany case with three telescope tubes and trade label" - Christie 13:12:84, Lot 143, £4-600 - both instrument and label illustrated.

Firm listed at 102 High Street from 1877-1905, Burnett & Morrison-Low 1989,152.

Ex0317 SEXTANT

[Label] FRANCIS M. MOORE 23, EDEN QUAY, DUBLIN.

R 152. 1865-1898. A.

Green marbled oxidised diamond-lattice frame; silvered scale; case; Christie 29:6:89, Lot 203, £300-400.

Frame has adjustable telescope mounting socket, seven shades, index and horizon mirrors; index arm has vernier, pivoted magnifier, tangent and clamping screws; three telescopes; pear-shaped handle; instrument unsigned, but shaped mahogany case has Trade Label; both sextant and Label are illustrated.

The trade label reads: "FRANCIS M. MOORE, Practical CHRONOMETER & WATCHMAKER, Adjuster of the Compasses of Iron Ships, OPTICIAN &c. MOORE'S PATENT STANDARD AND STEERING COMPASS WITH PERFECT SYSTEM OF ADJUSTMENT 2, EDEN QUAY, DUBLIN. AND 102, HIGH STREET, BELFAST. TIME SIGNALS DIRECT FROM GREENWICH OBSERVATORY BAROMETERS & TELESCOPES, SEXTANTS, QUADRANTS, BINNACLES, COMPASSES, CHARTS &c. MATHEMATICAL INSTRUMENTS MARINE CHRONOMETERS RATED BY TRANSITS Nautical Instruments repaired with the greatest care BY APPOINTMENT ... AGENT TO THE..... LONDON.....A few good second hand chronometers... & ready for sea." - [photograph unclear after SEXTANTS].

Dates from Burnett & Morrison-Low 1989,152.

Ex0489 TELESCOPE - REFRACTING

(D. Adams Charing Cross - Label, Francis Moore Dublin)

LeD 70; TuL 112. Early 19 C. PC.

"A Dudley Adams 2 3/4-Inch Brass Refracting Telescope on Stand, English, early 19th century, signed 'D. Adams Charing Cross', the tube with rack and pinion focusing, supported by bracket above brass column and folding tripod base...in mahogany case with Francis Moore of Dublin trade label (tune [sic] with surface dents, lacking original lacquer) £600-1,000"; illustrated - Sotheby 11:5:90, Lot 529.

Presumably sold second hand as maker's and supplier's dates do not overlap.

Dudley Adams went bankrupt in 1817, Millburn Bull SIS 19,1988,19; Moore listed from 1864, Morrison-Low 1989,132.

Ex0379 TELESCOPE - REFRACTING

(Dollond, London - Label, Francis M. Moore, Belfast)

TuL 1092; LeD 76. Mid to late 19 C. G.

"A lacquered brass three-inch refracting telescope by 'Dollond, London' with sighting telescope, rack adjustment, quick-release azimuth adjustment, brass pillar-and-claw and fixed wood tripods...in mahogany case with label of 'Francis M. Moore, Belfast'." - Christie 12:3:81 Lot 115.

Firm traded from 1854-1906, Burnett & Morrison-Low 1989,152.

Ex0595 STANDARD VOLUMES - IMPERIAL

MUNSTER IRON CO. CORK 94 NORTH MAIN STREET

BD 162-51; H 300-75. Mid 19 C. G.

Pewter; seven jugs with handles at sides and conical lips on top; sizes from gallon to half-noggin.

The jugs are inscribed: "1 GALLON", "½ GALLON", "1 QUART", "1 PINT", "1 HALF PINT", "1 GILL", "½ NOGGIN"; the four largest jugs have a lion above a crown in the middle of the signature mark; the others just have a crown above an "X" with no signatures; a similar set of jugs, 3527 SAL050, has one signed as these, but the others are signed: "AUSTEN & SON CORK IMPERIAL 94 NORTH MAIN STREET".

Sold to London dealer by North Monastery School, Cork.

Ex0383 BAROMETER - MARINE

(Neill Belfast)

H 930. Mid to late 19 C. G.

"A MAHOGANY SHIP'S BAROMETER signed 'Neill Belfast' on the ivory register plates with vernier, the trunk with ivory thermometer and with circular brass cistern below, now lacking gimbal suspension." - Christie, 28:4:82 Lot 18.

Different Neills listed in Burnett & Morrison-Low 1989, 153-4 from 1805-1921.

Ex0481 BAROMETER

(James Neill & Son, Belfast)

D 133. Mid to late 19 C. G.

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"A 'Holosteric' barometer by 'James Neill & Son, Belfast'"; Christie 16:8:90, part Lot 49, £50-100.
Burnett & Morrison-Low 1989,153 record James Neill from 1856-1861, and James Neill & Co. from 1865-1880, but do not record James Neill & Son.

Exo504 ANEMOMETER

(SHARMAN D. NEILL LTD. BELFAST

No.15735 patent No.3729)

No measurements available. 1915. P.

"A lacquered brass and enamelled brass airflow meter ...in fitted leather case"; Christie 4:7:91, part lot 205.

Burnett & Morrison-Low 1989,154 list Sharman D. Neill Ltd from 1910-21.

Ex0645 BAROMETER - ANEROID, PORTABLE

(Sharman D. Neill Ltd., Belfast)

D 35. 1910-1921. R.

"A gilt pocket barometer, in shaped leather-covered case" - Christie 29:6:95, part of Lot 18a.

Dates from Morrison-Low & Burnett 1989,154.

Ex0387 BAROMETER - ANEROID, PORTABLE

(Sharman D. Neill BELFAST)

D 57. 1884-1909. F.

"A pocket aneroid barometer, the silvered dial signed: 'Sharman D. Neill BELFAST' in the original lined and fitted leather covered case." - Christie 10:7:86 Lot 53, £50-70.

Burnett & Morrison-Low 1989,153-4 list the firm from 1884-1909, after which it became a Limited Company.

Ex0476 COMPASS - MARINE, IN BINNACLE

(Sharman D. Neill Ltd., Belfast)

GiD 150 (6"). Early 20 C. R.

"A 19th century bulkhead mounted binnacle, the compass card signed 'Sharman D. Neill Ltd., Belfast', spirit dampened, complete with brass gimbal and bulkhead mounting" - Christie 14:4:89, Lot 394, £40-60.

Firm became a Limited Company in 1910, Burnett & Morrison-Low 1989,154.

Ex0505 HYDROMETER - SIKES

(SHARMAN D. NEILL BELFAST SIKES 13041)

L 165; C 203x108x57. 1884-1909. F.

Brass; nine ring weights; thermometer on bone plate; box-wood slide rule; Historical Technology 134,1991,241.

"...name plate on case cover of 'SHARMAN. D. NEILL BELFAST' and the thermometer is similarly marked while the float is signed 'SIKES' with serial no.13041."; the thermometer is on a long bone plate (168x26), and along with the boxwood proof slide rule (L 168), the set contains a 'revised edition (no date) of "SIKES' TABLES OF THE CONCENTRATED STRENGTH OF SPIRITS, WITH DIRECTIONS FOR USE OF HIS HYDROMETER, ESTABLISHED THROUGHOUT THE UNITED KINGDOM FOR ESTIMATING THE DUTIES ON SPIRIT-VOUS LIQUORS"; 118 pages in very fine condition.' - \$215 - illustrated.

Firm dates from Burnett & Morrison-Low 1989,153-4.

Ex0384 SEXTANT

(S.D. Neill Ltd., Belfast)

R 190. c1920. D.

"A Hezzanith sextant signed 'S.D. Neill Ltd., Belfast', with three eyepieces and Hezzanith certificate dates 1920...in mahogany case." - Christie 8:1:81, Lot 109.

Sharman D. Neill Ltd listed in Burnett & Morrison-Low 1989,154 from 1910-1921.

Ex0385 SEXTANT

(S.D. Neil Ltd., Belfast Z855) - assumed to be "Neill"

R 260. c1930. D.

"A BRASS SEXTANT with platina scale and vernier, numbered Z855, signed on the arc 'S.D. Neil Ltd., Belfast' [assumed to be a misprint for Neill], with two sets of coloured filters and wooden handle, in fitted case with telescope and pin-hole sight, the lid with 'Hezzanith' certificate dated 1930, 10¼in." - Lawrence 26:3:87, Lot 6.

Ex0386 TELESCOPE - REFRACTING

(Shurman D. Neill, Belfast) - assumed to be "Sharman"

TuL 991. 1884-1909. F.

"A brass telescope by 'Shurman D. Neill, Belfast' [presumably a misprint for Sharman] with two eye-pieces, on pillar-and-claw stand with extended iron legs." - Christie 21:10:82, Lot 109.

Sharman D. Neill listed by Burnett & Morrison-Low 1989,154 from 1884-1909, after which firm became a Limited Company.

Ex0033 BAROMETER - MARINE

NEILL BROTHERS, BELFAST

No measurements available. 1850-1863. F.

Mahogany; ivory register plates; thermometer on hinged panel beside plates; illustrated, Banfield 1985b,168.

Ivory signature plate on top; from Park Street Antiques, Berkhamstead.

Dates from Burnett & Morrison-Low 1989,152.

Ex0388 BAROMETER - PORTABLE

(Neill Bros. Belfast)

H 950. 1850-1863. F.

"A MAHOGANY TRAVELLING BAROMETER with a plaque signed 'Neill Bros. Belfast' above the angled bone plate and enclosed tube, in a flat-topped case with a bronzed metal cistern cover." - Sotheby 7:6:84, Lot 188A, £2-300.

Dates from Burnett & Morrison-Low 1989,152-3.

Ex0389 OCTANT

(Crichton London Made for Neil [sic] Bros Belfast)

AR 193. 1850-1863. F.

"A brass octant, the arc signed 'Crichton London Made for Neil [sic] Bros Belfast', the frame with rosewood handle, telescope socket, seven shades and horizon mirror, the index arm with vernier, magnifier and silvered scales, in a shaped mahogany case with trade label for Hayes Brothers." - Christie 27:11:86, Lot 168, £180-220.

Neill dates from Burnett & Morrison-Low 1989,152-3.

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Ex0636 OCTANT

(Neill & Son, Belfast)

No measurements available. 1843-1846. F.

Listed in Brooks, 1992,9; located in Haliburton House at the Museum of Nova Scotia, Canada.

Although the signature is given as "Neil & Son" and the date c1810, this is assumed to be Robert Neill & Sons, listed in Burnett & Morrison-Low 1989,153 from 1842-1846.

Ex0026 BAROMETER - BANJO

(Neill & Sons, Belfast)

D 203. 1842-1846. F.

Mahogany; scroll pediment; listed in Goodison 1977, 344.

Burnett & Morrison-Low 1989,153 list Robert Neill & Sons, Belfast, 1842-46.

Ex0484 TELESCOPE - REFRACTING

(Neills Opticians, Belfast)

LeD 45 (1 3/4"). Early 19 C. PC.

"An early 19th century 1 3/4 inch brass refracting telescope signed 'Neills Opticians, Belfast', with rack and pinion focusing on tapering pillar support and tripod stand, the cabriole legs terminating in pad feet. £100-150" - Christie 5:3:87, Lot 311.

Burnett & Morrison-Low 1989,153-4 record various Neill entries, but no actual "Neills Belfast".

Ex0027 BAROMETER - MARINE

(Nelson, Dublin)

No measurements available. 1830-1862. F.

Listed in Goodison 1977,344; Morrison-Low 1989,132 lists William (1830-39) & William H. Nelson (1840-62).

Ex0390 BAROMETER - ANEROID, PORTABLE

(S. Nicholl, Belfast)

No measurements available. 1901-1908. F.

"Pocket barometer..in fitted leather case with miniature compass and thermometer"; Christie 28:7:83 Lot 56.

Dates from Burnett & Morrison-Low 1989,154.

Ex0289 BAROMETER - BANJO

JOHN NOSEDA Fecit

H 940. c1774. FL.

"An unusual and early mahogany Barometer, mid-18th Century, with paper scales inscribed 'John Noseda fecit', with turned surround and tapering moulded terminals, with alcohol thermometer and boxwood scales." - illustrated - SothebySU 19:6:86, Lot 1958, £800-1200.

The Sotheby Guide for 1988, 135 records the price obtained as £484.

Also illustrated in Burnett & Morrison-Low 1989,80; date p154.

Ex0629 BALANCE - EQUAL ARM

[Trade label] D. PICKERING Scale Maker to the BANK of IRELAND No 73 PILL LANE Dublin

BmL 180; CL 225. 1796-1806. R.

Swan neck ends; brass pans stamped "D.P."; beech-wood case with trade label containing two bronze weights; Crawforth-Hitchins 1994,1830; SM.

This is one of only two sets of coin/apothecary scales recorded for David Pickering, the other being in the Science Museum London; no details of the latter were available, but its trade label is illustrated.

Ex0067 BALANCE - EQUAL ARM

(Jas Pickering. Beam and Scale Maker to the Bank of Ireland No 73, Pill Lane Dublin [on label in lid]).

BmL 247; PaD 50. 1810-1834. R.

Steel; brass pans; case; Whipple 1406; Brown 1982b,26.

Box beam ends; self locating knife edges; ring bearing in gallows which have a large aperture in each side of plane of beam; pans circular; wood case with partition for weights (none extant); Stokes collection.

Dublin Directories list James Pickering at 73, Pill Lane, as Scale-Maker from 1810-1816, and Beam & Scale Maker from 1817-1834; Brown 1982b,26.

This balance is illustrated in Crawforth-Hitchins 1994, 1831, where it is noted that the case is made-up from oak wainscoting, and has the same trade card as that in the National Museum Dublin (1408 NMD057); the balance has an exceptionally long and slender beam; the pointer is nearly as long as half the beam, which is an Irish characteristic; the shears have a small sight hole, another Irish characteristic; the box is exceptionally large, far bigger than is needed for the scale pans, yet another Irish characteristic!

Ex0270 BAROMETER

(Anthony Pitzoli)

No measurements available. 1831-1835. F.

Burnett & Morrison-Low 1989,28 note that a barometer is known to have been produced by Anthony Pitzoli.

Dates from Morrison-Low 1989,133.

Ex0391 COMPASS - PRISMATIC

(Pollock & Co. (Ireland) Ltd., Dublin)

No measurements available. 20 C. G.

"A hand-held prismatic landing compass, stamped [as above], in case"; Christie 31:1:85, Lot 41.

Not listed in Burnett & Morrison-Low 1989.

Ex0392 BAROMETER - BANJO

(F. Porri Dublin)

H 1020; DID 203. Early to mid 19 C. G.

"A mahogany Wheel Barometer with a hygrometer, arched thermometer, convex mirror, 8-inch silvered plate and spirit level signed 'F. Porri Dublin', the case with a swan-neck pediment and ebonised border." - Sotheby 15:12:83 Lot 140, £120-180.

Ex0028 BAROMETER - BANJO

(F. Porri, Dublin)

D 203. Early to mid 19 C. G.

Mahogany; scroll pediment; mirror set above dial; listed in Goodison 1977,350

Not in Burnett & Morrison-Low 1989.

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Ex0621 OPHTHALMOSCOPE

(G. Prescott, Dublin)

No measurements available. 1895-1905. R.

"A Mr. Swanzy's Student Ophthalmoscope, in black composition case", Christie 3:3:94, part of Lot 81.

This instrument is in a Lot with: "a Liebrich's ophthalmoscope in fitted leather-covered case; a simple ophthalmoscope; an Anatomy and Physiology of the Eye stereoscope and cards; and two lorgnette testers £150-200"; it is not made clear how many of these are signed by Prescott - but presumably it is only Swanzy's Ophthalmoscope, listed immediately after his name in the Sale Catalogue.

Dates from Morrison-Low 1989,133.

Ex0129 TELESCOPE - REFRACTING

(A. Prince, Waterford)

No measurements available. 1839. FL.

"A brass three-draw telescope by A. Prince, Waterford, in a leather case."; Christie 24:11:76, Lot 25.

Date from Westropp.

Ex0108 CIRCUMFERENTOR

W.R. Dublin. fe. Latitude 53 20 * 1667 *

L 355. 1667. S.

Wood; brass line and window sights; printed compass/sundial card; purchased 1948-9; MHSO M20 49-32.

Wood frame for compass card and needle with scroll carvings at points where sight arms lead off; bracket below for stand; with south point of compass directed to sun, time can be read off line on card appropriate to solar declination, where it meets the needle.

Possibly made for Sir William Robinson c1643-1712, and sold in Dublin; Robinson was architect of the Royal Hospital, Kilmainham; Burnett 1989,14.

Sotheby 5:10:90 Lot 489, was a screw barrel microscope "W.R. fecit".

Writing in Rittenhouse Vol.3, No.1, 1988, p.7, A.V Simcock makes the following comments on this instrument: This wooden circumferentor or surveyor's compass in the Museum of the History of Science, Oxford, England, is signed and dated "W.R. Dublin ... 1667". It is one of the earliest of its kind, and is the forerunner of the American surveyor's compass which figures so frequently in the pages of Rittenhouse, and to which articles were devoted by Deborah Warner and M. Eugene Rudd in volume 1, number 3. The oldest American examples, which are early 18th century, are of very similar appearance and also sometimes of wood. This type of instrument, simplified from its English and European original, was developed for use in the mapping and apportioning of colonies. The existence of an early example from Ireland (Britain's handiest colony!) is of obvious significance. As one of the first scientific instrument makers in Ireland, W.R. will have learned his skills in London.

The establishment of the trade in Dublin arose not only from the demand but also from the excellent organisation brought by Sir William Petty's Down Survey of 1655-56, and the ensuing project to map the whole of Ireland, which was completed 30 years later. This instrument, dating from this very period, was presumably made for use by the government surveyors. The success of the surveyor's compass in Ireland must have shown its potential for the huge task of surveying North America. Ireland may in this way have been the stepping stone for its introduction into a sphere where, for a long time, it was the pre-eminent scientific instrument.

Illustrated in Burnett 1989,15 - this is the oldest known Irish signed instrument.

Ex0567 COMPASS - MARINE

(JAMES RAMSAY, The Globe, Essex Street, DUBLIN)

D c127 (5"); C 384x384x203. Late 18 C. PC.

In oak case; with sighting vanes; decorative compass card; agate fulcrum; reported by Stuart Talbot, London.

Owned by a colleague of Stuart Talbot, personal communication 22:7:92; the "most decorative and elaborate compass card" has a little mariner and backstaff cartouche surrounding the fulcrum.

James Ramsay is not listed in Burnett & Morrison-Low 1989.

Ex0393 SURGEON'S INSTRUMENTS

([Mostly by] Read, Dublin)

No measurements available. 19 C. PC.

"A part set of 19th Century Field Surgeon's Instruments, including saws, scalpels and forceps, a trepanning set, tooth key and tourniquets, 'mostly by Read of Dublin', in a brass bound mahogany case." - Philips 19:11:80, Lot 14.

Ex0512 DENTAL INSTRUMENTS

(Thomas Read & Co. manufacturers of Chirurgical Instruments, Parliament St. Dublin.) [Label]

CW 228. Early 19 C. R.

"A set of dental instruments signed 'Read' with makers label for 'Thomas Read & Co. manufacturers of Chirurgical Instruments, Parliament St. Dublin.' with octagonal ivory handles, steel instruments including two steel tooth keys with fluted cranked shafts, smooth ivory handles with removable claws, four steel forceps, pull out tray with part set of steel shaft and smooth ivory handled scalers with two replacement instruments including small finger saw in mahogany brass bound case, early 19th Century - 9in. wide £400-600" - Christie 3:3:92, Lot 126.

Ex0131 BAROMETER - BANJO

(J. Ribaldi Limerick)

D 203. 1824. F.

Mahogany; broken pediment; case inlaid with paterae of coloured woods; listed in Goodison 1977,352.

Date from Burnett & Morrison-Low 1989,155.

Ex0132 BAROMETER - STICK

(J. Ribaldi Limerick)

No measurements available. 1824. F.

Mahogany; bulb cistern; broken pediment; thermometer on register plates; listed in Goodison 1977,352.

Date from Burnett & Morrison-Low 1989,155.

Ex0130 BAROMETER - BANJO

(L. Riboldi, Limerick)

D 203. Early to mid 19 C. G.

Philips 8:5:85, Lot 1.

Burnett & Morrison-Low 1989,155 note a J. Riboldi, Carver & Gilder, in Limerick in 1824.

Ex0394 BAROMETER - BANJO

(L. Riboldi, Limerick)

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H 980; DID 203. Early to mid 19 C. G.

"A late 19th Century mahogany Wheel Barometer, having an 8-in. silvered dial, signed 'L. Riboldi, Limerick', the shaped case inset with shell and rosette paterae, mounted with a thermometer, and surmounted by pediment and urn finial." - Philips 8:5:85, Lot 1, £160-200.

Burnett & Morrison-Low 1989,155 note a J. Riboldi, Carver & Gilder, in Limerick in 1824.

Ex0395 BAROMETER - STICK

(Rider, Belfast)

H 990. c1820. PC.

"A 19th Century mahogany Stick Barometer, the glazed silvered scale signed 'Rider, Belfast', the case with boxwood stringing and circular cistern cover, inset with hygrometer and Fahrenheit scale thermometer, surmounted by broken pediment, circa 1820..restored." - illustrated - Philips 18:2:87/19:8:87, Lot 4/4, £3-500/5-600 - the illustration has a flat layered top, not the broken pediment described.

Not listed in Burnett & Morrison-Low 1989.

Ex0397 MICROSCOPE - COMPOUND, BINOCULAR

(Robinson, Grafton Street, Dublin)

CH 520. 1845-1884. F.

"A BRASS BINOCULAR MICROSCOPE 'by Robinson of Grafton Street, Dublin', the Wenham binocular eye-piece with tandem focusing and fine adjustment, rising and falling by knurled screws on a tilting frame, fully mechanical stage with adjustable mirror below, mounted on U-shaped base, in fitted mahogany box with extra eye pieces, objectives, polariser, dark ground lens etc...and

with manufacturer's written instructions and original receipt." (but no date given!) - illustrated - Sotheby 21:10:77, Lot 52.

Dates from Morrison-Low 1989,133.

Ex0396 TELESCOPE - REFRACTING

(Robinson, Dublin)

MxL 733; LeD 42. 1845-1884. F.

"A 19th century brass 1 5/8in six drawer telescope, signed 'Robinson, Dublin', with belline covered outer body tube, lens cap and dust slide." - Christie 14:4:88, Lot 131, £60-100.

Dates from Morrison-Low 1989,133.

Ex0292 CAMERA - WET PLATE

(J. Robinson, Grafton Street Dublin)

No measurements available. 1845-1884. F.

Presented by Henry Minn, 1928; formerly owned by John Barclay, Christ Church, Oxford (FL 1896); MHSO 28-69.

Information from Tony Simcock; noted in Morrison-Low 1989,67; dates from Morrison-Low 1989,133.

Ex0005 MEDICAL PHOTOGRAPHS

(J. Robinson & Sons, 65 Grafton Street, Dublin.)

No measurements available. 1871-1877. S.

Photographs of patients before and after surgery (47); noted Bull SIS 2,1984,14.

Sold to an American collector by B.A. Wiedenkiller of Arlington, Massachusetts; dated 1871 to 1877.

J. Robinson & Sons, Opticians, didn't appear in the directories until 1885 (it was James Robinson alone from 1845-1884) - was the photographic branch set up as J. Robinson & Sons before this?

Ex0646 MICROSCOPE - COMPOUND

(James Robinson, Dublin)

CW 264. 1845-1884. R.

"With rack and pinion focusing, mechanical stage, bull's eye condenser and swivel mirror, with two eye-pieces, two objectives, wheel condenser, polariser, live-box and other items, in fitted mahogany case. £400-600." - Christie 29:6:95, Lot 191.

Dates from Morrison-Low 1989,133.

Ex0004 OPTICAL MODEL

(J. Robinson & Sons Opticians 65 Grafton St Dublin)

No measurements available. 1885-1903. F.

Label on French model showing path of light through lenses; Bull SIS 1,1983,7.

Ex0001 CAMERA - DETECTIVE

J. Robinson & Sons 172 Regent St London & Dublin

D 180. Late 19 C. G.

"A C.P. Stirn's Patent Detective Camera, American, late 19th century, No.5739, size no.2 with simple lens, rotating shutter (lacking circular plate holder), in nickel plated case with pointer and four numerals together with 'Patentees Agents J. Robinson & Sons, 172 Regents St. London & Dublin'" - illustrated - Sotheby 23:6:87, Lot 28, £7-800.

The Sotheby Guide 1989,550 records the price obtained as £550.

Robinson & Sons at 72 Regent Street in 1885-6, Morrison-Low 1989,133; and in 1894, Pearsall 1974,264.

Ex0488 CAMERA - DETECTIVE

Sole Agents for Gt Britain J Robinson & Sons

172 Regent St London W. & Dublin

D c140. c1890. PC.

"A Stirn's Concealed Vest Camera, circa 1890, four six [sic] diameter round pictures on 14 cm. plate in nickelled brass case, with plate changing control and lens mounted at the front, with original strap and case", on offer with other equipment for £600-900, camera illustrated - Sotheby 16:11:87, Lot 35.

Ex0487 CAMERA - 'LUZO'

[Advert] J. ROBINSON & SONS, 172 REGENT STREET, LONDON, W.

And 65 GRAFTON STREET, DUBLIN. [Serial No.] N 282

146x89x89. c1891. R.

Mahogany with brass fittings; Eastman House, New York.

In the Collection of the International Museum of Photography, George Eastman House, 900 East Avenue, Rochester, New York 14607, U.S.A.; described and illustrated in Lothrop 1982, entry Number 61: "LUZO Ca.1891 (Serial No. N 282). This is a box-form of camera for 100 pictures, 2-3/8 ins. in diameter, on 2-7/8 in.-wide film. Designed by H.J. Redding, London, England. Manufactured by J. Robinson & Sons, London. A relatively little-known camera, the Luzo is a finely crafted early English-made roll-film camera. When introduced in 1889, the Luzo was referred to as 'The "New" Detective Camera'. It was

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advertised as the lightest, smallest, and most efficient camera of its type. The original model measured $5\frac{1}{2} \times 3\frac{3}{4} \times 1\frac{1}{4}$ ins. In 1890 the dimensions of the original model were increased slightly and it was designated 'The No.1'. No.2, No.3, and No.4 models were also introduced for, respectively, 60 exposures $3\frac{1}{4} \times 3\frac{3}{4}$ ins., 48 exposures $4\frac{1}{4} \times 3\frac{3}{4}$ ins., and 48 exposures $4\frac{1}{4} \times 3\frac{3}{4}$ ins [sic]. The No.4 Luzo had the additional feature of a rack-and-pinion focusing mechanism with a dial distance-indicator. By 1893, 5×4 in. and $\frac{1}{2}$ -plate sizes had been added, and in 1894 the shutter was improved slightly. The 1895 model No.1 took square pictures only, as opposed to the square or round pictures available in the No.1 in 1891. In 1896 Henry J. Redding, inventor of the Luzo, left J. Robinson & Sons, where he had worked for over 25 years. He joined E.T. Gyles, also of J. Robinson, to form the firm of Redding & Gyles. They Manufactured the Luzo from sometime in 1896 until 1899. In 1897 six sizes of Luzo were still being produced, but in 1899 only the $\frac{1}{4}$ -plate, 3×4 in. and $\frac{1}{2}$ -plate sizes remained in production. Other sizes were available on order..."

The description includes an illustration of an advertisement from the British Journal Photographic Almanac of 1891, p249, which gives further details and also the signature: "ONLY TO BE OBTAINED FROM THE MANUFACTURERS - J. ROBINSON & SONS, Opticians and Manufacturers of all kinds of Photographic Apparatus, 172 REGENT STREET, LONDON, W. And 65 GRAFTON STREET, DUBLIN."

Ex0486 CAMERA - 'LUZO'

(J. Robinson & Sons Luzo Trade Mark H.R. Redding)

No measurements available. Late 19 C. R.

"A Similar J. Robinson & Son [sic] Luzo Roll Film Camera, circa 1890, stamped 'H.J. Redding No.17328 Patent 1126', in leather carrying case" - Sotheby 28:10:86, Lot 11, £300-400.

The "similar" refers to the previous Lot 10, clearly produced after H.J. Redding left the firm of Robinson & Sons in 1896: "A J. Robinson & Sons 'Luzo' Roll Film Camera, English, circa 1890, with maker's plaque printed 'Luzo Trade Mark H.R. Redding & Gyles Sole Makers, 3 Argyle Place London W.', rotary shutter in front of lens mahogany case with brass fittings, in leather carrying case", £500-700, illustrated.

For further details of the 'Luzo' camera, see previous entry Ex0487.

Ex0509 COIL - INDUCTION, RUHMKORFF

(Robinson & Sons, Dublin)

L 330. 1885-1903. F.

"A rare 6-volt induction coil, signed on the vulcanite end-plate, "Robinson & Sons, Dublin", with lacquered brass fittings and switch on mahogany plinth base - 13in. (33cm.) long; six assorted Geissler tubes; a Crookes' fluorescent mineral sample tube on stand; and a Papendorff bi-chromate cell." - illustrated - Christie 26:9:91, part lot 14, £400-600 - from the Nicholas Webster Collection - sold for £462.

The covered coil, on a mahogany base, between two vertical supports, has two electrical contacts on top, and a central vertical disc strengthener; there is no commutator.

Dates from Morrison-Low 1989,133.

Ex0581 BED OF HOOPS FOR THREE FOOT REFLECTOR

Unsigned (Lord Rosse)

No measurements available. Mid 19 C. G.

Presented by the Earl of Rosse 16:6:1914; SM 1914-375.

Information from SM computer: registered papers 14/1512; location H/3/CB05/06L.

Ex0085 EYEPIECE

Unsigned (Lord Rosse)

L 130; W 300; H 30. Mid 19 C. G.

Cylindrical brass mount; three diameters; original "finder" eyepiece for Leviathan; SM 1914-852.

The telescope had no subsidiary telescope or "finder" as do most larger telescopes; objects were found by means of this low-power eyepiece which gave a comparatively larger field, with a magnification of 84 times.

Computer details: registered papers 14/2506;

Presented by the Earl of Rosse 4:12:1914.

Ex0086 EYEPIECE

Unsigned (Lord Rosse)

L 150; W 360; H 150. Mid 19 C. G.

Cylinder brass mount; three diameters; used with the Leviathan; magnification 280; SM 1914-853.

"Lord Rosse used this massive eyepiece to make his observations of nebulae, dim fuzzy patches of light. When used with the Great Rosse Telescope, it produced a magnification of 280 times"; the smaller lens is chipped at the edge.

Registered papers 14/2506; presented by the Earl of Rosse 4:12:1914.

Ex0578 GAUGES

Unsigned (Lord Rosse)

No measurements available. Mid 19 C. G.

"Two gauges, convex and concave" - presumably to check the curvature of specula; SM 1914-372.

Information from SM computer; registered papers 14/1512; presented by the Earl of Rosse 16:6:1914; location B/T26C/2Q/FS.

Ex0579 GRINDING TOOL

Unsigned (Lord Rosse)

No measurements available. Mid 19 C. G.

Presented by the Earl of Rosse 16:6:1914; SM 1914-373.

Information from SM computer: registered papers 14/1512; location H/1/FRY/II/2R.

The Museum also has a diagram of "Lord Rosse's Reflecting Telescope - machine for grinding speculum", at a scale of $\frac{1}{2}$ inch to 1 foot; a card records that, before the invention of this machine, grinding and polishing were carried out by hand.

Ex0577 MIRROR - SPECULUM METAL

Unsigned (Lord Rosse)

L 200; W 200; H 60. Mid 19 C. G.

"Experimental speculum of 6 inches aperture and 24 inches focal distance"; SM 1876-564.

Information from SM computer; the speculum is cracked across, and bound together with string.

Presented by the Earl of Rosse 26:4:1876; negative no. 1365/83; location B/T26C/1K/CU09/02.

Ex0084 MIRROR - SPECULUM METAL

Unsigned (Lord Rosse)

L 320; W 240; H 120. Mid 19 C. G.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Elliptical flat; tin cover with handle; used with the Leviathan of Parsonstown; SM 1914-690.
Computer details: registered Papers 14/2322; presented by the Earl of Rosse 30:10:1914.

Ex0083 MIRROR - SPECULUM METAL

Unsigned (Lord Rosse)
D 1829 (6') Cast 1843. PC.
Speculum of Leviathan of Parsonstown; SM 1914-370; presented by the Fifth Earl; on display 3:1988,8:1994; not on display 8:1993.

The computer gave more information: "Six foot speculum on travelling carriage, cover for speculum"; registered papers 14/1512; presented by the Earl of Rosse 16:6:1914; negatives 3391, 13/42, 14/42, 15/42, 16/42; Location S/G63/East End; Dimensions (fitting & mirror) L 2100; W 2900; H 600.

Mounted in a new exhibition in 1994; caption: "The Rosse Mirror Six feet across and weighing 4 tonnes, the Rosse Mirror is the largest metal mirror ever made for a telescope. It was a key part of the celebrated Great Rosse Telescope, which was built in 1845 at Birr Castle, Ireland."

Ex0580 POLISHING TOOL

Unsigned (Lord Rosse)
No measurements available. Mid 19 C. G.
Presented by the Earl of Rosse 16:6:1914; SM 1914-374.
Information from SM computer: registered papers 14/1512; location H/1/FRY/II/2L.
See also entry for Grinding Tool - Ex0579.

Ex0349 TELESCOPE - REFLECTING

(Supplied by the Earl of Rosse, F.R.S.)
No measurements available. c1876. R.
"Model of Equatorial Mounting for the 3-ft. Reflector at Parsonstown...recently erected for the Earl of Rosse."
No.1792a in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.
There is also a silver print photograph of the 3-ft reflector from the east side; SM 1930-767; registered papers 3771/1/1; presented by William Porthouse 9:12:1930; negative 4819; location B/T26C/1H/PP03/06.

Ex0087 TELESCOPE - REFLECTING

Unsigned (Lord Rosse)
BL 1616. 1876. AQ.
Model (1:24) of Leviathan of Parsonstown; SM 1876-1013; photographs SM 1930-766; on display 8:1994.
The computer gave some more information: "Model of the Rosse six foot telescope (parts broken) scale 1:24"; registered papers 983/985, 13/42, 16/42; On loan from the Earl of Rosse 31:3:1876, Presented 1914; Dimensions L 1620, W 1000, H 900; Negatives 983-5, AST003, 699/70.
The two photographs (silver prints) - from east of south and west of south were presented by William Porthouse 9:12:1930; registered papers 3771/1/1; negatives 4817-8;
Mounted in new display in 1994.

Ex0041 TELESCOPE - REFLECTING

Unsigned (Lord Rosse)
No measurements available.
Model of Lord Rosse's 3 foot reflector, showing method of mounting; made at Birr Castle; RMS 1911.160.
Presented by the Trustees of the late Lady Scoresby Johnston.
Illustrated in Burnett 1989,92.

Ex0260 SLIDE RULE

(Thomas Sargent Dublin 1719)
No measurements available. 1719. S.
Boxwood; was on display at the NMM; information from Peter Delehar.
Not in Burnett & Morrison-Low 1989.

Ex0122 DIAL - HORIZONTAL COMPASS

(Saunders, Dublin I. Burgh, Esq., June 1794.)
Bx 145x145. 1794. S.
"A portable Sundial by 'Saunders of Dublin', the compass rose silvered and engraved with two separate scales of degrees, the hour-scale with five-minute divisions, set in mahogany box, the lid with a silver label engraved 'I. Burgh, Esq.', the inside of the lid with a paper label showing the variation of the compass and the date 'June 1794'." - Sotheby 1:11:65, Lot 70.

Ex0029 BAROMETER - BANJO

(Thomas Saunders, Dublin)
DID 305. 1793-1819. F.
Satinwood; scroll pediment; listed in Goodison 1977, 356.
Dates from Morrison-Low 1989,134.

Ex0218 CIRCUMFERENTOR

(Seward Dublin)
No measurements available. Early to mid 18 C. PC.
"Surveyor's plain compass"; Tesseract 1981; information from Deborah Jean Warner.
John Seward was apprenticed to Gabriel Stokes on 8:7:1715 - W. Stuart, King's Hospital Archives.

Ex0399 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

(Seward Dublin)
D 114. Early to mid 18 C. PC.
"A MECHANICAL UNIVERSAL EQUINOCTIAL DIAL by 'Seward, Dublin', of brass with silvered dial and compass 'card', the latitude scale arm mounted centrally and socketing through a latitude setting plate at the centre of the hinged equinoctial ring, pivoted about the setting plate is an arm mounted with a folding plate sight with a vertical centre-line, and outside this the minute dial with pointer, straddled by a folding pin-hole sight, the reverse of the peripheral edge of the hour scale is toothed to operate the small minute 'tooth wheel' mounted on the reverse of the minute dial, the whole contained in a black fishskin case, 4 1/2 in." - Sotheby 13:11:61, Lot 78.
John Seward was apprenticed to Gabriel Stokes on 8:7:1715 - W. Stuart, King's Hospital Archives.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Ex0206 DIVIDERS - PROPORTIONAL

(Seward Fecit)

L 200. Early to mid 18 C. PC.

"A pair of brass and steel proportional dividers, the limbs signed 'Seward Fecit'; Christie 22:11:78 Lot 10. John Seward was apprenticed to Gabriel Stokes on 8:7:1715 - W. Stuart, King's Hospital Archives.

Ex0506 BAROMETER - STICK

J. SIMONTON. OPTICIAN. 70, GRAFTON ST DUBLIN

L 1041. 1863-1876. F.

Rounded carved top; double glazed plates 27-31"; stem thermometer; carved cistern cover; private ownership.

The carved top frame surrounds a carved flower with two leaves; the double scale plates "10 A.M. Yesterday 10 A.M. to Day" each have sliders, moved from key holes below, with one turned ivory key; the glass-mercury thermometer, 20-130° "FAHRENHEIT", and 0-50° "CENTIGRADE", is in a glazed rectangular frame, with carving above and below; the cistern cover is overall disc-shaped, but with four bevels at the sides and a twelve-petal flower carved in the centre.

Dates from Morrison-Low 1989,134.

Ex0511 BAROMETER - FITZROY

M.E. SOLOMONS, OPTICIAN, NASSAU ST., DUBLIN.

No measurements available. c1900. R.

"It has a solid mahogany case with one brass pointer to read the scale which is compensated for capacity error. There are two columns of Admiral Fitzroy's remarks on weather interpretation, but a storm-glass is not fitted. The usual Fahrenheit mercury thermometer is mounted on a boxwood scale and the maker's name, 'M.E. Solomons, Optician, Nassau St., Dublin', is printed opposite the thermometer." - illustrated in Banfield 1976,98 - the scale is 26-31".

Author gives c1900 date; Morrison-Low 1989,135 gives firm dates 1856-1905.

Ex0398 TELESCOPE - REFRACTING

(M.E. Solomons, Dublin)

MxL 412; LeD 25. 1856-1905. F.

"A 19th century three-draw brass 1 inch telescope"; Christie 30:6:88, Lot 122, £40-60.

Dates from Morrison-Low 1989,135.

Ex0281 CIRCUMFERENTOR

(Spear Dublin)

No measurements available. 1791-1837. F.

"A BRASS SURVEYING INSTRUMENT, signed in the centre of the compass rose 'Spear, Dublin', the cardinal points surrounded by a scale of degrees 0-90 four times, and surrounded by a further scale 0-360, needle detached, two detachable sighting vanes, with folding tripod stand, in three sections, early 19th Century, in wood box." - Sotheby 31:3:78, Lot 30.

Dates from Morrison-Low 1989,135.

Ex0280 CIRCUMFERENTOR

(Spear Dublin)

No measurements available. 1791-1837. F.

"Four in private collections"; noted in Burnett & Morrison-Low 1989,37, but without further details.

Ex0217 CIRCUMFERENTOR

(Spear 23 Capel St * Dublin)

No measurements available. 1793-1809. A.

"Surveyor's plain compass"; privately owned by person in Wilmington, North Carolina; information from Deborah Jean Warner, May 1988.

Dates from Morrison-Low 1989,135.

Ex0297 CLINOMETER

(Spear, 23 Capel St., Inst. Maker to His Majestys. Ordnance)

L 457. 1796-1809. A.

"An 18th Century brass Plane Table Clinometer, signed 'Spear, 23 Capel St., Inst. Maker to His Majestys. Ordnance', the 0-90° arc fitted with alarm [sic] mounted with a level, the reverse stamped with a War Department mark, 45.7cm. (18in.) long, on the base, the underside engraved in inches." - Philips 2:2:84, Lot 125.

Dates from Morrison-Low 1989,135.

Ex0571 DIAL - HORIZONTAL COMPASS

(Spear, Dublin)

No measurements available. Late 18 early 19 C. R.

Incomplete; formerly owned by "the late Mr. Strangeways"; purchased in 1937 from Juliet Strangeways; MHSO 37-12/6.

Dates from Morrison-Low 1989,135; information from Tony Simcock.

Ex0294 DIAL - HORIZONTAL COMPASS

(Spear, 27 College Green)

D 75. 1812-1837. A.

"An 18th Century brass circular Pocket Sundial and Cover by 'Spear, 27 College Green', with silvered compass and folding gnomon." - illustrated - Philips 27:2:80, Lot 76.

Dates from Morrison-Low 1989,135.

Ex0070 DIAL - UNIVERSAL INCLINING

(Spear Dublin)

BD 59. 1791-1837. F.

"Brass and silvered brass. 59mm dia. base, inset with compass, eight point compass rose, calibrated 0° to 90° to 0° x 2 by 10°. Pair of bubble levels. Pierced, hinged circular dial plate, calibrated IIII to XII, I to VIII by I [for 60°N] and marked for local noon across the world, Peking (4am) Cork (12.10pm), California (8.30 pm) as compared to noon in Dublin. Folding style, folding latitude arc, 0° to 60° by 10°. Equation of time on verso of compass box." - Whipple 819 - turned case and lid.

Description from Bryden 1988,39 (Entry 154).

Ex0303 GUNNER'S CALLIPERS

(Spear, 23 Capel St., Dublin, Inst. Maker to His Majesty's Ordnance)

L 180. 1793-1809. A.

Brass; iron points; Philips 16:11:88 Lot 106, £5-800.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

"A pair of 18th Century brass Gunner's Callipers, signed 'Spear, 23 Capel St., Dublin, Inst. Maker to His Majesty's Ordnance', the hinge divided to 180 degrees, the arms engraved with 'Proof Service' scales for 'Iron Guns' and 'Brass Guns', the inner tips with iron points."

Dates from Morrison-Low 1989,135.

Ex0518 GUNNER'S CALLIPERS

Spear 23 Capel St Dublin Inst. Maker to His Majesty's Ordnance
L 175/254. 1793-1809. A.

"A pair of late 18th-Century gunner's brass callipers ...with scales for 'Iron Guns Proof Service' and 'Brass Guns Proof Service' with two iron pointers - 6.9/10in (17.5cm) long £300-500"; illustrated - Christie 24:9:92 Lot 170, £3-500.

Ex0620 GUNNER'S CALLIPERS

Spear Dublin Inst. Maker to His MAJESTY'S ORDNANCE
L 180. Late 18 early 19 C. R.

"A pair of Spear brass gunner's callipers with scales for 'Iron Guns Proof Service' and 'Brass Guns Proof Service', with twin iron pointers", Christie 18:11:1993, Lot 180, £150-200 - illustrated.

Morrison-Low 1989,135 gives dates 1791-1837 for Richard Spear I & II.

Ex0644 GUNNER'S CALLIPERS

Spear Dublin. Inst., Maker to His MAJESTY'S ORDNANCE.

L 178. Late 18 early 19 C. R.

"IRISH GUNNER'S CALIPERS, c. late 18th century...These inside/outside calipers measure 7" overall, with inset iron tips and hand engraved scales and tables on both sides. Charges are listed for fourteen sizes of cannon in both iron and brass. The calipers permit direct readout of appropriate cannon capacity (e.g. 12 pounder) as well as diameter, when applied to either the ball or to the inside of the bore." \$1850 - four illustrations - Tesseract 49,1995,23.

Morrison-Low 1989,135 gives dates 1791-1837 for Richard Spear I & II.

Ex0073 GUNNER'S CALLIPERS

(Spear, 23 Capel Street, Inst Maker to his Majesty's Ordnance R.L. Dacres)

Closed L 178. 1793-1809. A.

Brass; National Army Museum, London; owned by Lieut. R.J. Dacres, Royal Artillery, 1817; 6106-45; listed in Holbrook 1992,162.

Dates from Morrison-Low 1989,135.

Ex0091 MICROSCOPE - COMPOUND, GOULD

Spear, College Green, Dublin.

H 295; TuD 27; C 208x152x48. 1833. D.

Brass; stage focus by rack and pinion; pivoted bar screws into top of mahogany case; SM A604166.

The tube screws into a horizontal bracket on top of the bar; four screw-on objective lenses for cylindrical and conical tube; a rotating condensing lens fits into holes on the stage, and a rotating concave mirror into a hole on the bar; accessories include two lieberkuhns, three ivory specimen slides, a black and white disc, a glass disc, specimen tweezers on a pin, a knife with a turned ivory handle; there is an 1833 watermark on a list of specimens; the case is warped, otherwise the microscope is in lovely condition; it was bought from a Dr B. McCallum for £25 in 1969 - it was in the possession of the practice he joined; location B/T14/11E.

Ex0072 MICROSCOPE - COMPOUND, GOULD

(Spear Dublin)

H 200; TuL 73; C 146x137x50. 1791-1837. F.

Nickel brass; pillar broken; one objective; stage forceps; mahogany case; SM A76118.

From the Sir Frank Crisp collection; purchased for £2.75 in 1928; Wellcome Collection; on display 8:1993.

The microscope pillar rises from the centre of the case, which contains accessories, and is lined with blue velvet; a rotating mirror lies below the circular stage, whose position is adjusted by rack and pinion for focus; the tube, conical and then cylindrical, is held at the objective end by a horizontal limb on top of the pillar.

Dates from Morrison-Low 1989,135.

Ex0069 OPERA GLASSES

(Spear Dublin)

No measurements available. 1791-1837. F.

Brass and ivory; Christie 29:4:82, Lot 222; now in Whipple 2834.

Dates from Morrison-Low 1989,135.

Ex0068 SECTOR

Spear Dublin

L (+Hi) 325 or 610; W 73 or 36. 1791-1837. F.

Brass hinge; ivory arms; many horizontal and inclined scales; BM 1906.11-5.1; presented by Max Rosenheim.

Scales include 1-12" above and 12-24" below; "In. Mer. Chords Sines Tangts. Latitde. Hours LIN SEC CHO Lon. Rum SIN TAN NUM TANGENT SINES V.SINES". Listed in Holbrook 1992,151.

F.A.B. Ward, "A Catalogue of European Scientific Instruments...in the British Museum", No. 237.

Ex0482 SEXTANT

(Spear Dublin)

R 190. 1791-1837. F.

"A Spear Brass Sextant, English or Irish, mid 19th century, signed on the arc 'Spear, Dublin', the shaped frame with ebony handle, two sets of coloured filters and inset silver scale, the index arm with tangent and securing screws, vernier and magnifier, in shaped mahogany case with three telescopes" - Sotheby 18:6:86, Lot 157, £3-400.

Dates from Morrison-Low 1989,135.

Ex0299 THEODOLITE - PLAIN

(Spear Dublin)

L 305. 1791-1837. F.

"A SPEAR BRASS Y-TYPE THEODOLITE, the sighting telescope with rack and pinion focusing to the eyepiece and objective and with spirit level, supported by two brackets above a racked 180° arc, with vernier scales with horizontal circle of degrees below mounted with two spirit levels and magnetic compass, the base signed 'Spear, Dublin'." - illustrated - SothebyBE 18:7:80, Lot 251.

Dates from Morrison-Low 1989,135.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

Ex0221 CIRCUMFERENTOR

(Speare [sic] - Dublin)

No measurements available. 1791-1837. F.

Reported (April 1988) as sold very recently by Paul Hamilton, 59 Mayfield Road, London N8 9LL.

Dates from Morrison-Low 1989,135.

Ex0462 BAROMETER - STICK

(R. Spear, 28 College Green, Dublin)

L 965. 1843-1864. A.

Mahogany(?); flat layered top; curved glass scale cover; two ivory knobs; thermometer; private ownership.

The adjusting knobs are below the scale on the stem; below these again is the glazed glass/mercury thermo-meter; the cistern is covered with a carved ebony urn.

Morrison-Low 1989,135 gives the 28 College Green address for Spears & Co., with Richard Spear at No.27 from 1812-1837, after which the firm became Spears & Co., still at No.27 until 1843; the owner has been asked to confirm the number; he notes that the barometer came from his family home in Ballinrobe, Co. Mayo.

Ex0123 BAROMETER - STICK

(R. Spear 27 College Green Dublin Patent)

H 930. 1812-1837. F.

"An Irish Mahogany Stick Barometer, circa 1825, the unusual brass plate with vernier and signed R Spear 27 College Green Dublin Patent, the case with a carved cresting, concealed tube and set with a similarly signed thermometer, the square cistern cover with canted corners...£600-800" - illustrated - Sotheby 22:2:90, Lot 206.

This is a de luxe version of that illustrated in Burnett & Morrison-Low 1989, vii, now in the National Museum Dublin, 4157 NMD134.

Dates from Morrison-Low 1989,135.

Ex0031 BAROMETER - STICK

(R. Spear, College Green, Dublin)

No measurements available. 1791-1837. F.

Mahogany; scroll pediment; thermometer on register plates; listed in Goodison 1977,360.

Dates from Morrison-Low 1989,135.

Ex0282 CIRCUMFERENTOR

(R. Spear Dublin John Nevill, Civil Engineer)

No measurements available. 1791-1837. F.

"A MINER'S DIAL BY R. Spear, Dublin, engraved on cover John Nevill, Civil Engineer, in brass reinforced oak case with spare needle." - illustrated - Christie 14:12:78, Lot 242.

Dates from Morrison-Low 1989,135.

Ex0219 CIRCUMFERENTOR

R. SPEAR 27 COLLEGE GREEN -- DUBLIN --

L 495; CpHsD 164. 1812-1837. A.

Brass; silvered dial; two spirit levels; double line and window sights; lower scale 10-80,80-10° twice; upper 10-360°; needle clamp attached to face by curled bracket; butterfly screws to attach alidade to lugs.

Information from Dale Beeks Idahoe with two photographs.

Dates from Morrison-Low 1989,135.

Ex0300 PROTRACTOR

(R. Spear, College Green, Dublin)

W 180. 1791-1837. F.

"A mid-19th Century brass Chart Protractor, with vernier, twin folding arms and external gearing, signed 'R. Spear, College Green, Dublin', in shaped mahogany case." - Philips 21:5:86, Lot 72, £120-150.

Dates from Morrison-Low 1989,135.

Ex0497 TELESCOPE - REFRACTING

(R. Spear, Instrument Maker to His Majesty's Crown [Bursers?] of Customs in Ireland Lt. Royse R.N. Kent)

LeD 35 (1½"); MxD 54; L 635-794. 1791-1837. R.

"IRISH SPYGLASS - Late 18th c, signed 'R. Spear, Instrument Maker to His Majesty's Crown (Bursers?) of Customs in Ireland' and with the owner's name 'Lt. Royse, R.N./Walmar/Kent'. Direct tapered conical mahogany barrel 2 1/8" large dia, bright lacquered brass fittings and single draw tube, 25" long (closed) extending to 31 1/4". The achromatic objective has a clear aperture of 1½"; 4 element eyepiece. The front lens slide is an old replacement and the eyepiece shutter is missing. Reasonably good images but with a somewhat narrow field of view; not of the quality associated with Dollond's telescopes of the period. Fine to very fine overall condition with some age cracks in the wood, wear to the brass draw tube and typical signs of use. The lacquer finish is a modern restoration." \$385 - illustrated - Historical Technology 122,1981,176.

Dates from Morrison-Low 1989,135.

Ex0301 TELESCOPE - REFRACTING

(R. Spear, Dublin)

MxL 720; LeD 38. 1791-1837. F.

"An early 19th Century three-draw brass Telescope, signed 'R. Spear, Dublin', having a 1½in. diam. lens, eyepiece, dust-cap and satinwood body-tube." - Philips 21:5:86, Lot 105, £50-70.

Dates from Morrison-Low 1989,135.

Ex0298 THEODOLITE

(Richard Spear of London [sic - presumed Dublin])

H 108. 1791-1837. F.

"A SMALL BRASS THEODOLITE by 'Richard Spear of London' signed on the circular base, the sighting tube with spirit level and rack adjustment to the elevation on a graduated scale, glazed compass below engraved with degrees and the cardinal points, mounted on a circular base with degree scale and a vernier...in mahogany box." - illustrated - Sotheby 25:10:79, Lot 218 - the arc scale rises from above the horizontal circle, and the vernier at the eyepiece end of the tube is racked along this by a pinion.

Dates from Morrison-Low 1989,135.

Ex0030 BAROMETER - BANJO

(Spear & Co., College Green, Dublin)

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

D 203. 1838-1864. F.
Mahogany; scroll pediment; listed in Goodison 1977, 360.
Dates of Spears & Co. from Morrison-Low 1989,135.

Ex0296 DRAWING INSTRUMENTS - SET

(Spear & Co., Dublin)
CW 203. 1838-1864. F.
"A good late 19th Century Drawing Set, by 'Spear & Co., Dublin', the nickel plated drawing instruments contained in a fitted mahogany case...with an ivory rule and parallel rule." - Philips 26:10:83, Lot 198.
Dates of Spears & Co. from Morrison-Low 1989,135-6.

Ex0143 BAROMETER - STICK

(Speer [sic] & Co College Green DUBLIN)
H 965. 1838-1864. F.
Moulded top; bow front; ivory plates; ebony stringing; thermometer; Christie 18:7:85, Lot 1, £700-900.
"A fine 19th century bow-fronted stick barometer, the ivory plates signed 'Speer & Co College Green DUBLIN', fitted with an ebonised vase shaped cistern cover, bow front thermometer with ivory plate, the shaped case inset and strung with ebony and having canted corners and moulded top." - illustrated - flat layered top.
Dates of Spears & Co. from Morrison-Low 1989,135.

Ex0144 BAROMETER - STICK

(Spears & Co., Dublin)
H 940. 1838-1864. F.
"A 19th Century mahogany Stick Barometer, having a moulded pediment, the brass plates mounted with a thermometer." - Philips, 4:3:81, Lot 1.
Dates from Morrison-Low 1989,135-6.

Ex0295 DIAL - HORIZONTAL COMPASS

(Spears & Co., Dublin)
D 64. 1838-1864. F.
"A pocket compass sundial by 'Spears & Co., Dublin', in circular brass casing."; Christie 13:3:80, Lot 70.
Dates from Morrison-Low 1989,135-6.

Ex0293 SYMPIESOMETER

(Spears & Co., 28 College Green, Dublin)
H 635. 1843-1864. A.
"A MAHOGANY FRAMED SYMPIESOMETER signed at the top Spears & Co., 28 College Green, Dublin, with inverted mercury centigrade thermometer flanking the barometric tube with sliding scale." - Christie 7:10:81 Lot 1.
Dates from Morrison-Low 1989,135-6.

Ex0044 MICROSCOPE - COMPOUND

Unsigned (Spencer scratched on hidden components)
195x250x405. 1845-1863. F.
Brass; tripod foot; two pillars to limb pivot, bracket for tube above; three objectives one eyepiece; RMS T.1979.74.
The mirror is on a sliding semicircular mount at the bottom of the limb; above this is the stage, with a revolving disc of apertures below; then comes the pivot secured by two knurled knobs; at the top of the limb is a bracket at right angles, under the fine focus knurled knob, which holds the objective end of the tube; coarse focus appears to be by push; achromatic; nicol prism and analyser; case and accessories.
Bought from Arthur Frank.
Maybe supplied by James Robinson - a microscope pricelist from James Robinson's Polytechnic Museum, Dublin is bound in Lyons 1851, - "Large Achromatic Microscope with Double Pillar on a Massive Tripod Foot...£14-14-0".
Illustrated Morrison-Low 1989,53, and Nuttall 1979,50; dates from Morrison-Low 1989,136.

Ex0490 TELESCOPE - REFRACTING

SPENCER DUBLIN
LeD 76 (3"); TuL 970. 1845-1863. F.
"A 3in. Spencer Brass Refracting Telescope On Stand, Irish, early 19th century, signed around the eye piece, 'Spencer, Dublin', the tube with Starfinder mounted in parallel, supported on bracket above turned brass column and folding tripod base" £1,200-1,800 - illustrated - Sotheby 11:5:90, Lot 537.
Dates from Morrison-Low 1989,136.

Ex0008 MICROSCOPE - COMPOUND

(J. Spencer Maker 13 Aungier St. DUBLIN.)
H 440. 1852-1863. A.
Brass; tripod foot; two pillars to limb pivot, bracket for tube above; private ownership; Turner 1983,168.
A semicircular mount for the missing mirror is at the bottom of the limb; above this is the rectangular stage with a circular hole; then comes the pivot secured by two knurled knobs; on top of the limb is a bracket at right angles, under the fine focus knurled knob, which holds the objective end of the tube; coarse focus appears to be by push; - illustrated.
Dates from Morrison-Low 1989,136.

Ex0520 PROTRACTOR

(J. Spencer & Son Dublin)
No measurements available. 1864-1886. F.
"A swing-arm protractor, 19th Century, with cross hair, engraved scale and vernier on the arm, in fitted case with label of J. Spencer & Son Dublin." - W & F C Bonham & Sons Ltd, Chelsea Auction 5:11:92 Lot 51.
Dates from Morrison-Low 1989,136.

Ex0032 BAROMETER - STICK

(Spencer & Son, Dublin)
No measurements available. 1864-1886. F.
Rosewood; rounded top; ivory register plates; listed in Goodison 1977,361.
Dates from Morrison-Low 1989,136.

Ex0572 HELIOSTAT - STONEY

(Spencer & Son, Dublin)

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

No measurements available. 1864-1886. F.
Transferred from University Observatory, Oxford, in 1936; formerly owned by Charles Pritchard; MHSO 36-14/2.
Dates from Morrison-Low 1989,136.

Ex0124 HELIOSTAT - STONEY

Spencer & Son Dublin

No measurements available. 1864-1886. F.

Mahogany base; clock housing at one end; at the other, brass heliostat; used by William Abney; SM 1921-106.

The heliostat mechanism sits on a brass disc base with a central pillar; a pulley wheel, which would have been driven by a cord from the clock, alters the position of counter-weighted arm and support for the missing mirror.

The instrument belonged to William Abney (1844-1920), who was an Officer in the Royal Engineers from 1861-1877, after which he moved to the Science and Art department at South Kensington until 1903; it was donated by Lady Abney.

A card with the instrument records: "Heliostats were frequently employed in the 19th century when a bright source of white light was needed. Abney's one is incomplete. It lacks the drive connecting the clock to the mirror mounting, and the mirror itself."

Noted in Morrison-Low 1989,67; dates p.136.

Ex0106 HELIOSTAT - STONEY

SPENCER & SON DUBLIN

BL c393. 1864-1886. F.

Mahogany base; raised platform for clock; at other end, pillar to brass horizontal disc with couplings; SM 1921-106.

The base has three level screws; the clock has a white face and roman numbers; the raised platform has an arc scale 50-55°, and the platform has a sprung adjusting screw and also a circular bubble level; a pulley belt from the clockwork leads to a wheel below the brass horizontal disc, which is raised on an oxidised brass pillar; the disc is engraved with hours VI-XII-VI, and has a coupling to the (cracked) rectangular mirror; location B/T26C/2N/KD20.

Dates from Morrison-Low 1989,136.

Ex0075 HELIOSTAT - STONEY

(Spencer & Son Dublin)

No measurements available. 1864-1886. F.

Used by mineralogist Nevil Story-Maskelyne (1823-1911); presented to University by his wife in 1911; MHSO.

Transferred to the Museum from the Department of Mineralogy, Oxford; this type of instrument was on sale from Spencer & Son for six guineas in 1872 - Morrison-Low 1989,54.

Dates from Morrison-Low 1989,136; information from Alison Morrison-Low and Tony Simcock.

Ex0074 HELIOSTAT - STONEY

(Spencer & Son Dublin)

No measurements available. 1864-1886. F.

George Stokes collection; Whipple 1445 (G.58); from the Cavendish Laboratory.

Dates from Morrison-Low 1989,136.

Ex0400 LEVEL - TELESCOPIC

(Spencer & Son, Dublin)

TuL 356. 1864-1886. F.

"A surveyor's brass level...with four-screw mounting, tripod and mahogany case", Christie 7:1:82, Lot 279.

Dates from Morrison-Low 1989,136.

Ex0402 LEVEL - TELESCOPIC

(Spencer & Son, 19 Grafton St., Dublin)

W 381. 1866-1883. A.

"A brass surveyor's level signed 'Spencer & Son, 19 Grafton St., Dublin', with four-screw tripod mounting in mahogany case - 15in. wide." - Christie 11:7:85, Lot 73, £40-60.

Dates from Morrison-Low 1989,136.

Ex0403 LEVEL - TELESCOPIC

(Spencer & Son, Grafton St. Dublin)

TuL 330. 1866-1883. A.

"A Spencer & Son Surveyor's Lacquered Brass Level, Irish, 20th Century, signed on the 33cm; 13in tube 'Spencer & Son, Grafton St. Dublin', surmounted by spirit level, with rack and pinion focusing, on tripod mount with four levelling screws, in case with 'Spencer' trade label to lid; complete with tripod stand and extending measuring staff." - SothebyCH 2:6:87, Lot 171, £100-150.

Dates from Morrison-Low 1989,136.

Ex0401 PANTOGRAPH

(Spencer & Son 19 Grafton St. Dublin)

L 692. 1866-1883. A.

"A fine 19th century lacquered brass pantograph signed: 'Spencer & Son 19 Grafton St. Dublin', the arms engraved with scales, fitted with ivory castors and with a makers trade label in the original fitted mahogany case." - Christie 17:10:85, Lot 239, £100-150.

Dates from Morrison-Low 1989,136.

Ex0059 SACCHARIMETER - JELLETT

SPENCER & SON, DUBLIN

No measurements available. 1864-1886. F.

Brass; circular foot; pillar to pivot for bench, which holds the optical components; MHSO 36-13.

Presented by Noel Deerr, the sugar scientist and historian of the polarimeter, in 1936 - information from Tony Simcock.

Illustrated in Morrison-Low 1989,52.

See J.H. Jellett, Proceedings, Royal Irish Academy 7,1862,348-50;8,1864,279-81; 0292 TDP165; and Mollan 1995,23-25..

Ex0513 SACCHARIMETER - JELLETT

(Attributed to Spencer & Son, Dublin)

No measurements available. 1864-1886. PC.

Jellet's "saccharometer" donated to 1876 Loan Collection, SM, S. Kensington, by Trinity College, Dublin.

"861. Jellett's Saccharometer, for the measurement of the rotation which certain fluids are capable of producing in the plane of polarisation of the transmitted ray. Trinity College, Dublin."

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A maker's name is not given, but other such instruments are signed by Spencer & Son; it could not be traced in 8:1993 - presumably it was returned?
Instrument (from MHSO) illustrated in Morrison-Low 1989,52 - see entry Ex0059.

Ex0104 SPECTROSCOPE - TABLE

SPENCER & SON DUBLIN

L 630. c1874. D.

Binocular; designed by Charles Burton to observe faint zodiacal light; built by Spencer & Grubb; SM 1900-141.

"The use of a chain to focus the twin telescopes suggests the work of Spencer, who used similar chains in other instruments, and Spencer's trade card is on the box. Grubb probably made no more than the prisms and the recording mechanism. Burton took it to Rodriguez, and was able to observe with it on ten nights before the cement holding the prisms in place dried out." - see C.E. Burton, *Proceedings of the Royal Irish Academy* 2,1877,42-45; quote from Burnett 1989,94.

The double spectroscope, with parallel telescopes and collimators sits in a double-sided mahogany mount; a trade card is preserved: "J. Spencer & Son, Opticians & Scientific Instrument Makers To The Queen, BOARD OF PUBLIC WORKS AND BOARD OF TRADE, 19 GRAFTON STREET, DUBLIN."

A card with the instrument records: "The designer of this instrument was Charles Burton. He believed that the very faint spectrum of the aurora could be seen better with two eyes than with one. The spectroscope was taken by the Transit of Venus Expedition to the Cape of Good Hope in 1874-75. It is probably unique."

The SM computer records that the instrument was loaned by the Royal Society on 16:11:1900; Negative numbers 1176/85, 1178/85; LocatioB/MT9/10/C.

Ex0304 THERMOMETER

(Sold by Spencer & Son Dublin)

No measurements available. 1864-1886. F.

Trade label on case of two clinical thermometers, design of Sir Wm Aitken; private ownership; Morrison-Low 1989,60.

The label indicates that, in addition to the shop in Grafton Street, the firm had a "Manufactory" at 13 Aungler Street.

Ex0517 CIRCUMFERENTOR

Spicer Dublin *

CW 381. 1768-1772. FL.

"A rare 18th-Century Irish surveying compass, signed on the silvered dial 'Spicer Dublin', the edge-bar needle with balance weight and clamp, the North point engraved as a fleur-de-lys, with level and cross-bubble, twin sights, in pine case" - Christie 18:6:92, Lot 253.

Offered with W. & S. Jones pantograph, suggested price £300-400, part of Sale of property of Saul Moscovitz; illustrated; this is unusual in having spirit levels at right-angles to each other on the side wings.

Dates from Morrison-Low 1989,136.

Ex0215 CIRCUMFERENTOR

(Spicer Dublin)

L 419; DID 152. 1768-1772. FL.

"SPLENDID IRISH SURVEYING COMPASS, c.1800, signed 'Spicer, Dublin.' Measuring 16½" overall, this brass instrument is complete with sight vanes, staff mount, brass cover, and carved wood carrying case. The 6" diameter compass has engraved degree scale (divided to ½°), silvered face with compass rose, decorative centre piece, and exquisite fleur-de-lys, original needle, needle lifter and glass..."; eight screw holes individually numbered - illustrated - Tesseract 21,1988,40, \$1050; now believed to be in the Whipple Museum.

Also in Tesseract 10,1985,52.

Dates from Morrison-Low 1989,136.

Ex0214 CIRCUMFERENTOR

(Spicer Fecit)

No measurements available. 1768-1772. FL.

Private owner in Pennsylvania; Spicer's name appears on the title page of John Hood "Tables of Difference of Latitude and Departure for Navigators, Land Surveyors, &c.", Dublin 1772; information from Deborah Jean Warner, May 1988.

Dates from Morrison-Low 1989,136.

Ex0007 CIRCUMFERENTOR

(Spicer Dublin John Garman, Doneraile 1771)

DID 145. 1771. S.

"A BRASS MINER'S DIAL by 'Spicer of Dublin', the silvered compass rose marked with the cardinal points and surrounded by two circles of degrees, with brass lid bearing the inscription 'John Garman, Doneraile' and dated 1771, on staff-head mounting and with fixed North and South limbs." - Sotheby 5:3:81, Lot 16.

Ex0006 CIRCUMFERENTOR

(Edwd Spicer * Dublin Fecit)

L 443; CpD 133. 1768-1772. FL.

"A Rare Edward Spicer Brass Miner's Dial, Irish, late 18th century, the 13cm: 5¼in compass rose signed and inscribed 'Edwd Spicer * Dublin Fecit', the alidade inscribed with 1.5.6.2. to one side, 1,3,4,2 to the other, with twin sight attached by wingnut (glass cracked, lacking brass lid)" - illustrated - Sotheby 25:2:86, Lot 144, £350-500 - bracket below for stand.

Also in sale 18:6:86, Lot 169, £200- 350.

Illustrated in Sotheby Guide 1988,471, which records price obtained £264.

Dates from Morrison-Low 1989,136.

Ex0643 BACKSTAFF

(MADE BY ALEXANER [sic] STEPHEN FOR Mr WILLIAM MUSON DUBLIN MAY THE 7th 1732)

L 565; LaAcR 530, Se 35x15; SmAcR 200, Se 23x15. 1732. S.

Mahogany(?); large arc scale 0-25° in 10 minute divisions; transversals reading to one minute; small arc scale 0-60° in 1° divisions.

In Den Antikvariske Samling, Quedens Gaard, 6760 Ribe, Denmark; listed in Andersen 1995,225 (No.1463).

Note two other backstuffs (Ex0076 and 0077) are signed A. Stephens rather than Stephen.

Ex0077 BACKSTAFF

(Made by Alexander Stephens for Gyles Fearon 1747)

No measurements available. 1747. S.

Ebony; noted in "Market-place" by D. Brieux, in Bull SIS 19,1988,21 - illustrated.

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Ex0076 BACKSTAFF

(Made by Alexr. Stephens Temple Barr DUBLIN For George Kiddrington)

L 603; AcsR 468&146. 1747. FL.

Mahogany and boxwood; Whipple 698; Bennett 1983, No. 127.

Greater arc divided 0-65° to 1'; lesser 0-25° to 5', by transversals to 1'; marked 1245; mahogany limbs and 60° brace; boxwood arcs and 30° brace; vanes missing; presented by R.S. Whipple.

Burnett & Morrison-Low 1989, 28 give "Waddington" rather than "Kiddrington", and illustrate the instrument.

Ex0265 BACKSTAFF

(Gab. Stokes DVBLIN Fecit)

No measurements available. 1719-1742. FL.

Wooden; private ownership; information from Alison Morrison-Low.

Ex0114 CIRCUMFERENTOR

(Gab. Stoak, Dublin fecit)

L 285. 1715-1742. FL.

"A BRASS SURVEYOR'S COMPASS...The compass with formerly silvered dial engraved with cardinal and intermediate points with adjacent degree scale divided at half-degree intervals, secured to shaped plate by means of screws (one replaced) with detachable slit sights and cover to compass (lacks needle)." - illustrated - ChristieNY 31:10:85, Lot 237, \$300-500.

Dates from Morrison-Low 1989, 137.

Ex0079 SCALE - GUNTER

Gabriel Stoakes Dublin Fecit 1719 for John Connell

L 914. 1719. S.

"A 36-inch wooden Gunter sliding rule"; Whipple 177.

Illustrated in Burnett & Morrison-Low 1989, 20.

Ex0526 DIAL - HORIZONTAL AND ANALEMATIC

Gab Stoaks Dublin Fecit

320x205. 1715-1742. FL.

Rectangular plate, silvered brass; hours on both dials IIII-XII-VIII; private collection, Cambridge, England.

The horizontal dial has a central compass design with the gilt gnomon (angle 53°) at North, and seven hatched triangles for the other directions; beyond the hour marks are divisions for five minutes, quarter and half hours; the openwork gnomon has a curved insert, with a central hole on the main arm, from which a plumb bob would have read an angle scale below 35-75°; the analematic dial has its outer rectangular edges divided 0-90-0-90-0°; inside these divisions is the elliptical hour circle, divided outside into five minutes, quarter, and half hours; inside the hour circle is the time adjustment "WATCH TOO SLOW WATCH TOO FAST" for days and months of the year; in the centre is a slit for the (missing) gnomon (a gnomon with the instrument is an incorrect replacement); along the sides of the slit is complex foliate decoration outside a scale of "de N 20-0-20 de S", month letters, and zodiac signs; the first point of Aries is March 10, dating the instrument to before 1752; the dial stands on three short legs.

Dates from Morrison-Low 1989, 137.

Ex0080 DIAL - HORIZONTAL COMPASS

(Stokes fecit 1742)

No measurements available. 1742. S.

"Horizontal compass dial"; circular brass box; folding gnomon; Willis Museum/Gallery, Basingstoke BWM 1958.4.

Ex0078 QUADRANT - HORARY

(Gab: Stokes Dublin Fecit 1738)

No measurements available. 1738. S.

Brass; pin-hole and cross-wire sights; brass tripod stand; for latitude 52°20'; NMM Gabb Collection F.17.

Ex0105 OCTANT

Sweeny Cork Fecit

D 381. 1763-1798. F.

Wood, ivory, and brass; curved T insert; window vernier; index and horizon glasses; NMM S.301.

Description taken from photograph in Burnett & Morrison-Low 1989, 73.

See Burnett & Morrison-Low 1989, 72, 73&84; dates 155-156.

Ex0042 BAROMETER - STICK

Geo Tickell Dublin

H 1050. 1827-1840. R.

"A George III mahogany bowfronted Stick Barometer, silvered scales signed Geo Tickell, Dublin, with Vernier and trunk set thermometer, case with moulded pediment and ebonised cistern cover...£1000-1500", illustrated Lot 164 in W & F C Bonham & Sons Ltd Knightsbridge, Auction, 15:12:92.

There is a knob on the stem below the glazed plate to alter the marker; the cistern has an urn decoration on top.

George Tickell operated from 1827-1840, Morrison-Low 1989, 137.

Ex0107 SLIDE RULE

Daniel Voster Corke Fecit 1742

940x28x18. 1742. S.

Wood; variety of scales on all four sides; central depression for slider; SM 1907-108.

Marred by a knot in the wood on the left hand side.

Bought from J. Lecky, the source also of the Valencia Island mariner's astrolabe.

Illustrated in Burnett & Morrison-Low 1989, 71. Location S/G46/NW3/Cu01/AB.

Ex0492 CIRCUMFERENTOR

(WALKER DUBLIN)

D 150. 1775-1804 or 1820-1826. F.

"A 19th-century brass Surveying Compass with twin levels", Philips 2:10:90, part Lot 181, £100-150.

Dates from Morrison-Low 1989, 138; Walker & Son came in the middle of two Walkers, presumably the father and son.

Ex0283 CIRCUMFERENTOR

(Walker, Dublin)

D 150. 1775-1804 or 1820-1826. F.

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"An 18th Century brass Compass by 'Walker, Dublin', with seven point rose and locking device...with a cover." - illustrated - Philips 4:3:81, Lot 32 (part) - two side lugs, but lacking alidade and sights.
Dates from Morrison-Low 1989,138.

Ex0208 CIRCUMFERENTOR

(Walker Dublin 1792)

D 127; LmL 432. 1792. S.

"An 18th Century brass Miner's Dial, having a...dial engraved with a star, foliage and signed 'Walter[sic - actually Walker], Dublin, 1792', fitted with a sprung needle clamp and mounted by twin-buckle screws to a limb...further fitted to a tripod attachment, the fore and aft sights, needle and glass lacking." - illustrated - Philips 2:2:84 Lot 84.

Ex0586 DRAWING INSTRUMENTS - SET

(WALKER DUBLIN)

CW 255. 1767. D.

"A SET OF WALKER DRAWING INSTRUMENTS PRESENTED TO THE MARQUIS OF KILDARE, Irish, circa 1767, the mahogany and oak Freedom Box with lid carved in relief with coat of arms of Guild of Carpenters, Millers, Masons, Helers, Turners and Plummers, velvet lined and fitted with silver compass and dividers, accessories, ivory sector stamped WALKER DUBLIN as is also the ivory and silver mounted parallel rule, the base with pine box for watercolours and brushes, with hand written presentation note dated first October 1767" £400-600 - illustrated - Sotheby 8:10:93, Lot 742.

Morrison-Low 1989,138 lists William Walker from 1775 - this extends the dates backwards.

Ex0210 DRAWING INSTRUMENTS - SET

(Walker Dublin Henry O'Connor 1779)

CL 170. 1779. S.

"A silver-mounted shagreen-covered Mathematical Instrument Case by 'Walker of Dublin', with the owner's name 'Henry O'Connor' and the date '1779' inscribed on the combined scale and protractor, the brass instruments complete with combined knife, file and key and with dividers, porte-crayon, ink bow and interchangeable points, the large dividers missing." - Christie 27:10:69, Lot 17.

Ex0639 CIRCUMFERENTOR

(Walker & Son, Temple Barr, Dublin)

No measurements available. 1805-1819. F.

No further information; owned by Gibson House, 5172 Yonge Street, North York, Ontario, Canada.

Information from Randall C. Brooks.

Dates from Morrison-Low 1989,138.

Ex0483 CIRCUMFERENTOR

(Walker & Son Temple Barr, Dublin)

DID 127 (5"); L 470. 1805-1819. F.

"A Walker & Son Brass Level, Irish, early 19th Century, the 5" diameter compass rose, signed 'Walker & Son Temple Barr, Dublin', and inset with two spirit levels (lacking sights)" - Sotheby 18:6:86, part Lot 174, £3-400.

Dates from Morrison-Low 1989,138.

Ex0285 CIRCUMFERENTOR

(Walker & Son, No.17 Temple-Barr Dublin)

DID 127; L 460. 1805-1819. F.

"A Walker & Son Brass Miners Dial, Irish, late 18th century, signed on the compass rose, 'Walker & Son, No.17 Temple-Barr Dublin', the 5in diameter dial engraved with compass rose and two circles of degrees, flanked by two sights." £250-350 - illustrated - Sotheby 11:6:85 Lot 221 - needle clamp; boss below for stand.

Dates from Morrison-Low 1989,138.

Ex0284 CIRCUMFERENTOR

(Walker & Son Dublin)

D 140. 1805-1819. F.

Brass; two spirit levels; needle lock; lid; and lugs; alidade and sights gone; Philips 4:3:81, Lot 32 (part).

Dates from Morrison-Low 1989,138.

Ex0081 DIAL - HORIZONTAL COMPASS

Walker & Son Dublin

D 95. 1805-1819. F.

Brass; single latitude 51.5°; folding gnomon; brass cap; SM 1918-95; presented by T.H Court.

Silver compass rose, with fleur-de-lys and seven points labelled, divided 10-80(x4); brass ring around top divided into hours IIII-XII-VIII; two brass arcs support the folding gnomon; disc cap.

On display 10/93; display card reads: "Pocket Sundial and Compass Made by Walker & Son Dublin, in the early part of the nineteenth century. It has a folding gnomon for latitude 51½° and is enclosed in a brass box. Presented by T.H. Court Esq. Time Measurement Catalogue No.86 Inv. 1918-95."

Dates from Morrison-Low 1989,138. Location S/G28/D1.

Ex0630 BALANCE - EQUAL ARM

(James Warren at the sign of St Dustan, Skinner Row, Dublin)

No measurements available. 1752-1768. R.

Two sets of scales in oak boxes with trade labels reported in Crawforth-Hitchins 1994,1844; SM.

Both are in the Science Museum, London; James Warren was at the above address from 1752-1768, then at the Sign of St Dunstan, 10 Cork Hill from 1768-1782, and at 20 Cork Hill from 1781-1782; he died in 1789; some coin weights by him are known; he placed an advertisement in the Dublin Mercury on 29:9:1768: "MONEY WEIGHTS: James Warren goldsmith and jeweller, and maker of money weights for weighing all gold coin current in this Kingdom, by authority of the Government, takes the liberty to acquaint his friends and the public, that he has removed from Skinner-row to the sign of St. Dunstan on Cork-Hill, where the public may be supplied with money weights and all sorts of the best money scales, and where he intends carrying on the goldsmith's and jeweller's business in all their branches,.... he also sells goldsmiths' and apothecaries weights and mends and adjusts old scales as usual".

4224 PRI242 is a Warren scale with some of his weights.

Ex0626 BAROGRAPH - ANEROID

(James Watts, Dublin)

W 360. Late 19 C. G.

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"An oxidised and lacquered-brass barograph, with clockwork motor, drum, recording stylus and vacuum chamber, in bevel-glazed mahogany case £200-250"; illustrated - Christie's 17:11:94, Lot 16 - eight evacuated capsules..
J. Watts, 29 Eden Quay is known from a refracting telescope 3874 PRI119.

Ex0514 FORCEPS - OBSTETRIC

(J. WHYTE 88 Upper Sackville St. Dublin)

No measurements available. Late 19 C. G.

"A small pair of thin blade obstetric forceps...with hatched ebony hand grip"; Christie 2:7:92, Lot 79.

One hand grip is missing; offered with an assortment of medical equipment and a Baker travelling microscope.

Ex0117 BACKSTAFF

MADE BY JAMES WOODSIDE FOR (name stamped out) 1733

L 615; W 350. 1733. S.

Longest limb and two angled side rods of lignum vitae, with boxwood quadrant and carved scale; SM 1912-393.

The cross bar on the triangular frame is also of boxwood; the quadrant has a scale 0-60° and has a mahogany vane and lens; the end of the large boxwood scale is carved into a curved shape; it is divided 0-25 and also has a mahogany vane; the brass screw ends are diamond shaped; location B/T26/2G/Cu14/04.

James Woodside, Mathematical Instrument Maker of Dublin, died 1743, is listed in Morrison-Low 1989,139.

Sotheby 30:5:91 Lot 424, similarly described, was signed "Made by Thos Woodside yr 1748 For William Thompson" - maybe a relative of James?

Sotheby Information from Alison Morrison-Low - 7/91.

Ex0014 BAROMETER - BANJO

(Yeates Dublin)

D 305. Early 19 C. G.

Rosewood; scroll pediment; mother-of-pearl inlays; listed in Goodison 1977,373.

Ex0012 BAROMETER - STICK

(Yeates Dublin)

No measurements available. Late 18 early 19 C. G.

Mahogany; broken pediment; bulb cistern; listed in

Goodison 1977,373.

Ex0013 BAROMETER - STICK

(Yeates Dublin)

No measurements available. Late 18 early 19 C. G.

Mahogany; square moulded pediment; urn cistern cover; bow-fronted case; thermometer on trunk; in Goodison 1977,373.

Ex0473 COIL - INDUCTION, MEDICAL

YEATES' MEDICAL INDUCTORIUM (Mottershead & Co.)

No measurements available. c1880. R.

Hinged mahogany case contains coil on ebonite bobbin with brass cover; nickel electrodes; MHSO 52-17.

"Irish medical induction coil, circa 1880, with printed label in lid, 'YEATES' MEDICAL INDUCTORIUM' and small address label of Mottershead & Co., Chemist and Importer of Scientific Apparatus, 1 Market Pl. and St Mary's Gate, Manchester. In mahogany box, small coil on ebonite bobbin with brass cover, brass studs current regulator with brass sliding switch, Neff's hammer break with simple lever adjustment, and compartment for Leclanché cell. Nickel-plated cylinder electrodes with mahogany handles." - illustrated and described in Hackmann 1989,247. Tony Simcock (PC 1992) reports that the Inductarium was presented to the Museum by Magdalen College in the academic year 1951-2; from the Daubeny Laboratory, Oxford; possibly acquired by Edward Chapman, head of the laboratory 1869-94, who lived near Manchester.

The fact that it is signed Yeates, not Yeates & Son, might suggest an earlier - Mid 19C date?

Ex0409 DIAL - MINER

(Yeates, 2 Grafton Strt. Dublin)

CpD 140; CW 298. 1840-1864. G.

"An unusual early 19th century Irish lacquered brass miners dial, the silvered 5½ inch diameter compass signed 'Yeates, 2 Grafton Strt. Dublin', with edge bar needle suspended on a jewelled pivot the limb mounted with a level and folding fore and aft sights with rack and pinion adjustment, the pin hole sight with 0°-30° (x2) and vernier, the second sight with three cross wires and both sights held in tension by a steadying bar, fitted with a low screw tripod mounting and contained in a mahogany case - 11 3/4in. (29.8cm.) wide, the lid applied with a trade label." illustrated - Christie 17:10:85, Lot 232, £200-400 - two disc four screw base; the spirit level is mounted above the glass cover of the compass.

Assumed to be George Yeates; dates from Morrison-Low 1989,139.

Ex0338 GNOMON

(YEATES DUBLIN) ([on dial] John Cruise...1843)

H 305. c1843. S.

Cast bronze; on slate dial from Castletown; latitude 55°, around Derry; Historical Technology 22 Fall 1981.

Catalogue suggests that the dial may have been made using a kit supplied by Yeates, though it is not clear why the latitude is wrong, since the dial inscription includes: "CASTLETOWN Lat 53°38'" as well as: "Made by John Cruise, Castletown Kilpatrick In The Year Of Our Lord 1843"; maybe Cruise bought a damaged dial around Derry, and made another dial plate?; illustrated.

Ex0279 PROTRACTOR

(Yeates 2 Grafton St. Dublin)

D 152. 1843-1858. A.

"A 19th century lacquered brass swinging arm protractor with silvered scale signed 'Yeates 2 Grafton St. Dublin', with rack and gear motion." - Christie 30:6:88, Lot 154, £100-150.

Assumed to be George Yeates, as address given; dates from Morrison-Low 1989,139.

Ex0555 SEXTANT - BOX

(Yeates, 2 Grafton St, Dublin)

W 115. 1843-1858. A.

"A lacquered brass box sextant....with vernier and magnifier, silver scale, internal shades and mirrors, cover, telescope, in fitted velvet lined leather case." - Christie 6:5:93, Lot 141, £200-300, illustrated.

Assumed to be George Yeates, as address given; dates from Morrison-Low 1989,139.

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Ex0211 THEODOLITE

(Yeates, Dublin)

TeL 180. Early to mid 19 C. G.

"A lacquered brass theodolite signed 'Yeates, Dublin', on the table with 360° scale and with magnetic compass and two spirit levels mutually at right angles - 18cm. length of barrel unassembled - fitted box with two eye pieces." - Christie 22:11:78, Lot 42.

Ex0480 COMPASS - PRISMATIC

(Designed & Made by Andrew Yeates 12 Brighton Place, New Kent Rd, London Yeates 2 Grafton Street DUBLIN)

W 133. 1837-1873. A.

"A 19th-century oxydised brass surveying compass, signed 'Designed & Made by Andrew Yeates 12 Brighton Place, New Kent Rd, London', with folding wire, prism and slit sights, bubble level (damaged), fixed telescope, finely engraved compass ring an [sic] steel bar needle on jewelled pivot, with trade label for 'Yeates 2 Grafton Street DUBLIN' in mahogany case" - illustrated £200-300 - Christie 29:3:90, Lot 206.

The compass is shown in Yeates 1887,32-3: "Yeates & Son's Improved Telescopic Prismatic Compass. With this instrument, vertical and horizontal angles can be taken with great accuracy and rapidity. Inside the compass-box is a silver ring, divided to half degrees. This gives the magnetic bearing, even when the instrument is held in the hand. On the tripod stand (as in fig.51), with the spirit-level and telescope, horizontal angles can be measured on the fixed circle, independent of the magnetic needle. This is of great importance in districts abounding with iron. To measure vertical angles, the compass is turned sideways (as in fig.52); the level, then, shows the horizontal line, and all angles can be taken from the zenith round. All observations can be verified by reversing the compass in azimuth and altitude...£9 9 0 to 12 12 0".

Fig.52 clearly shows the "ANDREW YEATES" signature.

Morrison-Low 1989,64 notes that there is an Andrew Yeates prismatic compass in the Science Museum, London, inventory number 1948-27.

Andrew Yeates dates from Morrison-Low 1989,42.

Ex0563 BAROMETER - ANEROID

(Was owned by George Yeates [1796-1882])

H 320. c1841. D.

Supported by cast metal figure of boy on wooden base; now in Western Australia Museum, Perth, No.T1080.

This is a French, and not an Irish instrument, but it has an interesting background, as reported by Julian Holland in a letter to John Burnett 22:4:87. It was donated to the Museum by Mrs R.R. McKee, born Yeates, from the estate of Miss M.K. Yeates; Mrs McKee was the granddaughter of Horatio Yeates (1834-1906), son of George Yeates; Horatio emigrated first to London in 1864, and then to South Australia in 1880.

A hand-written inscription inside the case reads: "Sold to T.F. Bergin Esq Dublin by Geo Yeates in 1841 F[sic].F.B. died in 1863 and Mrs Bergin gave it to me as a souvenir the following year. Horatio Yeates."; the Museum record document records: "This instrument is one of the first Aneroid Barometers brought from Paris to Dublin, in 1841 by G. Yeates; it was a subject of much interest in scientific circles, where its action was tested in measuring the heights of some of the Dublin Mountains. It then became the property of the late F.H. Bergin in whose possession it was presented by Mrs Bergin to H. Yeates as a souvenir. During its 46 years existence [sic] it has required no repairs and is in good order still." (There seems to be some confusion about the initials of Mr Bergin!).

Ex0557 LENS - BULL'S EYE

Horatio Yeates 12, Wicklow Street Dublin

BD 86; H 324; LeD 63 (2.5"). c1858. G.

Brass stand holds oak bracket for brass claw on arm, and also a lens on brass arm; University of Queensland.

The condenser lens, on a horizontal arm, slides vertically on the stand by means of a split tube; the arm can be extended by 77mm (3"); an oak clamp also slides on the stand clamped by a brass locking screw; on its other end is a brass arm leading to a specimen claw, with (replacement) corks, whose separation can be adjusted by means of a bolt and nut.

A description and photographs were supplied by Windsor Davies of the Microscope Division, UQ, Brisbane, Australia.

Horatio Yeates is listed from 1859-1864, at 29 (not 12) Wicklow Street from 1859-1862, Morrison-Low 1989,139.

Ex0405 COIL - INDUCTION

(Supplied by Horatio Yeates)

WiL 10½ miles. c1876. R.

"Large Induction Coil, with thick secondary wire (10½ miles in length), and improved form of contact breaker by which a long interval of contact is obtained. This is wound on the plan proposed by Dr. Ferguson (in two divisions), the secondary wire which is No.32, B.W.G. is 10½ miles long. The primary wire, No.8, B.W.G. is wound in two laps. The condenser is composed of 70 sheets of tinfoil, 26x16, insulated with paraffine paper. The contact-breaker, which is so formed as to give a long interval of contact, is also furnished with an adjustment by means of which the coil can be worked with a very small battery, and maximum results obtained with the largest suitable battery."

No.1304aa in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0120 MICROSCOPE - COMPOUND

(H. Yeates, Dublin)

CH 492. 1859-1864. F.

"A LARGE BRASS ROSS TYPE MONOCULAR MICROSCOPE by 'H. Yeates of Dublin', signed on the barrel support, coarse focusing by rack and pinion to the square pillar, fine focusing by screw, fully mechanical stage with double sided mirror, damaged, tilting on plain support with tripod foot, in original mahogany box with four drawers of slides and lenses." - Sotheby 10:5:79, Lot 13.

Dates from Morrison-Low 1989,139.

Ex0010 BAROMETER - STICK

(S. Yeates & Son 2 Grafton Street Dublin)

H 910. 1832-1839. A.

"AN IRISH MAHOGANY STICK BAROMETER, the silvered register signed 'S. Yeates & Son 2 Grafton Street Dublin' and with vernier scale, the case with a moulded cresting and urn-shaped cistern cover." - Sotheby 2:12:77, Lot 45.

Dates from Morrison-Low 1989,139.

Ex0011 DIAL - HORIZONTAL PEDESTAL

S.. Yeates, 29. Capel St. DUBLIN

No measurements available. 1795-1810. A.

"A 19th century bronze sundial, signed 'Yeates, 29, Capel St., DUBLIN', the dial engraved with scrolls and with a plain gnomon." - signature illustrated - Christie 11:9:86, Lot 240, £150-200.

Dates from Morrison-Low 1989,139.

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Ex0038 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL

(Made by S. Yeates, 29 Capel St. Dublin)
BD 154. 1795-1810. A.

"A somewhat unusual form of mechanical equinoctial dial. The folding latitude scale (marked for each degree of latitude) for adjusting the equinoctial hour -ring is not at the side, but passes through the centre of the ring. The hour scale is divided to ¼ hour divisions, and the minute scale to each minute. A hinged arc, with a pin-hole, straddles the minute scale, and allows sunlight falling through the hole to fall on an engraved vertical line on a hinged bar near the centre of the rotatable diametral arm. As this arm is rotated, a geared ring under the hour-scale engages a pinion on the arbor of the minutes hand. When the spot of sunlight so falls the time is indicated on the hour scale by a mark on the opposite end of the diametral arm, and by the position of the minute hand. This type of sundial is not self-orienting so a compass must be missing from below the decorative skeleton support for the latitude-adjustment quadrant. The missing compass probably carried bubble levels to aid the levelling of the instrument with the three feet, two of which have screw adjustment. The base plate carries two plaques, engraved with a detailed table of the equation of time. S. Yeates is not recorded, but was clearly an instrument-maker who dealt in high quality instruments." ("Instruments Scientifiques, Livres Anciens: Collection Leonard Linton" - Paris, 9:10:80.) Sold by Nouveau Drouot, Collection Leonard Linton, illustrated; see Morrison-Low 1989,4&8.

Ex0559 INSTRUMENT COMPENDIUM

(MADE BY Sam Yeates, N.29 Capel St, Dublin.)
H 1220; W 510; D 140. 1795-1810. A.

"The Yeates Instrument Compendium. An important Irish late 18th century wall mounted mahogany instrument compendium with ebony stringing and broken pediment top, containing a barometer, clock, thermometer, wind gauge, hygrometer and spirit level." - Mallett Sale at Bourdon House 1993.
This was sold in the Mountainstown House Sale, Navan, Co. Meath, on 28:9:1988 - see main Inventory entry 1719 SAL006. Dates from Morrison-Low 1989,139.

Ex0009 MICROSCOPE - SOLAR

(S. Yeates, Dame Sr. Dublin.)

No measurements available. 1811-1826. A.

Brass; mahogany case; information from J. Burnett.

In "Book of Miscellaneous Illustrations", collected c1900, from Crisp Collection; sold at auction of Crisp collection 17:2:1925, Lot 358,13; it apparently had been in the Royal Microscopical Society and had been sold to B. Braisgirdle some years ago; its present whereabouts are unknown.
Dates from Morrison-Low 1989,139.

Ex0097 TELEPHONE

(S.M. Yeates)

No measurements available. (1865) PC.

Facsimile of telephone made in 1865 by S.M. Yeates; improved Reiss telephone; SM 1916-54; not seen 8:1993.

The SM computer gives more information: Regd Papers 16/273; Presented by A.A. Campbell Swinton FRS, 17:5:1916; Location B/F30C/CU/T6/C.

Ex0098 MICROSCOPE - COMPOUND

(Wm YEATES, MAKER)

BD 109; H 370. c1856. PC.

Weighted base; angled tube; side pillar for stage, wheel of apertures, and mirror; SM 1918-72.

The rotating plane and convex mirrors are located at the top of the pillar; the revolving stage is moved by a (broken) rack and pinion; the objective is mounted near the base of the instrument and faces upwards; light passes downwards through the objective and, by a prism of special form, mounted on the base, the light is directed upwards into the main body tube, which is inclined; the object, in a glass pan, is observed through bottom of the pan.

Although the signature could not be located in 1994, it is recorded as "Wm YEATES" but, since no instrument maker of this name is known in the Irish family, this microscope may not be Irish.

This type of microscope is like that specially designed for chemical work by Dr Lawrence Smith of Louisiana in 1850; it was presented to the Science Museum by T.H. Court.

See American Journal XIV,232,1852.

Ex0093 AIR PUMP PLATE

YEATES & SON OPTICIANS DUBLIN.

Sp 240; H 195; PD 228. 1889. AQ.

Green painted iron tripod base with side stop-cock, supports a metal then a glass plate; SM 1889-46.

The metal plate is strengthened by four radial struts below, and has red resin between it and the larger glass plate on top; in the centre of the latter is a hole with a square-shaped nut.

On loan from Yeates & Son; location B/T26C/2C /FREA/05.

Ex0419 ANEMOMETER

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Electrical Anemometer"; velocity of wind shown on dials in observatory or study; SM, 1876 Loan Collection.

"Electrical Anemometer, by which the velocity of the wind in miles, &c., can be shown in an observatory or study."

No.2842 in the Catalogue of the 1876 Loan Collection at South Kensington. Not found in Museum 8:1993.

Ex0421 BAROGRAPH - ANEROID

(Yeates & Son)

CW 355. c1920. PC.

"A YEATES & SON BAROGRAPH with vacuum chamber and revolving clockwork graph barrel, contained in glazed oak case, 1ft 2in; 35.5cm wide, English, c.1920" - SothebyBE 7:9:79, Lot 101.

Ex0040 BAROMETER - ANEROID

(Yeates & Son, Dublin)

No measurements available. 1882. AQ.

Mahogany glazed case; circular dial; with india rubber

tube; for lecture purposes; RMS T.1882.47.2.

Bought from Yeates & Son.

Ex0015 BAROMETER - BANJO

(Yeates & Son Dublin)

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No measurements available. Mid to late 19 C. G.
In carved giltwood frame; listed in Goodison 1977, 373.

Ex0608 BOILER - MARCET

YEATES & SON OPTICIANS DUBLIN

Sp 190; SrD 100; H 403. Mid to late 19 C. G.

Brass; three curved legs to heavy sphere in two parts held by 21 screws; stop-cock, opening and thermometer on top. Vertically on top of the sphere is an opening which has a screw-in cubic base; to one side is a screw-in stop-cock, which has a screw thread on top as well; on the other side of the centre is an opening for a (broken) thermometer on a boxwood scale 200-410°; the central opening is for a missing barometer tube.

Griffin 1910,470 describes this as: "Marcet's Boiler, for showing the properties of high pressure steam."

Sold to London dealer by North Monastery School, Cork.

Ex0039 CLINOMETER

(Yeates & Son, Dublin)

DiD 203. c1875. G.

Ship's clinometer; RMS T.1921.63 - but disposed of in 1947.

The accession record (1921.63) reads: "Ship's Clinometer. A circular tube half filled with mercury is mounted on a wooden disc 8 ins. in diameter, fitted with a circular brass scale, each quadrant being graduated from 0° to 90°. In the upper part of the tube are two indices to record the maximum roll. Made by Yeates & Son, Dublin."

Information from A. Morrison-Low.

Ex0519 CLOCK/BAROGRAPH/THERMOMETER

YEATES & SON DUBLIN

C c1130x375x200 (as 4446 TDP322) AQ 1882. D.

Mahogany glazed housing contains a clock, a recording barometer and a thermometer; RMS T.1882.47.1.

The clock has roman hours; a mechanism from the smaller open end of the mercury barometer tube alters the position of a pen recording on a revolving cylindrical chart.

The instrument appears identical to that presented to George Francis FitzGerald in 1885 (4446 TDP322).

The instrument was bought from Yeates & Son; information from Alison Morrison-Low.

Ex0475 CLOCK/BAROGRAPH/THERMOMETER

(Yeates & Son Dublin [Plaque to] Erasmus Smith Professor of Natural Philosophy, University of Dublin)

C c1130x375x200. Mid to late 19 C. G.

Mercury; recording drum; SothebySU 18:12:90, Lot 2956.

"A Yeates & Son combined mercury Barometer/Timepiece, circa 1880, the brass dial surmounted with recording drum, the back applied with a thermometer, in rectangular mahogany glazed case with brass presentation plaque to 'Erasmus Smith,[sic] Professor of Natural Philosophy, University of Dublin'; £500-700.

This instrument was purchased by the Physics Department, Trinity College Dublin - see entry 4446 TDP322.

Ex0209 COMPASS

(Yeates & Son, Dublin)

No measurements available. Mid to late 19 C. G.

In Town Docks Museum Hull; listed in Holbrook 1992,139.

Ex0212 DIAL - HORIZONTAL PEDESTAL

(MADE BY Yeates & Son, Dublin. Latitude 54°20')

D 229; GnH 152. Mid 19 C. G.

Bronze; circular; hours V-XII-VII; gnomon with foliate insert; Historical Technology 110,1975,194.

"Circular bronze tablet 9" d with elaborately pierced gnomon 6" high. The engraving on this garden sundial is well done and construction is substantial. Very fine condition with a browning patina from outdoor use." - illustrated, \$295.

Offered again in Historical Technology 113,1976,135 for \$325, in 115,1977,190 for \$325, in 117,1978,204 for \$345, and in 119,1979,160 for \$345.

Ex0495 DIAL - UNIVERSAL EQUINOCTIAL

(YEATES & SON DUBLIN)

53x56; CpD 34. Mid to late 19 C. G.

"Mahogany with brass fittings, 53x56mm. Compass 34mm dia. set in base, engraved paper compass card with 'makers' name pasted on, 16 point lettered rose, calibrated 0° to 90° by 10° x 2. Hour circle set in upper plate calibrated 4 to 12 to 8 and 8 to 12 to 4 for 'N'(orthern) and 'S'(outhern) latitudes, Latitude arc calibrated 0° to 90° by 10°. Presented by R.S. Whipple." - Whipple 962.

Described in Bryden 1988,54 (Entry 217).

Ex0611 DIP CIRCLE

Yeates & Son Dublin

B 225x149x33; H 280; RiOD 240. Mid to late 19 C. G.

Mahogany base with bevelled edge; two vertical supports to needle reading brass divided ring 0-90-0-90-0°.

The ring is held on the base between the bottom of the two narrow triangular needle supports. Sold to London dealer by North Monastery School, Cork.

Ex0613 DISC SPINNER

[On disc] YEATES & SON OPTICIANS DUBLIN

Sp 178; AxH 316; WhD 158; DiD 261.

Late 19 early 20 C. G.

Blue-painted iron tripod foot and vertical support for large pulley wheel and axis of coloured disc.

The disc axis has a brass screw clamp and a small pulley wheel (D17) connected to the large five-spoke wheel below, which is revolved using a turned wood handle; the disc itself is of cardboard, with a black circle (D97) at the centre and coloured dial areas.

Sold to London dealer by North Monastery School, Cork.

Ex0612 DISC SPINNER

[On wheel] YEATES & SON, DUBLIN. [On stand] BAIRD & TATLOCK LONDON

Sp 119; AxH 272; WhD 100; DiD 305. Late 19 C. G.

Cast iron tripod foot and support; pulley wheel system.

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The support to the axis, and for the larger lower five-spoke pulley wheel, has an X cross-section; the wheel is revolved using a horizontal turned wood handle; a thong connects the wheel to the small pulley wheel (D22) at the axis of the disc, which is held on with brass disc clamps (D36); the present disc is of poorly cut copper, and is probably not original; the rest is, indicating Yeates & Son as Baird & Tatlock retailers.
Sold to London dealer by North Monastery School, Cork.

Ex0415 ELECTROMAGNETIC ROTATION APPARATUS

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"To illustrate some of the laws of electrical rotation of Faraday and Ampère."

No.1474 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0590 ELECTROMETER - TORSION, COULOMB

YEATES & SON DUBLIN

BD 234; H 480; CyD 227; TuD25. Mid to late 19 C. G.

Mahogany base; glass cylinder body; mahogany bound glass disc above; on top, glass tube to fibre support.

The latter is of brass and has a divided disc 0-90; the glass cylinder body has cracked off from the base, which sits on three turned mahogany feet; a scale around the glass reads 90-0-90; the original indicator is gone; on top of the glass disc are two holes, one occupied with a turned wood knob and an iron rod descending into the cylinder.

Sold to London dealer by North Monastery School, Cork.

Ex0417 EXPANSION APPARATUS

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Reflecting Pyrometer", to show by projection the different expansions of metals.

"Reflecting Pyrometer, for showing by projection the difference of expansion of different metals."

No.1069 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0606 EXPANSION APPARATUS - BAR BREAKER

YEATES & SON DUBLIN

B 409x82x27; H 84. Mid to late 19 C. G.

Cast iron base and strengthened vertical supports for (missing) rod and bar.

The rod would have had a ring at one end and a tightening screw at the other; on cooling the heated rod, the bar would break.

Sold to London dealer by North Monastery School, Cork.

Ex0416 EXPANSION APPARATUS - TWO METALS

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Pyrometer, of iron and copper, for lecture illustration...The above consists of a compound bar of iron and copper, bent into the form of U, one arm of which is firmly attached to the stand; the other arm is free, and carries a long index. If the compound U be immersed in a beaker of boiling water, the index will move over several degrees of the scale."

No.1068 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0101 EXPANSION APPARATUS - TWO METALS

(Yeates & Son, Dublin)

H 410. 1889. AQ.

Compound bar, iron and brass, with oak handle and scale to show unequal expansion; SM 1889-47.

The bar ends in a point; a bent rod from near the handle runs parallel to the bar and holds a small metal scale read by the point.

On display 8:1993; location S/G62/16; a display card reads: "Compound Bar This apparatus illustrates the unequal expansions of brass and iron when heated. If strips of these two metals are welded together and heated, the brass expands more than the iron and so the compound bar becomes curved. The brass is on the convex side and the iron on the concave side of the curved bar...Heat and Cold Catalogue No.10."

Ex0598 GALVANOMETER - UPRIGHT

YEATES & SON, DUBLIN

B 220x144x33; H 250; W 317. Mid to late 19 C. G.

Mahogany base and vertical support for fan-shaped yellow scale 40-0-40; two brass screw electric contacts on base; brass bound housing for the green wire coil.

Sold to London dealer by North Monastery School, Cork.

Ex0043 HELIOSTAT - STONEY

Yeates & Son DUBLIN

310x280x200. Mid to late 19 C. G.

S.M. Yeates' improved form of G.J. Stoney's local Heliostat; brass; shaped mahogany base; RMS T.1962.94.

Presented by the Royal Observatory, Blackford Hill, Edinburgh; three level screws; two spirit levels; rectangular mirror.

Illustrated in Morrison-Low 1989,43; listed in Holbrook 1992,126.

Ex0637 LEVEL - TELESCOPIC

Yeates, 2 Grafton St., Dublin.

No measurements available. 1843-1858. R.

Brass; plate and disc base with central screw thread; two supports for tube; bubble level missing; knob at side for rack and pinion focus; two supports remain on top of the tube for the missing spirit level; private collection.

Dates from Morrison-Low 1989,139.

Ex0640 LEVEL - SPIRIT

(Yeates & Son Dublin)

No measurements available. Mid to late 19 C. G.

"Levelling rod" - assumed to be spirit level; owned by Glanbow-Alberta Institute, Clagary, Alberta, Canada.

Information from Randall C. Brooks.

Ex0404 LEVEL - TELESCOPIC

(Yeates & Son, 2 Grafton Street, Dublin) [Trade Label]

W 343. 1840-1864. G.

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"An anodised brass surveyor's level with four-screw tripod mounting in mahogany case - 13½in. wide, the lid with trade label of 'Yeates & Son, 2 Grafton Street, Dublin'." - Christie 11:7:85, Lot 43, £40-60.
Assumed to be George Yeates, as address given; dates from Morrison-Low 1989,139.

Ex0589 MELDOMETER

Yeates & Son, Dublin Joly's Meldometer

B 165x140; TuH 160; PrH 80. c1891. PC.

Slate base and metal pillar; brass microscope moves above heated platinum ribbon; Melbourne University.

The short pillar is painted blue, and holds a horizontal brass plate for a worm screw, turned by an incomplete handle at the end; the vertical brass microscope, which has a rack and pinion focus, views the heated platinum ribbon, which is held between two tapering clamps; an extension of one of these makes contact with a gold topped pointer attached to a drum micrometer, and thus the expansion of the platinum ribbon, and hence its temperature, can be measured; contact is demonstrated electrically using a small galvanometer near the eyepiece of the microscope. Photographs and details of the meldometer were supplied by Dr Ed Muirhead, of the School of Physics, University of Melbourne, who records that H [presumably Horatio] Yeates visited the Melbourne Observatory in 1891, so perhaps the meldometer was brought by him.

Horatio (1834-1907) emigrated to South Australia in 1880, and was a brother of Stephen M. Yeates, who ran the family firm in Dublin; Joly read his description of the meldometer to the Royal Irish Academy on May 11, 1891, and records that the instrument was made by Yeates & Son, so it would presumably have been possible for him to have obtained an example in that year.

For details of the other Yeates meldometer, see 2975 UDE001.

J. Joly, Proceedings of the Royal Irish Academy, Vol.2, 1891,38-64.

Ex0573 MICROSCOPE - COMPOUND

Made by Yeates & Son, Dublin.

H c300; Fo 131x122. Mid to late 19 C. G.

Brass; Y-foot; trunnion to limb for mirror, stage and tube; Royal Microscopical Society Collection MHSO RMS450.

Described in Turner 1989,102 (Item 90): "The appearance of this instrument is like that of a small Ross microscope, with the same type of Y foot. The limb is supported on trunnions, coarse focusing is by rackwork and fine by a lever on the nose. There is a mechanical stage and the sub-stage mirror is plano-concave. There are now no optics, no accessories and no case. Strangely there is no evidence of the brass ever having been lacquered."; Lent to MHSO in 1970 by RMS.

Photographs of the instrument and signature are reproduced in Turner 1989,102.

Ex0089 MICROSCOPE - DISSECTING

(Yeates & Son, Dublin - engraved on stage plate)

H 218; SgL 157, W 129. Second ½ 19 C. G.

Quekett type; mahogany base; brass; SM A38561; purchased 9:11:1925, for £0.5.

SM suggests dates 1850-1870.

Ex0407 MICROSCOPE - PROJECTING

(Yeates & Son, Dublin)

No measurements available. Mid to late 19 C. G.

"A lantern microscope slide projection attachment"; Christie 9:12:82, part Lot 116.

Ex0562 MICROSCOPE SLIDE

(Yeates & Son Dublin)

Presumably standard size. Mid to late 19 C. G.

In cabinet of prepared slides with Grubb microscope Ex0508; Macleay Museum, University of Sydney.

Recorded in Holland 1989,98 (p.41), the slide has the Yeates & Son signature engraved on the glass; a paper label reads "CHARLES BURGOGNE Préparateur, A PARIS.", and the slide has two small preparations; it is possible that it came to Australia with Horatio Yeates, who emigrated from Dublin, first to London, from 1864-1880, then to Melbourne, and to Adelaide, where he is listed from 1883-7 (Morrison-Low 1989,42 and personal communication from Julian Holland 19:12:89).

Ex0596 MIRROR - ROCKING

Unsigned - attributed to Yeates & Son

Sp 194; H 408; WhD 128; DiD 133. Mid to late 19 C. G.

Iron tripod base and conical pillar support five-spoke wheel and small pulley wheel; on top, rocking disc.

The five-spoke pulley wheel, just above the foot, is revolved by a turned wood handle; a thong from this would revolve the upper pulley wheel (D32); the axis of this, through the top of the conical pillar, turns a small wheel (D20) with a coupling to a ring around a brass pipe on top of the pillar such that, when the pulley wheel is revolved, the ring rocks the pillar and an angled metal disc on top; the angle of the disc can be altered a little by means of a screw adjust on a bracket behind; the tripod foot is very reminiscent of Yeates & Son apparatus, and the apparatus seems likely to be the "Rocking or Vibrating Mirror" listed in Yeates 1880,5, although there is now no mirror on the disc.

Sold to London dealer by North Monastery School, Cork.

Ex0597 NEWTON RINGS APPARATUS[?]

YEATES & SON DUBLIN

HsH 22, D 65; DiD 52. Mid to late 19 C. G.

Flat glass disc in brass shallow cylinder housing with central hole and with screw-on oxidised brass ring.

Likely to be the remains of a Newton rings apparatus, with the screw-thread hole in the cylinder housing to hold the missing pressure adjust screw.

Sold to London dealer by North Monastery School, Cork.

Ex0594 OPTICAL STAND

YEATES & SON DUBLIN

Bd 126; MnH 408; PrD 20. Mid to late 19 C. G.

Green painted cast-iron fluted base; expanding brass pillar, with screw clamp, ending in pivot with screw thread.

The pillar has a central strengthening ring; the height is increased by means of a brass tube sliding inside the pillar; the signature is cast into the base around the foot of the pillar; the stand is assumed to be for a missing optical element.

Sold to London dealer by North Monastery School, Cork.

Ex0604 ORGAN PIPE - REED

YEATES & SON OPTICIANS DUBLIN

Hs 247x58x58; Wds 80x32. Mid to late 19 C. G.

Boxwood with ebony top and frames for four glass windows on top sides; inside, rectangular frame for brass reed.

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One of the windows is cracked; there is a mahogany conical input tube below; the ebony top has a hole into which the sound tube, Ex0605, fits.

Sold to London dealer by North Monastery School, Cork.

Ex0615 ORGAN PIPE WITH MANOMETRIC CAPSULE

YEATES & SON OPTICIANS DUBLIN C4 G3 E3 C3

Hs 608x73x63 - 295x51x46. Mid to late 19 C. G.

Two; boxwood with mahogany lip and conical input below; single turned wood capsule; one with a slide on top.

The larger has parallel mahogany rods on the top front of the housing, and a sliding mahogany panel in these, with a window above a rounded rectangular hole in the boxwood; the capsules have two short pipes, one sticking vertically up from the centre of the dome, and the other at its side.

Sold to London dealer by North Monastery School, Cork.

Ex0603 ORGAN PIPE WITH MANOMETRIC CAPSULES

YEATES & SON OPTICIANS DUBLIN

Hs 702x79x76. Mid to late 19 C. G.

Boxwood with mahogany lip and conical input below; glass back; oxidised brass pipe splits into three to three capsules.

The pipe runs across the front of the housing and turns in a right-angle around the corner, where it splits into three arms, each leading to a turned wood capsule.

Sold to London dealer by North Monastery School, Cork.

Ex0576 PLANIMETER

(Yeates & Son, Opticians to the University, Dublin)

No measurements available. Mid to late 19 C. G.

"Fixed scale polar planimeter"; the signature is on the case; SM 1977-408; presented by R.M. Rouse.

Information from SM computer; registered papers 1007/68/01; negative no. 154/93; presented 3:4:1977; location S/G20/PS.

Ex0610 PRISM ON STAND

YEATES & SON DUBLIN

BD 105; PvMnH 290; PrH 37; Sis 35. Mid to late 19 C. G.

Weighted brass base and expanding pillar to pivot for oxidised brass arm to housing for equilateral prism.

The latter is in the form of a brass triangular plate with sides, on top of a brass rod through a sleeve in the oxidised brass arm; the prism can thus be turned by means of the pivot and revolved in the sleeve; the pillar has a ring clamp.

Sold to London dealer by North Monastery School, Cork.

Ex0411 PROJECTION APPARATUS

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Apparatus for the projection on the screen of the curves produced by the combination of rectangular vibrations."

No.732 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0420 RAIN GAUGE

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Electrical Self-registering Rain Gauge The peculiarity of the above is a novel form of rocking bucket, the partition of which is so constructed that it will register correctly, no matter at what rate the rain may fall."

This may be the same instrument as Ex0094.

No.2852g in the Catalogue of the 1876 Loan Collection at South Kensington, 1877.

Ex0094 RAIN GAUGE

YEATES & SON, DUBLIN

B 270x260; H 408. 1875. PC.

Rocking bucket electrical gauge in a green-painted housing incorporating a square top funnel; SM 1893-121.

The housing has glass side panels; above the funnel is a filter, and the funnel leads to the rocking buckets arranged so that when one side fills, it tips out the rain, and the other side becomes located under the funnel; each time the bucket tips, an electrical signal goes to a counter; the apparatus is illustrated on the back cover of Yeates 1877, and also inside (p.47).

The SM computer lists the other parts of the apparatus, the counter with a mahogany base and glass casing, signed "YEATES & SON DUBLIN" with dials for "INCHES" and "HUNDREDTHS", and also a battery pack signed "Yeates & Son, 2 Grafton Street. DUBLIN" and "HELLESEN'S PATENT DRY BATTERY TYPE NO.2"; location B/T26.

Ex0593 SINGING FLAMES APPARATUS

YEATES & SON Dublin

Sp 198; H 451. Mid to late 19 C. G.

Green painted iron tripod foot; brass plate with two stop-cocks to tapering burners; on top, frame for (missing) glass tubes; gas input at the back of the foot.

Sold to London dealer by North Monastery School, Cork.

Ex0410 SINGING FLAMES APPARATUS

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Apparatus for experiments with singing gas flames. The above, consisting of glass tubes of similar size, with the assistance of a revolving mirror, will illustrate most of the phenomena of interference, harmony, &c."

No.699 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877.

Ex0591 SIREN - CAGNIARD

Made by Yeates & Son, Dublin.

H 205; CyD 75, H 34. Mid to late 19 C. G.

Brass; input pipe to cylinder; on this, revolving disc with 25 oblique holes; endless screw to scale plate.

The watch hands are missing which would have read the scales 0-90 and 0-20 on the silver plate, which is supported by two turned pillars from the cylinder.

Sold to London dealer by North Monastery School, Cork.

Ex0605 SOUND TUBE

YEATES & SON OPTICIANS DUBLIN

HsL 302, Se 70x68 - 29x27. Mid to late 19 C. G.

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Boxwood cone with square section, having a circular input boss below and an open top.
The tube fits into the top of the reed organ pipe, Ex0604, and would amplify the sound from it. Sold to London dealer by North Monastery School, Cork.

Ex0414 SPECTROSCOPE

(Supplied by Yeates & Sons[sic])

No measurements available. c1876. R.

"Spectroscope, with compound prism and angular scale".

No.851 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0412 SPECTROSCOPE

(Made by Yeates Dublin, supplied by Prof.J.P.O'Reilly)

No measurements available. c1876. R.

"Spectroscope made by Yeates, of Dublin, fitted with a diaphragm instead of cross threads for measurement of position of lines. The diaphragm, above, being perfectly opaque, is always visible against even the faintest lines;

moreover, it dispenses with the introduction of an extraneous light which may by its brilliancy interfere with that of faint lines.

This spectroscope is specially adapted for the examination of fluorescent minerals, the prisms being of quartz."

No.849 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877 - from Prof. Jos. P. O'Reilly. Not found in Museum 8:1993.

Ex0413 SPECTROSCOPE - PROJECTION

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Spectroscope, with bi-sulphide of carbon prisms and lens, arranged for projection. The prisms and collimating lens are so proportioned that no light is lost by passing outside the prisms or otherwise."

No.850 in the Catalogue of the 1876 Loan Collection at South Kensington, 1877. Not found in Museum 8:1993.

Ex0102 SPECTROSCOPE - ULTRA VIOLET

W.N. HARTLEY 1879 MEAGHER MANUFACTURER 21 SOUTHAMPTON ROW HIGH HOLBORN London, W.C.

YEATES & SON Dublin

L c1570; TD c520. 1879. S.

Red-painted tripod foot; pillar to circular table; collimator, prism table, and camera parts; SM 1914-323.

The tripod foot has three level screws; a tapering pillar leads to the large circular table, which has no scale; on this is a small oxidised brass table making up most of a circle, with a brass divided edge and with mounts for two prisms - it is this table which is signed "YEATES & SON Dublin"; the slit is in a mahogany mount at the end of the long oxidised brass collimator; beyond the prisms is a tapering wood chamber with a rectangular cross-section leading to the (missing) camera for taking photographs of the spectra.

This is the quartz spectrograph used by Walter Noel Hartley (1846-1913) in the Royal College of Science in Dublin, to which he was appointed in 1879; Hartley was the first to establish that relationships exist between the wave lengths of the spectral lines of the elements and their positions in the periodic table.

An enormous spectroscope, also used by Hartley, is in the collection of St Patrick's College Maynooth (see Inventory 1039 MAY013).

See Burnett in Mollan 1990,38-39.

Ex0560 SURVEYING RULE

YEATES & SON LTD DUBLIN

L 457 (18"). Late 19 early 20 C. G.

"IRISH SURVEYING RULE....made of boxwood 18" long with slider and fittings of electrum (or plated brass). The rule is divided 0-36 and back to 72 acres, and is scaled 6 inches to the mile. The slider, which is fitted with a celluloid target, is engraved with twin verniers. The boxwood scales show faint traces of prior calibrations at 12 inches to the mile - apparently the maker had an order for a 6 in.\mile rule, and simply renumbered an existing rule in his inventory. An interesting Irish item, in fine condition." - Tesseract 39, Winter 1992/3, No.40, \$350; illustrated.

Ex0418 TELESCOPE MOUNT

(Supplied by Yeates & Sons [sic])

No measurements available. c1876. R.

"Equatorial, small, capable of carrying a telescope of 3 to 3½ inch aperture with perfect steadiness."

No.1788 in the Catalogue of the 1876 Loan Collection at South Kensington.

Not found in Museum 8:1993.

Ex0408 THEODOLITE - TRANSIT

(Yeates & Son, Grafton St, Dublin)

No measurements available. Late 19 C. PC.

"A YEATES & SON BRASS TRANSIT THEODOLITE, the sighting telescope focusing by rack-and-pinion, surmounted by magnetic compass, wheel of degrees at side, above horizontal circle of degrees, inscribed 'Yeates & Son, Grafton St, Dublin', verniers and magnifiers, three spirit levels, on staff-head mount with four levelling screws, Irish, late 19th century." - SothebyBE 18:9:87, Lot 100, £2-300.

Ex0406 THEODOLITE - TRANSIT

(Yeates & Son, Grafton Street, Dublin)

CW 200. Early 20 C. PC.

"A YEATES & SON THEODOLITE, with compass inscribed 'Yeates & Son, Grafton Street, Dublin', and with azimuth alignment, on adjustable feet and with removable dial illuminator, in fitted mahogany case, 8in; 20cm wide, Irish, 20th century." - illustrated - SothebyBE 10:7:74, Lot 17 - tribach base; magnifiers for both circles; spirit level(s) beside compass; trunnions to axis of vertical circle and telescope; spirit level below tube; rack and pinion focus of telescope.

Ex0600 THERMOPILE

Made by Yeates & Son Dublin

B 107x107x10; H 200; FnMxD 64. Mid to late 19 C. G.

Brass; shaped base with concave sides; pillar to thermopile at right-angles with single conical funnel.

Covered copper wires extend from two ivory rings (D6) at the sides of the pile housing, and these were probably originally connected to the two screw electric contacts on the base.

Sold to London dealer by North Monastery School, Cork.

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Ex0100 THERMOPILE

YEATES & SON DUBLIN

BD 63; H 197; FmMxD 70; C 250x173x92.

Mid to late 19 C. G.

Brass base and pillar to ebonite-mounted couple, with two brass caps and a conical funnel; case; SM 1981-43.

In the mahogany case is an ebonite base (D125) signed "Ridout's Patent John Browning, London" which has three brass contacts; a small moving-magnet galvanometer, with scale 45-0-45 sits in a central shallow cylinder on the base; it has a housing of ebonite with a glass top.

On loan from the Wellcome Trust, registered papers 1001/11/27; location S/G64/15.

Ex0099 TITRATION APPARATUS

(Yeates & Son, Dublin)

No measurements available. Late 19 C. PC.

Portable apparatus in case; purchased from Peter Delehar; SM 1977-650; registered papers 5085/5/1.

Information from Alan Morton and SM computer.

Ex0607 TUNING FORK - ELECTROMAGNETIC

Yeates & Son Dublin

B 805x150x47; H 206; FkL 739. Mid to late 19 C. G.

Mahogany base; horizontal iron fork with electro-magnetic coil (D64) between the ends of the prongs.

The coil is mounted on a plate (100x60) on top of two turned brass pillars; a brass spring on the base contacts an adjustable pin on the lower prong when the fork vibrates; there are two brass screw electric contacts on the base.

The Yeates & Son catalogue (Yeates 1877,53) calls this an "Electro-Magnetic Tuning Fork, for illustrating vibratory motion of strings...£4 4 0".

Sold to London dealer by North Monastery School, Cork.

Ex0602 TUNING FORK ON RESONANCE BOX

K [i.e. Rudolph Koenig] YEATES & SON OPTICIANS DUBLIN

Bx 308x115x64; H 270. 1858-1901. F.

Boxwood box with one end open, and mahogany veneer on three sides; metal fork "UT3" on turned wood boss on top.

The box has a boxwood top, and the mahogany veneer on the sides shows the dove tail joints - thus the sides were presumably made with veneered boxwood, rather than having the veneer added after making the box, as in Ex0601; there appears to be no Koenig stamp on the box in this case, but the fork has the Koenig "K" monogram, and is also stamped "512V".

Another box of the same dimensions and Yeates & Son signature stamp is also stamped "C3" and has a turned mahogany boss for its missing fork.

Sold to London dealer by North Monastery School, Cork.

Koenig dates from Payen 1986,160.

Ex0601 TUNING FORK ON RESONANCE BOX

RUDOLPH KOENIG A PARIS YEATES & SON OPTICIANS DUBLIN

Bx 310x118x66; H 287. 1858-1901. F.

Boxwood box with one end open, and mahogany veneer on four sides; metal fork "UT3" on turned wood boss on top.

The veneer has some chipping, but covers the top and the edge joints of the box underneath; the Yeates & Son stamp is rather indistinct, and is mixed up with the Koenig stamp on the box; the box and fork are both stamped "UT3", with the fork also having the Koenig "K" monogram, and "512 V".

Sold to London dealer by North Monastery School, Cork.

Koenig dates from Payen 1986,160.

Ex0592 VIBRATING ROD FOR LISSAJOUS FIGURES

Yeates & Son Dublin

BD 128; MnH 345; TH 142. Mid to late 19 C. G.

Cast iron fluted base; support rises to small brass table with screw clamp, which holds vibrating rod; this is in the form of two pointers fused at right-angles in the centre.

Sold to London dealer by North Monastery School, Cork.

Ex0614 WAVE DEMONSTRATION APPARATUS

[On instrument] G. Wheatstone Invr... [On wave forms] YEATES & SON DUBLIN

B 710x200x35&24; H 150; Hs 378x108x82.

Mid to late 19 C. G.

Mahogany two-step base; oxidised brass housing for three sets of wire and white glass bead waves; 12 wave forms.

The three sets of 81 wire and bead indicators are on the top and at the sides of the housing; a pair of parallel mahogany bars, bound at their ends with oxidised brass, push mahogany wave forms into the housing making moving waves on the indicators; there are five pairs of wave forms, plus two more matching, but with the waves displaced one from the other; in a blackened boxwood case with a handle.

Sold to London dealer by North Monastery School, Cork; - the purchaser (a private collector) is known.

Ex0568 WIND SPEED INDICATOR(?)

Yeates & Son Dublin

W c233; H c225. Mid to late 19 C. G.

Stepped mahogany base; four turned pillars; glass top; brass dial 0-190; mechanism hidden; MHSO (no number).

The vertical ring dial is housed between the base and the glass top, and has a five-spoke ring inside the dial and an arrow hand to read it.

Identified as a "Galvanometer (for demonstration purposes)" by MHSO, this instrument is here listed as a wind speed indicator because of its great resemblance to other weather registering devices, involving electro-magnetic coils, made by Yeates and Son (See Weather Station 1068 MAY044, Rain Gauge 1579 NMD068).

Information from Tony Simcock.

Ex0616 MANOMETERS

[Unsigned] THE GERALD GRIFFIN TECHNICAL SCHOOL OUR LADY'S MOUNT CORK

Wm COOCH 1915 Wm O'Sullivan 1915

B 177x106x25; H 465; TusD 7. 1916. S.

Two; wood base and support for two vertical glass tubes.

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The tubes are bent through 90° on top; behind each is a paper on wood sliding scale; one is in inches from 2-15, and has the hand-written name Wm COOCH 1915, the other is in centimetres from 6-37, and has the name Wm O'Sullivan 1915; the Gerald Griffin legend is on a school stamp used three times on the base and support.
Sold to London dealer by North Monastery School, Cork.

IRISH NATIONAL INVENTORY OF HISTORIC SCIENTIFIC INSTRUMENTS

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AIR PUMP Unsigned 0476 RDS096
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BAROMETER - BANJO Buckley, J. 0331 Ex0331
BAROMETER - BANJO Cappel, J. 1424 SAL002
BAROMETER - BANJO Casartelli, A. 0017 Ex0017
BAROMETER - BANJO Cetti & Gatty 0336 Ex0336
BAROMETER - BANJO Cochrane, H. 2618 PRI052
BAROMETER - BANJO Fagioli, D. & Son 2619 PRI053
BAROMETER - BANJO Gardner & Dowling 0342 Ex0342
BAROMETER - BANJO Gatty, D. 2617 PRI051
BAROMETER - BANJO Gerletti, C. 4016 SAL073
BAROMETER - BANJO Giacomelli, G. 4104 UFM021
BAROMETER - BANJO Gilbert 0268 Ex0268
BAROMETER - BANJO Gilbert, W. 4164 NMD137
BAROMETER - BANJO Grassi, S. 4447 SAL085
BAROMETER - BANJO Hunt 3303 UCP303
BAROMETER - BANJO Hunt, T. 0020 Ex0020
BAROMETER - BANJO Intross, A. & Co. 2468 SAL029
BAROMETER - BANJO Malacrida 2492 SAL041
BAROMETER - BANJO Malacrida & Co. 0133 Ex0133
BAROMETER - BANJO Malacrida, C. & Co. 0021 Ex0021
BAROMETER - BANJO Mason, S. 633 Ex0633
BAROMETER - BANJO Milesio, D. 0023 Ex0023
BAROMETER - BANJO Milesio, D. 0307 Ex0307
BAROMETER - BANJO Milesio, D. 0024 Ex0024
BAROMETER - BANJO Milesio, D. 0716 NMD015
BAROMETER - BANJO Neill, J. & Co. 3400 PRI085
BAROMETER - BANJO Neill & Sons 0026 Ex0026
BAROMETER - BANJO Neill & Sons 1394 PRI023
BAROMETER - BANJO Nosedà, J. 0289 Ex0289
BAROMETER - BANJO Porri 4013 SAL070
BAROMETER - BANJO Porri, F. 0028 Ex0028
BAROMETER - BANJO Porri, F. 0392 Ex0392
BAROMETER - BANJO Porri, F. 2605 PRI039
BAROMETER - BANJO Porri, F. 3528 PRI088
BAROMETER - BANJO Prince, A. 2616 PRI050
BAROMETER - BANJO Rhodes, M. 4017 SAL074
BAROMETER - BANJO Ribaldi, J. 0131 Ex0131
BAROMETER - BANJO Ribaldi, J. 0130 Ex0130
BAROMETER - BANJO Ribaldi, L. 0394 Ex0394
BAROMETER - BANJO Saunders, T. 0029 Ex0029
BAROMETER - BANJO Spear 2615 PRI049
BAROMETER - BANJO Spear & Co. 0030 Ex0030
BAROMETER - BANJO Tedeo 2632 PRI067
BAROMETER - BANJO Tedeo 4027 MIS046
BAROMETER - BANJO Yeates 1862 MIS029
BAROMETER - BANJO Yeates 0014 Ex0014
BAROMETER - BANJO Yeates & Son 0015 Ex0015

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BAROMETER - BANJO Yeates & Son 1418 MIS007
BAROMETER - BANJO Unsigned 1795 MAY278
BAROMETER - DEMONSTRATION BANJO Unsigned 3601 NMC097
BAROMETER - FITZROY Baird & Tatlock 2631 PRI066
BAROMETER - FITZROY Chancellor, J. 4386 SAL088
BAROMETER - FITZROY Littlewood & Co. 1863 MIS030
BAROMETER - FITZROY Mason 0118 Ex0118
BAROMETER - FITZROY Mason 0720 NMD017
BAROMETER - FITZROY Mason, T. 3670 PRI098
BAROMETER - FITZROY Robinson 3669 PRI097
BAROMETER - FITZROY Solomons, M.E. 0511 Ex0511
BAROMETER - FITZROY Solomons, M.E. 2630 PRI065
BAROMETER - FORTIN Adie 4509 MET008
BAROMETER - FORTIN Chadburn Brothers 4507 MET006
BAROMETER - FORTIN Chancellor & Son 0035 Ex0035
BAROMETER - FORTIN Dixon & Hempenstall 1213 TDP136
BAROMETER - FORTIN Griffin & Sons 0340 CWC071
BAROMETER - FORTIN Hicks, J. 2264 UDP342
BAROMETER - FORTIN Maiben, J.M. & Co. 4473 STL001
BAROMETER - FORTIN Robinson, J. & Sons 0560 IDG003
BAROMETER - FORTIN Yeates & Son 0472 RDS031
BAROMETER - FORTIN Yeates & Son 1786 MAY269
BAROMETER - FORTIN Yeates & Son 2263 UDP341
BAROMETER - MARINE Adie 4508 MET007
BAROMETER - MARINE Adie, P. 1849 DUN031
BAROMETER - MARINE Bennett, T. 0034 Ex0034
BAROMETER - MARINE Casella, L. 1864 MIS031
BAROMETER - MARINE Hunt, T. 0019 Ex0019
BAROMETER - MARINE Jones 0036 Ex0036
BAROMETER - MARINE Jones 0127 Ex0127
BAROMETER - MARINE Mason, S. 0561 IDG001
BAROMETER - MARINE Negretti & Zambra 4097 UFM014
BAROMETER - MARINE Neill 0383 Ex0383
BAROMETER - MARINE Neill Brothers 0033 Ex0033
BAROMETER - MARINE Nelson 0027 Ex0027
BAROMETER - MARINE Unsigned 2335 SAL018
BAROMETER - PORTABLE Neill Brothers 0388 Ex0388
BAROMETER - PORTABLE Newman, J. 2696 TDP240
BAROMETER - PORTABLE Unsigned 2570 PRI205
BAROMETER - PORTABLE Unsigned 2831 UCP284
BAROMETER - STICK Alment, J. 3742 MIS058
BAROMETER - STICK Bennett 2484 SAL033
BAROMETER - STICK Bennett, T. 0125 Ex0125
BAROMETER - STICK Buckley, J. 0723 NMD020
BAROMETER - STICK Buckley, J. 4486 PRI283
BAROMETER - STICK Carpenter 3854 MIS060
BAROMETER - STICK Chancellor & Son 3944 SAL061
BAROMETER - STICK Cohen, S.P. 2467 SAL028
BAROMETER - STICK Collins, R. 4101 UFM018
BAROMETER - STICK Dixey, C.W. 4023 SAL075
BAROMETER - STICK Gatty, J. 0269 Ex0269
BAROMETER - STICK Gatty, J. 2637 SAL043
BAROMETER - STICK Giocomelli, G. 0128 Ex0128
BAROMETER - STICK Gray 0344 Ex0344
BAROMETER - STICK Hicks, J. 0833 UDP099
BAROMETER - STICK Hicks, J. 4505 MET004
BAROMETER - STICK Hunt 0018 Ex0018
BAROMETER - STICK Hunt 2571 PRI206
BAROMETER - STICK Hunt 4166 SAL083
BAROMETER - STICK Lee 3946 SAL063
BAROMETER - STICK Lizars 0361 Ex0361
BAROMETER - STICK Long, J. 3855 MIS061
BAROMETER - STICK Lynch 2604 PRI037
BAROMETER - STICK McDonagh, J. 4025 NMD133
BAROMETER - STICK Margas, J. 1542 STR001
BAROMETER - STICK Mason 0507 Ex0507
BAROMETER - STICK Mason 0721 NMD018
BAROMETER - STICK Mason 0722 NMD019
BAROMETER - STICK Mason 2575 PRI210
BAROMETER - STICK Mason 4448 SAL086
BAROMETER - STICK Mason, J. 0463 Ex0463
BAROMETER - STICK Mason, S. & T. 0022 Ex0022
BAROMETER - STICK Mason & Co. 0357 MIS005
BAROMETER - STICK Milessio, D. 0025 Ex0025
BAROMETER - STICK Moore, F.M. 3945 SAL062
BAROMETER - STICK Negretti & Zambra 2015 BLA004
BAROMETER - STICK Negretti & Zambra 2336 SAL019
BAROMETER - STICK Negretti & Zambra 2529 UGP235
BAROMETER - STICK Newman, J. 3967 ARM041
BAROMETER - STICK Polti, J.L. 4102 UFM019
BAROMETER - STICK Ribaldi, J. 0132 Ex0132
BAROMETER - STICK Rider 0395 Ex0395
BAROMETER - STICK Roncheti, B. 2614 PRI048
BAROMETER - STICK Simonton, J. 0506 Ex0506
BAROMETER - STICK Spear 4168 PRI191

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BAROMETER - STICK Spear, R. 0031 Ex0031
 BAROMETER - STICK Spear, R. 0123 Ex0123
 BAROMETER - STICK Spear, R. 0462 Ex0462
 BAROMETER - STICK Spear, R. 1565 MIS021
 BAROMETER - STICK Spear, R. 4156 MIS062
 BAROMETER - STICK Spear, R. 4157 NMD134
 BAROMETER - STICK Spears & Co. 0144 Ex0144
 BAROMETER - STICK Spears & Co. 1858 MIS025
 BAROMETER - STICK Speer & Co. [sic] 0143 Ex0143
 BAROMETER - STICK Spencer & Son 0032 Ex0032
 BAROMETER - STICK Spencer & Son 0913 NMD024
 BAROMETER - STICK Spencer & Son 1127 PRI015
 BAROMETER - STICK Spencer & Son 2666 PRI074
 BAROMETER - STICK Tickell 0042 Ex0042
 BAROMETER - STICK Troughton 4103 UFM020
 BAROMETER - STICK Troughton & Simms 1859 MIS026
 BAROMETER - STICK Wallace, R. 1051 MAY027
 BAROMETER - STICK Watson & Son 3619 NMC115
 BAROMETER - STICK Yeates 0012 Ex0012
 BAROMETER - STICK Yeates 0013 Ex0013
 BAROMETER - STICK Yeates, G. 4445 MIS009
 BAROMETER - STICK Yeates, S. 0010 Ex0010
 BAROMETER - STICK Yeates, S. 1437 PRI017
 BAROMETER - STICK Yeates & Son 1417 MIS008
 BAROMETER - STICK Yeates & Son 1985 MIS033
 BAROMETER - STICK Yeates & Son 2362 BIR048
 BAROMETER - STICK Yeates & Son 2607 PRI041
 BAROMETER - STICK Unsigned 2608 PRI042
 BAROMETER - STICK Unsigned 2748 TDP292
 BAROMETER - STICK Unsigned 3352 UCP352
 BAROMETER - STICK Unsigned 3856 MIS043
 BAROMETER - STICK Unsigned 4024 SAL076
 BASE Robinson, J. & Sons 2681 TDP225
 BASE Watkins & Hill 3331 UCP331
 BASE Yeates & Son 3199 QBP144
 BASE WITH DIVIDED CIRCLE Unsigned 4150 TDP316
 BASE LINE MEASURES Grubb, H. 046 Ex0046
 BASIN Unsigned 1998 RDS135
 BASIN WITH GUTTERED BEEHIVE TOP Unsigned 4340 TDC031
 BATTERY Unsigned 1773 MAY256
 BATTERY Unsigned 2944 UGP352
 BATTERY - BICHROMATE Yeates & Son 1794 MAY277
 BATTERY - BICHROMATE Yeates & Son 2671 TDP215
 BATTERY - BICHROMATE Unsigned 2943 UGP351
 BATTERY - BICHROMATE Unsigned 3543 NMC039
 BATTERY - BICHROMATE Unsigned 3543 NMD146
 BATTERY - BUNSEN Unsigned 1774 MAY257
 BATTERY - DANIELL Callan, N. 1772 MAY255
 BATTERY - DRY PILE, ZAMBONI Yeates 1168 TDP147
 BATTERY - DRY PILE, ZAMBONI Yeates & Son 0090 UCP037
 BATTERY - DRY PILE, ZAMBONI Yeates & Son 0262 QBP057
 BATTERY - DRY PILE, ZAMBONI Yeates & Son 1587 MAY076
 BATTERY - EDISON-LELANDE Unsigned 0033 UCP064
 BATTERY - FLOATING[?] Unsigned 3544 NMC040
 BATTERY - GROVE Wedgwood 1793 MAY276
 BATTERY - LECLANCHÉ Handley & Shanks 3780 Ex0609
 BATTERY - LECLANCHÉ India-Rubber Co. 2421 BIR096
 BATTERY - LECLANCHÉ India-Rubber Co. 3780 NMC181
 BATTERY - LECLANCHÉ India-Rubber Co. 3797 NMC198
 BATTERY - LECLANCHÉ Litton 1251 TDP131
 BATTERY - LECLANCHÉ R A L & Co 1775 MAY258
 BATTERY - LECLANCHÉ R A L & Co 2420 BIR095
 BATTERY - LECLANCHÉ Yeates & Son 2279 PRI165
 BATTERY - LECLANCHÉ Yeates & Son 2422 BIR101
 BATTERY - LECLANCHÉ Unsigned 1560 STR019
 BATTERY - MAYNOOTH Callan, N. 1663 MAY150
 BATTERY - MAYNOOTH Callan, N. 4056 MAY319
 BATTERY - MAYNOOTH Clarke, E.M. 1664 MAY151
 BATTERY - SMEE(?) Griffin 2823 UCP276
 BATTERY - VOLTAIC PILE Unsigned 1725 MAY208
 BATTERY - VOLTAIC PILE Unsigned 2172 UDP258
 BATTERY - WOLLASTON Unsigned 1770 MAY253
 BATTERY - ZINC/CARBON Yeates & Son 1771 MAY254
 BATTERY - ZINC/CARBON[?] Unsigned 3642 NMC138
 BATTERY - ZINC/COPPER[?] Unsigned 3779 NMC180
 BATTERY CELL CYLINDERS Stiff, J. & Sons 3363 UCP363
 BEAM ENGINE Coates, V. & Co. 3152 UDE177
 BED OF HOOPS FOR THREE FOOT REFLECTOR Rosse, Earl of 0581 Ex0581
 BELL Yeates & Son 1735 MAY218
 BELL Unsigned 1909 UGP178
 BELL Unsigned 1910 UGP179
 BELL Unsigned 1912 UGP181
 BELL Unsigned 3809 NMC210
 BELL - GLASS Harvey & Peak 3209 QBP154
 BELL - ELECTRIC Elliott Brothers 0053 UGP025

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BELL - ELECTRIC Elliott Brothers 0179 UGP059
BELL - ELECTRIC Elliott Brothers 1498 UGP069
BELL - ELECTRIC GPO 3777 NMC178
BELL - ELECTRIC Miller & Woods 2533 UGP239
BELL - ELECTRIC Yeates & Son 0284 CWC067
BELL - ELECTRIC Yeates & Son 1684 MAY171
BELL - ELECTRIC Unsigned 1804 MAY287
BELL - ELECTRIC Unsigned 3438 BIR140
BELL - ELECTRIC, "THE GAMUT" Elliott Brothers 0173 UGP052
BELL - ELECTRIC, "THE GAMUT" Yeates & Son 1581 MAY070
BELLS - SET OF Townshend & Co. 3587 NMC083
BENDING ELASTICITY APPARATUS Kohl, M. 2955 UGP363
BILL & LETTER HEADS Unsigned 2633 PRI068
BILL & LETTER HEADS Unsigned 2636 PRI071
BINOCULARS Curtis Brothers 2342 SAL025
BIOT APPARATUS Griffin 0285 CWC024
BIOT APPARATUS Unsigned 1239 TDP113
BIOT APPARATUS Unsigned 3324 UCP324
BIOT APPARATUS Unsigned 3819 NMC220
BLOWPIPE Unsigned 0406 RDS105
BLUE GLASS FILTER Unsigned 2305 QBC034
BOILER - MARCET Harris, P. & Co. 3751 NMC152
BOILER - MARCET Yeates & Son 3624 Ex0608
BOILER - MARCET Yeates & Son 3624 NMC120
BOILING POINT APPARATUS Harris, P. & Co. 2506 UGP212
BOILING POINT APPARATUS Unsigned 0952 UDP220
BOW Baird & Tatlock 2189 UDP275
BOW Unsigned 0950 UDP032
BOW Unsigned 1289 TDP087
BOW Unsigned 1914 UGP183
BOW Unsigned 2772 UCP225
BOW Unsigned 3470 QBP196
BOW Unsigned 3803 NMC204
BREWSTER BANDS APPARATUS Duboscq, J. 2331 QBP097
BRIDGE Yeates & Son 0785 UDP052
BRIDGE - KOHLRAUSCH Pye, W.G. & Co. 4134 MAY338
BRIDGE - POGGENDORF Unsigned 2949 UGP357
BRIDGE - SLIDE WIRE Paul, R.W. 3090 UDE116
BRIDGE - WHEATSTONE Elliott Brothers 3077 UDE103
BRIDGE - WHEATSTONE Elliott Brothers 3554 NMC050
BRIDGE - WHEATSTONE Griffin 0885 UDP151
BRIDGE - WHEATSTONE Harvey & Peak 2885 UGP293
BRIDGE - WHEATSTONE Nalder Brothers & Co. 3059 UDE085
BRIDGE - WHEATSTONE Nalder Brothers & Co. 3725 UGP377
BRIDGE - WHEATSTONE Pye, W.G. & Co. 0223 QBP005
BRIDGE - WHEATSTONE Rabone, J. & Sons 2950 UGP358
BRIDGE - WHEATSTONE Tinsley, H. & Co. 3051 UDE077
BRIDGE - WHEATSTONE Unsigned 2791 UCP244
BUNG ROD Unsigned 0572 IDG078
BURETTE Unsigned 4326 TDC022
BURETTE - BINK Unsigned 4321 TDC017
BURETTE - MOHR Unsigned 4322 TDC018
BURNER Fletcher, Russell & Co. 2303 PRI177
BURNER Fletcher, Russell & Co. 2776 UCP229
BURNER Wharton, T. 2284 PRI170
BURNER Unsigned 2777 UCP230
BURNER Unsigned 1919 UGP188
BURNER Unsigned 2928 UGP336
BURNER - ACETYLENE Incanto 0409 RDS106
BURNER - BUNSEN Fletcher, T. 0408 RDS089
BURNER - BUNSEN Robinson & Sons 2741 TDP285
BURNER - BUNSEN Unsigned 4129 MAY333
BURNER - GAS Warrington et.al. 4128 MAY332
BURNER - GAS(?) Unsigned 3802 NMC203
BURNER - GOBLET Unsigned 3565 NMC061
BURNER - OIL Unsigned 1273 TDP188
BURNER - OXY HYDROGEN Clarke, E.M. 0407 RDS034
BURNER - SPIRIT Unsigned 1808 MAY291
BURNER - SPIRIT Unsigned 4423 PRI257
BURNING GLASS Parker, W. or S. 0410 RDS001
BUZZER Unsigned 1287 TDP101
BUZZER Unsigned 3593 NMC089
CALCULATOR Block Anderson 3240 QBE018
CALCULATOR Brunsviga 3962 ARM036
CALCULATOR De Colmar, T. 3236 QBE014
CALCULATOR Felt & Tarrant Co. 3239 QBE017
CALCULATOR Grimme, Natalis & Co. 1302 TDP209
CALCULATOR Halden, J. & Co. 0211 UGE022
CALCULATOR Hennessy 0355 Ex0355
CALCULATOR Wood, G. 3237 QBE015
CALCULATOR Unsigned 0377 RDS019
CALCULATOR - TEXTILE Fowler & Co. 3849 SAL057
CALENDAR - PERPETUAL Kempson & Kindon 1416 NMD065
CALENDAR - PERPETUAL Lort, J. 0624 Ex0624
CALENDAR - PERPETUAL Powell, J. 1415 NMD064

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CALLIPER - CROSS Dring & Fage 0574 IDG063
CALLIPER - CROSS Long, J. 0573 IDG074
CALLIPER - LONG Dring & Fage 0575 IDG052
CALLIPER - ROPEWORK Belfast Ropework Company 2960 NMD200
CALLIPER - VERNIER Grubb, H. 1144 TDP168
CALORIMETER(?) Unsigned 2224 UDP302
CALORIMETER Unsigned 2293 QBC028
CALORIMETER Unsigned 2294 QBC029
CALORIMETER Unsigned 2780 UCP233
CALORIMETER - FUEL, DARLING Gallencamp, A. & Co. 2688 TDP232
CALORIMETER - JOLY STEAM Joly, J. 1203 TDP150
CALORIMETER - JOLY STEAM Pye, W.G. & Co. 2866 UGP286
CALORIMETER - JOLY STEAM Pye, W.G. & Co. 3166 QBP111
CALORIMETER - THOMPSON FUEL Unsigned 0512 IDG060
CAMERA - BELLOWS Meagher 2727 TDP271
CAMERA - BELLOWS Middlemiss, W. 2725 TDP269
CAMERA - BELLOWS Watson, W. & Sons 2384 BIR060
CAMERA - BELLOWS Unsigned 0423 RDS063
CAMERA - BOX Watson, W. & Sons 2726 TDP270
CAMERA - CINEMATOGRAPHIC Williamson Co. 1158 TDP175
CAMERA - DETECTIVE Robinson, J. & Sons 0001 Ex0001
CAMERA - DETECTIVE Robinson, J. & Sons 0488 Ex0488
CAMERA - FALLING PLATE Cambridge Co. 2840 TDP301
CAMERA - FOLDING Lancaster, J. 2728 TDP272
CAMERA - FOLDING Ottewill 2349 BIR035
CAMERA - FOLDING Thornton Pickard 2707 TDP251
CAMERA - 'LUZO' Robinson, J. & Sons 0487 Ex0487
CAMERA - 'LUZO' Robinson, J. & Sons 2383 BIR059
CAMERA - 'LUZO' Robinson, J. & Sons 0486 Ex0486
CAMERA - NOVELTY Unsigned 3173 QBP118
CAMERA - PHOTOMICROGRAPHIC Leitz, E. 0422 RDS064
CAMERA - PHOTOMICROGRAPHIC Leitz, E. (Baker, C.) 3346 UCP346
CAMERA - STEREO Dallmeyer, J.H. 2348 BIR034
CAMERA - STEREO Knight 2347 BIR033
CAMERA - WET PLATE Robinson, J. 0292 Ex0292
CAMERA LUCIDA Chevallier 1688 MAY175
CAMERA LUCIDA Mason 1413 NMD062
CAMERA LUCIDA Unsigned 0483 RDS030
CAMERA LUCIDA Unsigned 0977 BIR018
CAMERA LUCIDA Unsigned 1689 MAY176
CAMERA LUCIDA Unsigned 2628 PRI063
CAMERA LUCIDA MICROSCOPE EYEPIECE Unsigned 4066 BIR157
CAMERA OBSCURA Unsigned 0164 UGP043
CANDLE HOLDER Unsigned 0890 UCP142
CANNON SCRIBE OR GUNNER'S PERPENDICULAR Lynch, J. 0465 Ex0465
CAPILLARY PLATES Unsigned 2929 UGP337
CAPILLARY TUBES Unsigned 1872 UGP141
CARBON ARC RODS Champion, C.H. & Co. 2752 TDP296
CARBON ARC RODS Unsigned 2650 RDS147
CARBON DIOXIDE APPARATUS - ROHRBECK Unsigned 4353 TDC044
CARBON DIOXIDE APPARATUS - ROSE Unsigned 4352 TDC043
CARTESIAN DIVER Unsigned 2897 UGP305
CATHETOMETER Griffin 0740 UCP100
CATHETOMETER Spencer & Son 0675 UDP003
CATHETOMETER Yeates & Son 1810 MAY293
CATHETOMETER Yeates & Son 4049 MAY312
CATHETOMETER Unsigned 3354 UCP354
CATHETOMETER Unsigned 3720 UGP372
CENTRE OF GRAVITY TOWER Unsigned 3452 QBP178
CENTRIFUGE Piccolo 4072 BIR163
CENTRIFUGE - GERBER Lister, H.A. & Co. 0136 RDS079
CERAMIC WARE Unsigned 2413 BIR089
CHEMICAL FLASK - GAS CONTAINER Unsigned 2900 GP308
CHEMICAL FLASK Unsigned 4325 TDC021
CHEMICAL FLASK Unsigned 4338 TDC029
CHEMICAL FLASK WITH SWAN NECK Unsigned 4348 TDC039
CHEMICAL FLASKS Unsigned 3744 NMC145
CHEMICAL FLASKS Unsigned 3744 NMD167
CHEMICAL FLASKS - CONTAINERS FOR CHEMICALS Murphy J.J. & Co. 4181 NMC251
CHEMICAL FLASKS - CONTAINERS FOR CHEMICALS Murphy J.J. & Co. 4181 PRI233
CHEMICAL FLASKS - CYLINDER SHAPED Unsigned 4179 NMC249
CHEMICAL FLASKS - CYLINDER SHAPED Unsigned 4179 NMD140
CHEMICAL FLASKS - GAS COLLECTING JARS Unsigned 4180 NMC250
CHEMICAL FLASKS - GAS COLLECTING JARS Unsigned 4180 NMD139
CHEMICAL FLASKS - PRECIPITATING AND OTHER CYLINDERS Unsigned 4308 TDC004
CHEMICAL FLASKS - ROUND BOTTOMED Unsigned 3645 NMC141
CHEMICAL FLASKS - ROUND BOTTOMED Unsigned 3645 NMD169
CHEMICAL FLASKS - ROUND BOTTOMED Unsigned 4309 TDC005
CHEMICAL FLASKS - TEST TUBES Unsigned 3766 NMC167
CHEMICAL FLASKS - TEST TUBES Unsigned 3766 NMD159
CHEMICAL GLASSWARE Hicks 1552 STR011
CHEMICAL GLASSWARE Unsigned 1033 QBC014
CHEMICAL GLASSWARE Unsigned 1975 UCP202
CHEMICAL GLASSWARE Unsigned 2412 BIR088
CHEMICAL GLASSWARE Unsigned 3771 NMC172

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CHEMICAL GLASSWARE Unsigned 3771 NMD156
CHEMICAL GLASSWARE - ADAPTORS Unsigned 4312 TDC008
CHEMICAL RETORTS Pyrex 4178 NMC248
CHEMICAL RETORTS Pyrex 4178 NMD141
CHEMICAL RETORTS Unsigned 2931 UGP339
CHEMICAL RETORTS Unsigned 3643 NMC139
CHEMICAL RETORTS Unsigned 3643 NMD171
CHEMICAL RETORTS Unsigned 4306 TDC002
CHEMICAL RETORT FILLING FUNNEL Unsigned 4307 TDC003
CHEMICALS Unsigned 1549 STR008
CHEMICALS Unsigned 2411 BIR087
CHEMICALS - SET Yeates & Son 2691 TDP235
CHEMICALS - SET Unsigned 2280 PRI166
CHEMICALS - SET Unsigned 4172 NMC242
CHEMICALS - SET Unsigned 4172 NMD145
CHEMICAL TEST PLATES Silex 4176 NMC246
CHEMICAL TEST PLATES Silex 4176 NMD143
CHESHIRE DISC Griffin, J.J. & Sons 0826 UDP092
CHLADNI PLATE Baird & Tatlock 0943 UDP211
CHLADNI PLATE Yeates & Son 1922 UGP191
CHLADNI PLATE Yeates & Son 3213 QBP158
CHLADNI PLATE Unsigned 0942 UDP210
CHLADNI PLATE Unsigned 1282 TDP084
CHLADNI PLATE Unsigned 1923 UGP192
CHLADNI PLATE Unsigned 2064 BLA046
CHLADNI PLATE Unsigned 2089 BLA077
CHLADNI PLATE Unsigned 2770 UCP223
CHLADNI PLATE Unsigned 3540 NMC036
CHLADNI PLATE Unsigned 3629 NMC125
CHLADNI PLATE Unsigned 3630 NMC126
CHLADNI PLATE CLAMP(?) Unsigned 2177 UDP263
CHLADNI PLATE CLAMP Unsigned 2762 UCP215
CHONDROMETER De Grave, Short, & Fanner 2469 SAL030
CHONDROMETER Spear, R. 0708 NMD007
CHROMOTROPE Unsigned 2815 UCP268
CHRONOGRAPH Grubb, H. 1465 UCP154
CHRONOGRAPH Grubb, H. 1823 DUN005
CHRONOGRAPH Grubb, H. 0237 Ex0237
CHRONOGRAPH Grubb, H. 0238 Ex0238
CHRONOMETER Gardner & Co. 0343 Ex0343
CHRONOGRAPH Knoblich, T. 3707 ARM020
CHRONOMETER - MARINE Barraud 0118 QBP009
CHRONOMETER - MARINE Brockbank & Atkins 3267 NMM007
CHRONOMETER - MARINE Crisp, W.B. (Moore, F.M.) ARM018
CHRONOMETER - MARINE Dent 1839 DUN021
CHRONOMETER - MARINE Glashütte 2340 SAL023
CHRONOMETER - MARINE Hornby, R. 0616 NMD272
CHRONOMETER - MARINE Litherland Davies & Co. 4502 MET001
CHRONOMETER - MARINE McMaster & Son 1313 TDP199
CHRONOSCOPE - HIPPI Zimmermann, E. 0919 UDP184
CINEMATOGRAPH MECHANISM Wray Coussell 2660 RDS158
CINEMATOGRAPH MECHANISM Unsigned 0484 RDS054
CINEMATOGRAPH PROJECTOR Watson, W. & Sons 0485 RDS053
CINEMATOGRAPH SPOOL WINDER Unsigned 2659 RDS157
CIRCUMFERENTOR Adie & Son 0192 UGE003
CIRCUMFERENTOR Alment 3651 NMD116
CIRCUMFERENTOR Barry 0213 Ex0213
CIRCUMFERENTOR Buckley 0715 NMD014
CIRCUMFERENTOR Cave 0116 Ex0116
CIRCUMFERENTOR Cave 2626 PRI060
CIRCUMFERENTOR Cave, T. 0052 Ex0052
CIRCUMFERENTOR Cave, T. 0264 Ex0264
CIRCUMFERENTOR Cave, T. 0912 NMD023
CIRCUMFERENTOR Cave, T. 1115 NMD314
CIRCUMFERENTOR Davis, W. 0271 Ex0271
CIRCUMFERENTOR Davis, W. Ex0622
CIRCUMFERENTOR Lewis, J. 0727 MAY002
CIRCUMFERENTOR Lewis, J. 0112 Ex0112
CIRCUMFERENTOR Lynch 0272 Ex0272
CIRCUMFERENTOR Lynch 0216 Ex0216
CIRCUMFERENTOR Lynch 0274 Ex0274
CIRCUMFERENTOR Lynch, J. 0273 Ex0273
CIRCUMFERENTOR Mason 0714 NMD013
CIRCUMFERENTOR Mason 0275 Ex0275
CIRCUMFERENTOR Mason 0276 Ex0276
CIRCUMFERENTOR Mason 0277 Ex0277
CIRCUMFERENTOR Mason, S. 0064 Ex0064
CIRCUMFERENTOR Mason, S. 0638 Ex0638
CIRCUMFERENTOR Mason, S. 0729 MAY004
CIRCUMFERENTOR Mason, T. & J. 1091 TDE012
CIRCUMFERENTOR Mason, T. & J. 0066 Ex0066
CIRCUMFERENTOR Megarey, A. 2372 NMD077
CIRCUMFERENTOR R, W. 0108 Ex0108
CIRCUMFERENTOR Seward 0218 Ex0218
CIRCUMFERENTOR Seward 2371 NMD076

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CIRCUMFERENTOR Spear 0217 Ex0217
CIRCUMFERENTOR Spear 0280 Ex0280
CIRCUMFERENTOR Spear 0281 Ex0281
CIRCUMFERENTOR Spear 0640 NMD249
CIRCUMFERENTOR Spear 4191 DCM003
CIRCUMFERENTOR Speare[sic] 0221 Ex0221
CIRCUMFERENTOR Spear, R. 0219 Ex0219
CIRCUMFERENTOR Spear, R. 0282 Ex0282
CIRCUMFERENTOR Spear & Clarke 0730 MAY005
CIRCUMFERENTOR Spicer 0728 MAY003
CIRCUMFERENTOR Spicer 0007 Ex0007
CIRCUMFERENTOR Spicer 0214 Ex0214
CIRCUMFERENTOR Spicer 0215 Ex0215
CIRCUMFERENTOR Spicer 0517 Ex0517
CIRCUMFERENTOR Spicer, E. 0006 Ex0006
CIRCUMFERENTOR Stoak, G. 0114 Ex0114
CIRCUMFERENTOR Troughton & Simms 3864 UDE181
CIRCUMFERENTOR Walker 0208 Ex0208
CIRCUMFERENTOR Walker 0283 Ex0283
CIRCUMFERENTOR Walker 0492 Ex0492
CIRCUMFERENTOR Walker 2640 NMD112
CIRCUMFERENTOR Walker & Son 0284 Ex0284
CIRCUMFERENTOR Walker & Son 0285 Ex0285
CIRCUMFERENTOR Walker & Son 0483 Ex0483
CIRCUMFERENTOR Walker & Son 0639 Ex0639
CIRCUMFERENTOR Walker & Son 0713 NMD012
CIRCUMFERENTOR Walker & Son 0731 MAY006
CIRCUMFERENTOR Walker & Son 1399 NMD049
CIRCUMFERENTOR Walker & Son 2465 NMD115
CIRCUMFERENTOR Walker & Son 2638 NMD114
CIRCUMFERENTOR Walker & Son 2639 NMD113
CIRCUMFERENTOR White, J. 0641 NMD248
CIRCUMFERENTOR White, J. 0642 NMD247
CIRCUMFERENTOR/SURVEYING CIRCLE Cave 4029 PRI127
CLAMP FOR COMPRESSING GLASS Duboscq, J. 3490 QBP216
CLINOMETER Bennett, T. 0198 UGE009
CLINOMETER Casartelli, J. & Son 2579 TDE071
CLINOMETER Cooke, T. & Sons 1615 MAY104
CLINOMETER Hicks, J. (Grubb Patent) 1358 TDE032
CLINOMETER Hicks, J. 1614 MAY103
CLINOMETER Lynch & Son 0061 Ex0061
CLINOMETER Newton & Co. 0643 NMD246
CLINOMETER Spear 0297 Ex0297
CLINOMETER Watkins & Hill 0644 NMD245
CLINOMETER Yeates & Son 0039 Ex0039
CLINOMETER - ABNEY LEVEL Smith 3484 QBP210
CLINOMETER - ABNEY LEVEL Stanley 2585 PRI219
CLINOMETER & PRISMATIC COMPASS Hicks, J. 3268 NMM008
CLOCK - REGULATOR Arnold, J. 1821 DUN003
CLOCK - REGULATOR Arnold, J. & Son 1822 DUN004
CLOCK - REGULATOR Arnold & Dent 2363 BIR049
CLOCK - REGULATOR Booth, J. & Son 2834 MIS041
CLOCK - REGULATOR Booth, J. & Son 2846 TDP307
CLOCK - REGULATOR Buchanan, A. (Dutton) 3703 ARM016
CLOCK - REGULATOR Crosthwaite, J. 3704 ARM017
CLOCK - REGULATOR Dent, E. & Co. 1826 DUN008
CLOCK - REGULATOR Earnshaw 3691 ARM004
CLOCK - REGULATOR Earnshaw 3986 ARM060
CLOCK - REGULATOR Grubb, H. 0152 Ex0152
CLOCK - REGULATOR Grubb, H. 0023 UCP048
CLOCK - REGULATOR Gulbransen, P.F. 0515 Ex0515
CLOCK - REGULATOR Neill, R. 0240 QBP034
CLOCK - REGULATOR Recordon 3991 ARM065
CLOCK - REGULATOR Ritchie, J. & Son 2832 RDS161
CLOCK - REGULATOR Shearer, J. 2364 BIR050
CLOCK - REGULATOR Shelton, J. 3698 ARM011
CLOCK - REGULATOR Yeates & Son 0256 QBP050
CLOCK - REGULATOR Yeates & Son 0257 QBP051
CLOCK - STOP Pye 1884 UGP153
CLOCK - TIME SYSTEM Booth, J. & Son 2833 TDE072
CLOCK - TIME SYSTEM Unsigned 2835 RDS162
CLOCK - WATER DRIVEN "FREE" PENDULUM Earl of Meath 4449 PRI237
CLOCK/BAROMETER Donegan 0037 Ex0037
CLOCK/BAROGRAPH/THERMOMETER Yeates & Son 0519 Ex0519
CLOCK/BAROGRAPH/THERMOMETER Yeates & Son 4446 TDP322
CLOCK/BAROGRAPH/THERMOMETER Yeates 0475 Ex0475
CLOCK/BAROMETER/THERMOMETER Mackey, P. (Sharp) 4430 RCS053
CLOCK/BAROMETER/THERMOMETER Walsh, R. 3524 SAL047
CLOCK/COMPASS/THERMOMETER Gibson, W. & Co. 3526 SAL049
CLOCK ESCAPEMENT Unsigned 3555 NMC051
COELOSTAT Grubb, H. 0194 Ex0194
COELOSTAT Grubb, H. 0240 Ex0240
COELOSTAT Grubb, H. 1824 DUN006
COELOSTAT Ottway, W. & Co. 1830 DUN012
COHESION PLATES Unsigned 2936 UGP344

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COIL Gambrell Brothers 1269 TDP125
 COIL Gambrell Brothers 2253 UDP331
 COIL Yeates & Son 0271 QBP066
 COIL Yeates & Son 1507 UGP097
 COIL Yeates & Son 1515 UGP093
 COIL Yeates & Son 1574 MAY063
 COIL Yeates & Son 1629 MAY116
 COIL Yeates & Son 2097 BLA085
 COIL Yeates & Son 2322 QBP088
 COIL Yeates & Son 2669 TDP213
 COIL Yeates & Son 2774 UCP227
 COIL Unsigned 2183 UDP269
 COIL Unsigned 2184 UDP270
 COIL Unsigned 2186 UDP272
 COIL Unsigned 2262 UDP340
 COIL Unsigned 2537 UGP243
 COIL Unsigned 3135 UDE160
 COIL Unsigned 3349 UCP349
 COIL - DU BOIS REYMOND Becker, F.E. & Co. 0073 UCP087
 COIL - DU BOIS REYMOND Kershaw 2551 TDP210
 COIL - DU BOIS REYMOND Kershaw, A. 2555 TDP211
 COIL - DU BOIS REYMOND Sinclair, J. 1229 TDP138
 COIL - DU BOIS REYMOND Unsigned 2530 UGP236
 COIL - INDUCTION Callan, N. 1660 MAY147
 COIL - INDUCTION Callan, N. 1796 MAY279
 COIL - INDUCTION Callan, N. 1658 MAY145
 COIL - INDUCTION Callan, N. 1659 MAY146
 COIL - INDUCTION Callan, N. 1070 MAY046
 COIL - INDUCTION Callan, N. 0207 Ex0207
 COIL - INDUCTION Dean, A.E. 3365 UCP365
 COIL - INDUCTION Dean, A.E. 3366 UCP366
 COIL - INDUCTION Harvey & Peak 2494 UGP200
 COIL - INDUCTION Miller, L. 1535 UGP128
 COIL - INDUCTION Pye, W.G. & Co. 2536 UGP242
 COIL - INDUCTION Yeates, H. 1589 MAY078
 COIL - INDUCTION Yeates, H. 0405 Ex0405
 COIL - INDUCTION Yeates & Son 1590 MAY079
 COIL - INDUCTION Yeates & Son 1803 MAY286
 COIL - INDUCTION Unsigned 0938 UDP203
 COIL - INDUCTION Unsigned 1539 UGP131
 COIL - INDUCTION Unsigned 2161 UDP250
 COIL - INDUCTION Unsigned 2165 UDP251
 COIL - INDUCTION Unsigned 2185 UDP271
 COIL - INDUCTION Unsigned 2523 UGP229
 COIL - INDUCTION Unsigned 2821 UCP274
 COIL - INDUCTION Unsigned 3801 NMC202
 COIL - INDUCTION, MEDICAL Cox, H.W. & Co. 2158 UDP247
 COIL - INDUCTION, MEDICAL Fannin & Co. 4293 RCS043
 COIL - INDUCTION, MEDICAL McIntosh (Knight & Lowenburg) 4294 RCS044
 COIL - INDUCTION, MEDICAL Palmer, E. 0011 UCP024
 COIL - INDUCTION, MEDICAL Robinson, J. 0151 UGP014
 COIL - INDUCTION, MEDICAL Robinson, J. 0309 CWC033
 COIL - INDUCTION, MEDICAL Robinson, J. 1061 MAY037
 COIL - INDUCTION, MEDICAL Sherwood, H.H. 3805 NMC206
 COIL - INDUCTION, MEDICAL Siemens Brothers & Co. 2329 QBP095
 COIL - INDUCTION, MEDICAL Yeates (Mottershead & Co.) 0473 Ex0473
 COIL - INDUCTION, MEDICAL Young 2527 UGP233
 COIL - INDUCTION, MEDICAL Unsigned 0160 UGP039
 COIL - INDUCTION, MEDICAL Unsigned 1452 UCP124
 COIL - INDUCTION, MEDICAL Unsigned 1686 MAY173
 COIL - INDUCTION, MEDICAL Unsigned 3633 NMC129
 COIL - INDUCTION, RUHMKORFF AC 0393 RDS076
 COIL - INDUCTION, RUHMKORFF Apps 0394 RDS005
 COIL - INDUCTION, RUHMKORFF Apps 0781 UDP048
 COIL - INDUCTION, RUHMKORFF Apps 0835 UDP101
 COIL - INDUCTION, RUHMKORFF Apps 0836 UDP102
 COIL - INDUCTION, RUHMKORFF Apps 1310 TDP071
 COIL - INDUCTION, RUHMKORFF Apps 1968 UCP195
 COIL - INDUCTION, RUHMKORFF Apps 2712 TDP256
 COIL - INDUCTION, RUHMKORFF Apps 2750 TDP294
 COIL - INDUCTION, RUHMKORFF Cox-Cavendish Co. 3190 QBP135
 COIL - INDUCTION, RUHMKORFF Dixon & Hempenstall 2676 TDP220
 COIL - INDUCTION, RUHMKORFF Griffin 1969 UCP196
 COIL - INDUCTION, RUHMKORFF Griffin & Sons 2956 UGP364
 COIL - INDUCTION, RUHMKORFF Harvey & Peak 1534 UGP127
 COIL - INDUCTION, RUHMKORFF Newton & Co. 1008 QBC018
 COIL - INDUCTION, RUHMKORFF Newton & Wright 0780 UDP047
 COIL - INDUCTION, RUHMKORFF Robinson & Sons 0509 Ex0509
 COIL - INDUCTION, RUHMKORFF Ruhmkorff 1450 UCP130
 COIL - INDUCTION, RUHMKORFF Watson, W. & Sons 3834 NMC235
 COIL - INDUCTION, RUHMKORFF Yeates & Son 0103 UCP035
 COIL - INDUCTION, RUHMKORFF Yeates & Son 0307 CWC020
 COIL - INDUCTION, RUHMKORFF Yeates & Son 0793 UDP059
 COIL - INDUCTION, RUHMKORFF Yeates & Son 1593 MAY082
 COIL - INDUCTION, RUHMKORFF Yeates & Son 1811 MAY294

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COIL - INDUCTION, RUHMKORFF Unsigned 0308 CWC021
COIL - INDUCTION, RUHMKORFF Unsigned 1311 TDP070
COIL - INDUCTION, RUHMKORFF Unsigned 2711 TDP255
COIL - INDUCTION, RUHMKORFF Unsigned 3351 UCP351
COIL - INDUCTION, WEINHOLD Baird & Tatlock 2215 UDP293
COIL - INDUCTION, WEINHOLD Baird & Tatlock 2216 UDP294
COIL & MAGNETIC NEEDLE Becker, F.E. & Co. 3174 QBP119
COIL & MAGNETIC NEEDLE Unsigned 3175 QBP120
COIL WINDING APPARATUS Knight, A.W. 1685 MAY172
COLORIMETER Becker, F.E. 1015 PRI153
COLORIMETER Cogit 4310 TDC006
COLORIMETER Jobin, A. 0496 IDG067
COLORIMETER Leitz, E. 4475 STL003
COLORIMETER Lovibond 0502 IDG072
COLORIMETER Lovibond, J.W. 0500 IDG035
COLORIMETER Lovibond, J.W. 0501 IDG071
COLORIMETER Pellin, P. & F. 0497 IDG007
COLORIMETER Pellin, Ph & F. 2306 PRI179
COLOUR BOX Roberson, C. & Co. 4425 PRI259
COLOUR SPINNER Gorham, J. 3494 QBP220
COLOUR SPINNER Yeates & Son 2715 TDP259
COMMUNICATING VESSELS Elliott Brothers 0156 UGP035
COMMUNICATING VESSELS Unsigned 2243 UDP321
COMMUNICATING VESSELS Unsigned 2805 UCP258
COMMUTATOR Elliott Brothers 1897 UGP166
COMMUTATOR Secretan 2824 UCP277
COMMUTATOR Unsigned 0385 RDS115
COMMUTATOR Unsigned 0386 RDS086
COMMUTATOR Unsigned 1598 MAY087
COMMUTATOR - BERTIN Ducretet, E. & Cie 0766 UDP035
COMMUTATOR - BERTIN Ducretet, E. & Cie 0767 UDP207
COMMUTATOR - BERTIN Griffin 1680 MAY167
COMMUTATOR - RUHMKORFF Secretan 0083 UCP068
COMMUTATOR - RUHMKORFF Unsigned 0236 QBP030
COMMUTATOR - RUHMKORFF Unsigned 0926 UDP191
COMMUTATOR - RUHMKORFF Unsigned 1681 MAY168
COMMUTATOR - RUHMKORFF Unsigned 3329 UCP329
COMMUTATOR - RUHMKORFF Unsigned 3330 UCP330
COMPASS Blunt 1616 MAY105
COMPASS Brinsley, G. & R. 1620 MAY068
COMPASS Dixon & Hempenstall 3403 NMD111
COMPASS Eshelby, J. 0203 Ex0203
COMPASS GFR 1621 MAY109
COMPASS Jones, W. & S. 4138 SAL080
COMPASS Margas, J. 0382 Ex0382
COMPASS Margas, J. 0623 Ex0623
COMPASS Ronchetti, J. 2466 NMD211
COMPASS Wardale, J. & Co. 1619 MAY108
COMPASS Yeates & Son 0209 Ex0209
COMPASS Unsigned 1403 NMD053
COMPASS Unsigned 2283 PRI169
COMPASS Unsigned 3269 NMM009
COMPASS Unsigned 3652 PRI190
COMPASS Unsigned 3653 PRI090
COMPASS Unsigned 3916 ULS013
COMPASS - BEAM Yeates & Son 1374 TDE051
COMPASS - BEAM Unsigned 0202 UGE013
COMPASS - BEAM Unsigned 1845 DUN027
COMPASS - GEOMANTIC Unsigned 1411 NMD060
COMPASS - GEOMANTIC Unsigned 1412 NMD061
COMPASS - MARINE Buckley, J. 1161 TDP182
COMPASS - MARINE Chancellor & Son 1984 MIS032
COMPASS - MARINE Elliott Brothers 0170 UGP049
COMPASS - MARINE Gregory & Wright 2332 QBP098
COMPASS - MARINE Harvey & Peak 2801 UCP254
COMPASS - MARINE Holmes Lights Co. 3270 NMM010
COMPASS - MARINE Hunt, T. 0524 Ex0524
COMPASS - MARINE Mason 1037 MAY011
COMPASS - MARINE Murray, McVinnie & Co. 3281 NMM021
COMPASS - MARINE Pollock & Co. 3291 NMM031
COMPASS - MARINE Ramsay, J. 0567 Ex0567
COMPASS - MARINE Simpson Lawrence & Co 4121 UFM036
COMPASS - MARINE Unsigned 1463 UCP152
COMPASS - MARINE Unsigned 1617 MAY106
COMPASS - MARINE Unsigned 1639 MAY126
COMPASS - MARINE Unsigned 2107 BLA095
COMPASS - MARINE Unsigned 2961 NMD199
COMPASS - MARINE, IN BINNACLE Ashcroft, F. 3289 NMM029
COMPASS - MARINE, IN BINNACLE Neill, S.D. 0476 Ex0476
COMPASS - MARINE, IN BINNACLE Whyte, Thomson & Co. 3290 NMM030
COMPASS - PLANE TABLE Unsigned 1362 TDE034
COMPASS - PRISMATIC Barker & Son 2584 PRI218
COMPASS - PRISMATIC Brooks, J.B. & Co. 2665 PRI073
COMPASS - PRISMATIC Elliott Brothers 1613 MAY102
COMPASS - PRISMATIC Elliott Brothers 2583 PRI217

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COMPASS - PRISMATIC Hicks, J. 1612 MAY101
COMPASS - PRISMATIC Pollock & Co. 0391 Ex0391
COMPASS - PRISMATIC Savage & Son 1622 MAY110
COMPASS - PRISMATIC Troughton & Simms 0628 PRI130
COMPASS - PRISMATIC Yeates, A. 0480 Ex0480
COMPASS - SURVEYING Lynch 4162 NMD135
COMPASS - SIGHTING Bennett, T. 3832 NMC233
COMPASS - VARIATION Yeates & Son 1053 MAY029
COMPENDIUM Unsigned 0653 NMD237
COMPENDIUM FRAGMENT(?) Unsigned 3921 ULS018
COMPRESSED GLASS CUBE Duboscq Soleil 2546 UGP252
CONDENSER Apps 1644 MAY131
CONDENSER Callan, N. 1792 MAY275
CONDENSER King, Mendham & Co. 2271 UDP349
CONDENSER Still, W.M. & Co. 1561 STR020
CONDENSER - STANDARD Elliott Brothers 3037 UDE063
CONDENSER - STANDARD Griffin 3040 UDE066
CONDENSER - STANDARD Nalder Brothers & Co. 2935 UGP343
CONDENSER - STANDARD Paul, R.W. 3041 UDE067
CONDENSER - STANDARD Tinsley, H. & Co. 3039 UDE065
CONDENSER - VARIABLE Marconi Co. 2730 TDP274
CONDENSER - VARIABLE Marconi Co. 3038 UDE064
CONDENSER - VARIABLE Tinsley, H. & Co. 0891 UDP157
CONDENSER - VARIABLE Unsigned 4076 MAY325
CONDENSER - VARIABLE, AEPINUS Pye, W.G. 0232 QBP026
CONDENSER - VARIABLE, AEPINUS Spencer 1204 TDP120
CONDENSER - VARIABLE, AEPINUS Yeates & Son 1582 MAY071
CONDENSER - VARIABLE, AEPINUS Yeates & Son 1943 UCP170
CONDENSER - VARIABLE, AEPINUS Yeates & Son 3310 UCP310
CONDENSER - VARIABLE, AEPINUS Unsigned 2255 UDP333
CONDENSER WITH WHEEL OF APERTURES Ross, A. 4301 RCS051
CONDENSER BOX Dubilier Co. 3194 QBP139
CONDENSER BOX Elliott Brothers 2270 UDP348
CONDENSER BOX Elliott Brothers 2788 UCP241
CONDENSER BOX Elliott Brothers 3036 UDE062
CONDENSER BOX Pye, W.G. & Co. 2273 UDP351
CONDENSER BOX Tinsley, H. & Co (T. Mason) 2272 UDP350
CONDUCTOR Unsigned 1500 UGP071
CONDUCTOR Unsigned 2237 UDP315
CONDUCTOR - CYLINDRICAL Elliott Brothers 1502 UGP132
CONDUCTOR - CYLINDRICAL Elliott Brothers 2497 UGP203
CONDUCTOR - CYLINDRICAL Unsigned 1278 TDP108
CONDUCTOR - CYLINDRICAL Unsigned 1499 UGP070
CONDUCTOR - CYLINDRICAL Unsigned 1702 MAY189
CONDUCTOR - CYLINDRICAL Unsigned 2035 BLA024
CONDUCTOR - CYLINDRICAL Unsigned 2036 BLA025
CONDUCTOR - CYLINDRICAL Unsigned 3176 QBP121
CONDUCTOR - CYLINDRICAL Unsigned 3787 NMC188
CONDUCTOR - POINTED Unsigned 3177 QBP122
CONDUCTOR - SPHERICAL Yeates & Son 2192 UDP278
CONDUCTOR - SPHERICAL Unsigned 0901 UDP167
CONDUCTOR - SPHERICAL Unsigned 1271 TDP109
CONDUCTOR - SPHERICAL Unsigned 1272 TDP110
CONDUCTOR - SPHERICAL Unsigned 1501 UGP073
CONDUCTOR - SPHERICAL Unsigned 1701 MAY188
CONDUCTOR - SPHERICAL Unsigned 2034 BLA023
CONDUCTOR - SPHERICAL Unsigned 2825 UCP278
CONDUCTOR - SPHERICAL Unsigned 3156 QBP101
CONDUCTORS - CYLINDRICAL & SPHERICAL Unsigned 0286 CWC055
CONDUCTORS - CYLINDRICAL & SPHERICAL Unsigned 2502 UGP208
CONNECTING AND ISOLATING VESSELS Unsigned 4351 TDC042
CORK BORERS Unsigned 2403 BIR079
CORONAGRAPH Grubb, H. 0457 Ex0457
COUNTER Spencer & Son 3068 UDE094
COUNTER Unsigned 0503 IDG068
CRITICAL STATE APPARATUS Andrews, T. 1029 QBC001
CRITICAL STATE APPARATUS Cumine, J.A. 0305 Ex0305
CRITICAL STATE APPARATUS Yeates & Son 2673 TDP217
CROSS STAFF HEAD Unsigned 1095 TDE006
CROSS STAFF HEAD Unsigned 1855 PRI028
CROSS STAFF HEAD - FRENCH FORM Unsigned 4182 RDS163
CRUCIBLE F.W. & J. 0356 RDS056
CRUCIBLE WITH PIERCED BASE Unsigned 4177 NMC247
CRUCIBLE WITH PIERCED BASE Unsigned 4177 NMD142
CRYOPHORUS Unsigned 3467 QBP193
CRYOPHORUS - WOLLASTON Unsigned 1876 UGP145
CRYOPHORUS - WOLLASTON Unsigned 2105 BLA093
CRYOPHORUS - WOLLASTON Unsigned 3341 UCP341
CRYOPHORUS - WOLLASTON Unsigned 3465 QBP191
CRYSTAL - ICELAND SPAR Ladd, W. & Co. 0853 UDP119
CRYSTAL - ICELAND SPAR Yeates & Son 0819 UDP085
CRYSTAL - ICELAND SPAR Unsigned 0424 RDS044
CRYSTAL - ICELAND SPAR Unsigned 2142 UDP231
CUP OF TANTALUS Unsigned 1194 TDP185
CUP OF TANTALUS Unsigned 2081 BLA069

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CUP OF TANTALUS Unsigned 3379 NMC010
CUP OF TANTALUS Unsigned 3457 QBP183
DECLINATION/INCLINATION INSTRUMENT Unsigned 0031 UCP070
DEEP SEA WATER BOTTLE HOUSING(?) Unsigned 2663 RDS153
DENTAL INSTRUMENTS Read, T. & Co. 0512 Ex0512
DETONATING BOTTLE Unsigned 1703 MAY190
DIAL McClintock, R.L. 3671 PRI099
DIAL Unsigned 1626 MAY114
DIAL Unsigned 3853 MIS059
DIAL - ALTITUDE RING H, W. 0352 Ex0352
DIAL - ALTITUDE RING Hancock 4499 ULS067
DIAL - ALTITUDE RING Hancock 4498 ULS066
DIAL - ALTITUDE RING Proctor 4500 ULS068
DIAL - ALTITUDE RING Unsigned 0401 NMD031
DIAL - ANALEMMATIC Thompson, A. 0659 NMD231
DIAL - CYLINDER Robert, H. 0668 NMD222
DIAL - DIPTYCH Bloud, C. 3425 BIR127
DIAL - DIPTYCH Reinmann, P.[?] 0658 NMD232
DIAL - DIPTYCH Senecal, E. 4136 SAL078
DIAL - DIPTYCH Tucher, T. 3426 BIR128
DIAL - EQUATORIAL Knapp, J. 3686 NMD132
DIAL - HELIOCHRONOMETER Homan, W. 4450 PRI264
DIAL - HELIOCHRONOMETER Pilkington & Gibbs 3930 ULS027
DIAL - HELIOCHRONOMETER Pilkington & Gibbs (Pollock) 4488 CIL001
DIAL - HELIOCHRONOMETER Pilkington & Gibbs 4392 PRI252
DIAL - HORIZONTAL al-Amir Ridwan at-Tawil 4532 CBL009
DIAL - HORIZONTAL Donovan, M. 4249 MIS074
DIAL - HORIZONTAL Schebier 4525 CBL002
DIAL - HORIZONTAL Unsigned 4242 MIS069
DIAL - HORIZONTAL Unsigned 4243 MIS070
DIAL - HORIZONTAL AND ANALEMMATIC Stoaks, G. 0526 Ex0526
DIAL - HORIZONTAL BUTTERFIELD Butterfield 0725 NMD022
DIAL - HORIZONTAL BUTTERFIELD Butterfield 3423 BIR125
DIAL - HORIZONTAL BUTTERFIELD Butterfield 3424 BIR126
DIAL - HORIZONTAL COMPASS Baum, J. & Co. 2368 NMD073
DIAL - HORIZONTAL COMPASS Bennett 0049 Ex0049
DIAL - HORIZONTAL COMPASS Cave, T. 0051 Ex0051
DIAL - HORIZONTAL COMPASS Clarke, E. 0664 NMD226
DIAL - HORIZONTAL COMPASS Harrison 0306 Ex0306
DIAL - HORIZONTAL COMPASS Harrison 0493 Ex0493
DIAL - HORIZONTAL COMPASS Harrison, C. 0494 Ex0494
DIAL - HORIZONTAL COMPASS Lewis, J. 0111 Ex0111
DIAL - HORIZONTAL COMPASS Lynch 0367 Ex0367
DIAL - HORIZONTAL COMPASS Mason 0374 Ex0374
DIAL - HORIZONTAL COMPASS Mason 0376 Ex0376
DIAL - HORIZONTAL COMPASS Mason 0377 Ex0377
DIAL - HORIZONTAL COMPASS Saunders 0122 Ex0122
DIAL - HORIZONTAL COMPASS Spear 0294 Ex0294
DIAL - HORIZONTAL COMPASS Spear 0571 Ex0571
DIAL - HORIZONTAL COMPASS Spears & Co. 0295 Ex0295
DIAL - HORIZONTAL COMPASS Stokes 0080 Ex0080
DIAL - HORIZONTAL COMPASS Walker & Son 0081 Ex0081
DIAL - HORIZONTAL COMPASS Unsigned 0652 NMD238
DIAL - HORIZONTAL COMPASS Unsigned 0665 NMD225
DIAL - HORIZONTAL COMPASS Unsigned 1402 NMD052
DIAL - COMPASS Unsigned 4371 ULS058
DIAL - HORIZONTAL COMPASS (MAGNETIC) Essex, C. & Co. 0663 NMD227
DIAL - HORIZONTAL COMPASS (MAGNETIC) Essex, C. & Co. 1111 PRI002
DIAL - HORIZONTAL COMPASS (MAGNETIC) Unsigned 2369 NMD074
DIAL - HORIZONTAL MOON Lyons, M. 4190 DCM002
DIAL - HORIZONTAL PEDESTAL Alment, J. 0320 Ex0320
DIAL - HORIZONTAL PEDESTAL Alment, J. 3743 PRI116
DIAL - HORIZONTAL PEDESTAL B., J. 2444 NMD093
DIAL - HORIZONTAL PEDESTAL Bate, J. 2622 PRI056
DIAL - HORIZONTAL PEDESTAL Bate, P. 0322 Ex0322
DIAL - HORIZONTAL PEDESTAL Bennet, T. 4244 NMD193
DIAL - HORIZONTAL PEDESTAL Boyle, J. 3936 ULS033
DIAL - HORIZONTAL PEDESTAL Bracken, P. 3676 PRI105
DIAL - HORIZONTAL PEDESTAL Brady, P. 2460 PRI186
DIAL - HORIZONTAL PEDESTAL C., J. 4111 UFM026
DIAL - HORIZONTAL PEDESTAL Callinan, M. 2463 PRI188
DIAL - HORIZONTAL PEDESTAL Cave, T. 0617 Ex0617
DIAL - HORIZONTAL PEDESTAL Clarke, E. 0291 Ex0291
DIAL - HORIZONTAL PEDESTAL Collins, P. 2434 NMD084
DIAL - HORIZONTAL PEDESTAL Conway, W. 2872 UCP288
DIAL - HORIZONTAL PEDESTAL Coonan, S. 3739 PRI114
DIAL - HORIZONTAL PEDESTAL Croker, E. 4432 PRI234
DIAL - HORIZONTAL PEDESTAL Cruise, J. 0337 Ex0337
DIAL - HORIZONTAL PEDESTAL D., P.M. 2137 MIS037
DIAL - HORIZONTAL PEDESTAL Dawson, T. 1400 NMD050
DIAL - HORIZONTAL PEDESTAL Davy, J. 4007 SAL064
DIAL - HORIZONTAL PEDESTAL Dorset, Duchess of 4444 MIS002
DIAL - HORIZONTAL PEDESTAL Duffy, J. 2441 NMD090
DIAL - HORIZONTAL PEDESTAL Dunne, M. 3677 PRI106
DIAL - HORIZONTAL PEDESTAL EN 2459 NMD086

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DIAL - HORIZONTAL PEDESTAL Fahey, E. 1123 PRI011
DIAL - HORIZONTAL PEDESTAL Fahey, E. 1124 PRI012
DIAL - HORIZONTAL PEDESTAL Farrell, J. 2370 NMD075
DIAL - HORIZONTAL PEDESTAL Fawcett, J. 0702 NMD001
DIAL - HORIZONTAL PEDESTAL Fineran, P. 2440 NMD089
DIAL - HORIZONTAL PEDESTAL FitzPatrick, T. 3937 ULS034
DIAL - HORIZONTAL PEDESTAL Fleming, I. 2442 NMD091
DIAL - HORIZONTAL PEDESTAL Foster, J. 0309 Ex0309
DIAL - HORIZONTAL PEDESTAL Galway, J. 2667 PRI075
DIAL - HORIZONTAL PEDESTAL Gernon, E. 3928 ULS025
DIAL - HORIZONTAL PEDESTAL Gibbons, M. 2450 NMD099
DIAL - HORIZONTAL PEDESTAL Griffin, W. 2455 NMD103
DIAL - HORIZONTAL PEDESTAL Hannon, J. 2430 NMD080
DIAL - HORIZONTAL PEDESTAL Harrison, C. 0316 Ex0316
DIAL - HORIZONTAL PEDESTAL Harrison, C. 0737 MIS001
DIAL - HORIZONTAL PEDESTAL Hughes, J. 2433 NMD083
DIAL - HORIZONTAL PEDESTAL Hunt 3367 MIS049
DIAL - HORIZONTAL PEDESTAL JM 2438 NMD088
DIAL - HORIZONTAL PEDESTAL K, D. 2429 NMD079
DIAL - HORIZONTAL PEDESTAL Kane, J. 4497 ULS065
DIAL - HORIZONTAL PEDESTAL King, W. 1432 DCM001
DIAL - HORIZONTAL PEDESTAL Lacy, P. 4012 SAL069
DIAL - HORIZONTAL PEDESTAL Lewis, J. 0113 Ex0113
DIAL - HORIZONTAL PEDESTAL Lewis, J. 0502 Ex0502
DIAL - HORIZONTAL PEDESTAL Lewis, J. 4035 PRI136
DIAL - HORIZONTAL PEDESTAL Lynch 0311 Ex0311
DIAL - HORIZONTAL PEDESTAL Lynch 0566 Ex0566
DIAL - HORIZONTAL PEDESTAL Lynch 1120 NBG001
DIAL - HORIZONTAL PEDESTAL Lynch 1543 STR002
DIAL - HORIZONTAL PEDESTAL Lynch 2457 NMD104
DIAL - HORIZONTAL PEDESTAL Lynch 2625 PRI059
DIAL - HORIZONTAL PEDESTAL Lynch, J. 4485 PRI133
DIAL - HORIZONTAL PEDESTAL Lynch & Son 2624 PRI058
DIAL - HORIZONTAL PEDESTAL Lynch & Son 0286 Ex0286
DIAL - HORIZONTAL PEDESTAL Lynch & Son 0205 Ex0205
DIAL - HORIZONTAL PEDESTAL M, W. 2396 BIR072
DIAL - HORIZONTAL PEDESTAL McCann, C. 3740 PRI115
DIAL - HORIZONTAL PEDESTAL McHugh, T. 2462 NMD098
DIAL - HORIZONTAL PEDESTAL Magauran, J. 2437 NMD087
DIAL - HORIZONTAL PEDESTAL Malcom, I.W.G. 3939 ULS036
DIAL - HORIZONTAL PEDESTAL Margas 0096 Ex0096
DIAL - HORIZONTAL PEDESTAL Margas, J. 2623 PRI057
DIAL - HORIZONTAL PEDESTAL Martin, D. 2436 PRI182
DIAL - HORIZONTAL PEDESTAL Martin, T. 3650 MIS053
DIAL - HORIZONTAL PEDESTAL Mason 0710 NMD009
DIAL - HORIZONTAL PEDESTAL Mason 1126 PRI014
DIAL - HORIZONTAL PEDESTAL Mason 3401 PRI086
DIAL - HORIZONTAL PEDESTAL Mason, J.[?] 3674 PRI103
DIAL - HORIZONTAL PEDESTAL Melville, R. 2337 SAL020
DIAL - HORIZONTAL PEDESTAL Melville, R. 3877 PRI120
DIAL - HORIZONTAL PEDESTAL Melville, R. 4034 PRI134
DIAL - HORIZONTAL PEDESTAL Melvin, R. 0002 Ex0002
DIAL - HORIZONTAL PEDESTAL Melvin, R. 4439 ULS060
DIAL - HORIZONTAL PEDESTAL Nisdeal, D. 3932 ULS029
DIAL - HORIZONTAL PEDESTAL O'Connell, D. 2445 NMD094
DIAL - HORIZONTAL PEDESTAL O'Connell, D. 3672 PRI100
DIAL - HORIZONTAL PEDESTAL O'Connell, D. 3673 PRI101
DIAL - HORIZONTAL PEDESTAL O'Connell, T. 3368 MIS050
DIAL - HORIZONTAL PEDESTAL O Mahony, J.D. 1544 STR003
DIAL - HORIZONTAL PEDESTAL Philips, J. 3938 ULS035
DIAL - HORIZONTAL PEDESTAL Reilly, J. 3941 ULS038
DIAL - HORIZONTAL PEDESTAL Rowen, T. 2449 PRI183
DIAL - HORIZONTAL PEDESTAL Roche, P. 3649 MIS052
DIAL - HORIZONTAL PEDESTAL Saunders 0726 MAY001
DIAL - HORIZONTAL PEDESTAL Scott 3154 PRI078
DIAL - HORIZONTAL PEDESTAL Smith, I. 2461 PRI187
DIAL - HORIZONTAL PEDESTAL Spear 0709 NMD008
DIAL - HORIZONTAL PEDESTAL Spear 3402 PRI087
DIAL - HORIZONTAL PEDESTAL Spear 4165 NMD138
DIAL - HORIZONTAL PEDESTAL Spears, R. 3399 PRI084
DIAL - HORIZONTAL PEDESTAL Spelman, P. 2439 PRI181
DIAL - HORIZONTAL PEDESTAL Thompson, James 3933 ULS030
DIAL - HORIZONTAL PEDESTAL TN 2446 NMD095
DIAL - HORIZONTAL PEDESTAL Troy, E. 2453 PRI184
DIAL - HORIZONTAL PEDESTAL Voster, D. 1564 MIS020
DIAL - HORIZONTAL PEDESTAL Voster, D. 1866 PRI031
DIAL - HORIZONTAL PEDESTAL Walker, W. 3678 PRI107
DIAL - HORIZONTAL PEDESTAL Walsh, J. 2443 NMD092
DIAL - HORIZONTAL PEDESTAL White, H. 2456 PRI185
DIAL - HORIZONTAL PEDESTAL Yeates 4038 PRI138
DIAL - HORIZONTAL PEDESTAL Yeates, S. 0011 Ex0011
DIAL - HORIZONTAL PEDESTAL Yeates & Son 0212 Ex0212
DIAL - HORIZONTAL PEDESTAL Yeates & Son 1118 PRI006
DIAL - HORIZONTAL PEDESTAL Yeates & Son 3668 PRI096
DIAL - HORIZONTAL PEDESTAL Yeates & Son 4036 PRI139

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DIAL - HORIZONTAL PEDESTAL Yeates & Son 1119 PRI009
 DIAL - HORIZONTAL PEDESTAL Yeates & Son 2164 PRI010
 DIAL - HORIZONTAL PEDESTAL Unsigned 1409 NMD058
 DIAL - HORIZONTAL PEDESTAL Unsigned 2431 NMD081
 DIAL - HORIZONTAL PEDESTAL Unsigned 2432 NMD082
 DIAL - HORIZONTAL PEDESTAL Unsigned 2447 NMD096
 DIAL - HORIZONTAL PEDESTAL Unsigned 2448 NMD097
 DIAL - HORIZONTAL PEDESTAL Unsigned 2451 NMD100
 DIAL - HORIZONTAL PEDESTAL Unsigned 2452 NMD101
 DIAL - HORIZONTAL PEDESTAL Unsigned 2454 NMD102
 DIAL - HORIZONTAL PEDESTAL Unsigned 3600 NMC096
 DIAL - HORIZONTAL PEDESTAL Unsigned 3679 PRI108
 DIAL - HORIZONTAL PEDESTAL Unsigned 3741 MIS057
 DIAL - HORIZONTAL PEDESTAL Unsigned 3934 ULS031
 DIAL - HORIZONTAL PEDESTAL Unsigned 4037 PRI137
 DIAL - HORIZONTAL PEDESTAL Unsigned 4108 UFM023
 DIAL - HORIZONTAL & VERTICAL Unsigned 2435 NMD085
 DIAL - IRISH PILLAR Unsigned 3712 MIS056
 DIAL - IRISH PILLAR Unsigned 4237 MIS064
 DIAL - IRISH PILLAR Unsigned 4238 MIS065
 DIAL - IRISH PILLAR Unsigned 4239 MIS066
 DIAL - IRISH PILLAR Unsigned 4240 MIS067
 DIAL - IRISH PILLAR Unsigned 4241 MIS068
 DIAL - IRISH PILLAR Unsigned 4247 MIS072
 DIAL - MINER Braham 0636 NMD253
 DIAL - MINER Newton, E.T. 0637 NMD252
 DIAL - MINER Yeates 0409 Ex0409
 DIAL - MINER, HEDLEY Davis, J. & Son 2477 PRI198
 DIAL - MINER, HEDLEY Stanley 1092 TDE070
 DIAL - PEDESTAL McClintock, R.L. 3879 PRI122
 DIAL - PEDESTAL McClintock, R.L. 3881 PRI124
 DIAL - PEDESTAL McClintock, R.L. 3882 PRI125
 DIAL - UNIVERSAL EQUINOCTIAL Clarke, E. 0121 Ex0121
 DIAL - UNIVERSAL EQUINOCTIAL Müller, L.T. 2366 NMD071
 DIAL - UNIVERSAL EQUINOCTIAL Müller, L.T. 4137 SAL079
 DIAL - UNIVERSAL EQUINOCTIAL Schrettegger, J. 0650 NMD240
 DIAL - UNIVERSAL EQUINOCTIAL Yeates & Son 0495 Ex0495
 DIAL - UNIVERSAL EQUINOCTIAL Unsigned 0651 NMD239
 DIAL - UNIVERSAL EQUINOCTIAL Unsigned 0666 NMD224
 DIAL - UNIVERSAL EQUINOCTIAL RING Bate, J. & P. 0262 Ex0262
 DIAL - UNIVERSAL EQUINOCTIAL RING Birnie, J. 0333 Ex0333
 DIAL - UNIVERSAL EQUINOCTIAL RING Lynch & Son 0287 Ex0287
 DIAL - UNIVERSAL EQUINOCTIAL RING Parker, G. 0654 NMD236
 DIAL - UNIVERSAL EQUINOCTIAL RING Saunders 0657 NMD233
 DIAL - UNIVERSAL EQUINOCTIAL RING Seward 0655 NMD235
 DIAL - UNIVERSAL EQUINOCTIAL RING Stokes, G. 0703 NMD002
 DIAL - UNIVERSAL EQUINOCTIAL RING Unsigned 0366 NMD028
 DIAL - UNIVERSAL EQUINOCTIAL RING Unsigned 0656 NMD234
 DIAL - UNIVERSAL EQUINOCTIAL RING Unsigned 3706 ARM019
 DIAL - UNIVERSAL EQUINOCTIAL RING Unsigned 3929 ULS026
 DIAL - UNIVERSAL EQUINOCTIAL RING Unsigned 4248 MIS073
 DIAL - UNIVERSAL EQUINOCTIAL RING Unsigned 4370 ULS057
 DIAL - UNIVERSAL INCLINING Harris, T. & Son 0941 NMD027
 DIAL - UNIVERSAL INCLINING(?) Lynch 510 Ex510
 DIAL - UNIVERSAL INCLINING Lynch 2836 NMD106
 DIAL - UNIVERSAL INCLINING Melling & Co. 0662 NMD228
 DIAL - UNIVERSAL INCLINING Nelson, W. 3850 PRI117
 DIAL - UNIVERSAL INCLINING Spear 0070 Ex0070
 DIAL - UNIVERSAL INCLINING Webb, J. 0667 NMD223
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Hunter, E. 0263 Ex0263
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Lynch 0554 Ex0554
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Mason, T. 0661 NMD229
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Nelson, O. 1401 NMD051
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Seward 0704 NMD003
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Seward 0399 Ex0399
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Yeates, S. 0038 Ex0038
 DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL Unsigned 0660 NMD230
 DIAL - VERTICAL Unsigned 3935 ULS032
 DIAL - VERTICAL McClintock, R.L. 3880 PRI123
 DIAL - VERTICAL MacKeague, P. 3155 PRI079
 DIAL - VERTICAL McMurray, J. 3295 MIS048
 DIAL - VERTICAL Thompson, J. 3940 ULS037
 DIAL - VERTICAL Unsigned 1568 MIS024
 DIAL - VERTICAL Unsigned 2134 MIS036
 DIAL - VERTICAL Unsigned 3294 MIS047
 DIAL - VERTICAL Unsigned 3857 MIS044
 DIAL - VERTICAL Unsigned 4251 MIS010
 DIALS CUT ON STEPS OF STAIRS Unsigned 4245 MIS071
 DIAPHRAGM - IRIS Unsigned 0430 RDS088
 DIFFRACTION APPARATUS Bridge (Elliott Brothers) 2701 TDP245
 DIFFRACTION APPARATUS Zeiss, C. 2299 PRI173
 DIP CIRCLE Barrow, H. & Co. 1164 TDP152
 DIP CIRCLE Blunt, T. 1932 UCP159
 DIP CIRCLE Dover Charlton Kent 4517 MET016
 DIP CIRCLE Elliott Brothers 1900 UGP169

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DIP CIRCLE Gambey 1319 TDP037
DIP CIRCLE George, W. & J. 3908 QBP269
DIP CIRCLE George, W. & J. 4337 MAY350
DIP CIRCLE Kohl, M. 1901 UGP170
DIP CIRCLE Nicolson, W.B. 1274 TDP126
DIP CIRCLE Robinson & Barrow 1165 TDP151
DIP CIRCLE Troughton & Simms 0771 UDP039
DIP CIRCLE Wilton, W. 2328 QBP094
DIP CIRCLE Yeates & Son 3813 Ex0611
DIP CIRCLE Yeates & Son 2023 BLA012
DIP CIRCLE Yeates & Son 3813 NMC214
DIP CIRCLE Unsigned 2063 BLA045
DIP NEEDLE Griffin 1747 MAY230
DIP NEEDLE Griffin (T. Mason) 0289 CWC050
DIP NEEDLE Mason 0521 Ex0521
DIP NEEDLE Spencer & Son 0674 UDP002
DIP NEEDLE Unsigned 2878 UCP294
DIP NEEDLE Unsigned 3824 NMC225
DIPLEIDOSCOPE Dent, E.I. 1368 TDE044
DIPLEIDOSCOPE Dent, E.J. 0997 QBC007
DISC SPINNER Elliott Brothers 1903 UGP172
DISC SPINNER Yeates & Son 3815 Ex0612
DISC SPINNER Yeates & Son 3816 Ex0613
DISC SPINNER Yeates & Son 1217 TDP134
DISC SPINNER Yeates & Son 1670 MAY157
DISC SPINNER Yeates & Son (Baird & Tatlock) 3815 NMC216
DISC SPINNER Yeates & Son 3816 NMC217
DISC SPINNER Yeates & Son 4153 TDP319
DISC SPINNER Unsigned 0039 UCP061
DISC SPINNER Unsigned 0272 QBP067
DISC SPINNER Unsigned 1191 TDP133
DISC SPINNER Unsigned 1491 UGP118
DISC SPINNER Unsigned 2099 BLA087
DISCHARGE FLASK Unsigned 0290 CWC048
DISCHARGE FRAME Elliott Brothers 0181 UGP061
DISCHARGE FRAME Unsigned 2827 UCP280
DISCHARGE FRAME Unsigned 3157 QBP102
DISCHARGE TUBE Andrews, T. 1032 QBC012
DISCHARGE TUBE Andrews, T. 1035 QBC021
DISCHARGE TUBE Central Scientific Co. 1025 QBC035
DISCHARGE TUBE Kohl, M. 0874 UDP140
DISCHARGE TUBE Ladd, W. 0295 CWC059
DISCHARGE TUBE Ladd, W. 0296 CWC060
DISCHARGE TUBE Müller-Uri, R. 2287 QBC024
DISCHARGE TUBE Pilon, H. 3609 NMC105
DISCHARGE TUBE Yeates & Son 0283 CWC025
DISCHARGE TUBE Yeates & Son 0834 UDP100
DISCHARGE TUBE Unsigned 0293 CWC066
DISCHARGE TUBE Unsigned 0294 CWC061
DISCHARGE TUBE Unsigned 0873 UDP139
DISCHARGE TUBE Unsigned 0877 UDP143
DISCHARGE TUBE Unsigned 0878 UDP144
DISCHARGE TUBE Unsigned 0880 UDP146
DISCHARGE TUBE Unsigned 1028 QBC038
DISCHARGE TUBE Unsigned 1293 TDP086
DISCHARGE TUBE Unsigned 2037 BLA026
DISCHARGE TUBE Unsigned 2799 UCP252
DISCHARGE TUBE Unsigned 2891 UGP299
DISCHARGE TUBE Unsigned 2905 UGP313
DISCHARGE TUBE Unsigned 2908 UGP316
DISCHARGE TUBE Unsigned 2913 UGP321
DISCHARGE TUBE Unsigned 2915 UGP323
DISCHARGE TUBE Unsigned 2917 UGP325
DISCHARGE TUBE Unsigned 2920 UGP328
DISCHARGE TUBE Unsigned 2965 NMD118
DISCHARGE TUBE Unsigned 3509 QBP235
DISCHARGE TUBE Unsigned 3510 QBP236
DISCHARGE TUBE Unsigned 3616 NMC112
DISCHARGE TUBE Unsigned 3886 QBP247
DISCHARGE TUBE - AURORA Elliott Brothers 0080 UGP027
DISCHARGE TUBE - AURORA Unsigned 0060 UCP011
DISCHARGE TUBE - AURORA Unsigned 1009 QBC019
DISCHARGE TUBE - AURORA Unsigned 2597 NMD207
DISCHARGE TUBE - AURORA Unsigned 3628 NMC124
DISCHARGE TUBE - AURORA Unsigned 3658 NMD117
DISCHARGE TUBE - CROOKES Müller-Uri 3512 QBP238
DISCHARGE TUBE - CROOKES Unsigned 0872 UDP138
DISCHARGE TUBE - CROOKES Unsigned 0879 UDP145
DISCHARGE TUBE - CROOKES Unsigned 0881 UDP147
DISCHARGE TUBE - CROOKES Unsigned 1027 QBC037
DISCHARGE TUBE - CROOKES Unsigned 1294 TDP088
DISCHARGE TUBE - CROOKES Unsigned 1295 TDP092
DISCHARGE TUBE - CROOKES Unsigned 1296 TDP093
DISCHARGE TUBE - CROOKES Unsigned 1297 TDP089
DISCHARGE TUBE - CROOKES Unsigned 2249 UDP327

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DISCHARGE TUBE - CROOKES Unsigned 2250 UDP328
DISCHARGE TUBE - CROOKES Unsigned 2288 QBC025
DISCHARGE TUBE - CROOKES Unsigned 2906 UGP314
DISCHARGE TUBE - CROOKES Unsigned 2907 UGP315
DISCHARGE TUBE - CROOKES Unsigned 2909 UGP317
DISCHARGE TUBE - CROOKES Unsigned 2910 UGP318
DISCHARGE TUBE - CROOKES Unsigned 2911 UGP319
DISCHARGE TUBE - CROOKES Unsigned 2912 UGP320
DISCHARGE TUBE - CROOKES Unsigned 2918 UGP326
DISCHARGE TUBE - CROOKES Unsigned 2925 UGP333
DISCHARGE TUBE - CROOKES Unsigned 2926 UGP334
DISCHARGE TUBE - CROOKES Unsigned 3169 QBP114
DISCHARGE TUBE - CROOKES Unsigned 3513 QBP239
DISCHARGE TUBE - CROOKES Unsigned 3514 QBP240
DISCHARGE TUBE - CROOKES Unsigned 3887 QBP248
DISCHARGE TUBE - DE LA RIVE Unsigned 2061 BLA060
DISCHARGE TUBE - DE LA RIVE Unsigned 3511 QBP237
DISCHARGE TUBE - GEISSLER Watkins & Hill 0086 UCP072
DISCHARGE TUBE - GEISSLER Unsigned 0291 CWC064
DISCHARGE TUBE - GEISSLER Unsigned 1320 TDP200
DISCHARGE TUBE - GEISSLER Unsigned 2093 BLA081
DISCHARGE TUBE - GEISSLER Unsigned 2914 UGP322
DISCHARGE TUBE - GEISSLER Unsigned 3602 NMC098
DISCHARGE TUBE - GEISSLER Unsigned 3885 QBP246
DISCHARGE TUBE - GEISSLER Unsigned 3955 ARM029
DISCHARGE TUBE - GOLDSTEIN Unsigned 2916 UGP324
DISCHARGE TUBE - GOLDSTEIN Unsigned 2919 UGP327
DISCHARGE TUBE - HITTORF SPIRAL Unsigned 0875 UDP141
DISCHARGE TUBE - HITTORF SPIRAL Unsigned 3483 QBP209
DISCHARGE TUBE - HOLTZ VALVE Unsigned 3891 QBP252
DISCHARGE TUBE - LENARD Unsigned 2924 UGP332
DISCHARGE TUBE - OSCILLOSCOPE Kohl, M. 0876 UDP142
DISCHARGE TUBE - OSCILLOSCOPE Unsigned 2921 UGP329
DISCHARGE TUBE - OSCILLOSCOPE Unsigned 3603 NMC099
DISCHARGE TUBE - PERRIN Unsigned 2923 UGP331
DISCHARGE TUBE - SPANGLED AURORA Unsigned 1010 QBC020
DISCHARGE TUBE - SPANGLED AURORA Unsigned 2964 NMD119
DISCHARGE TUBE - SPANGLED AURORA Unsigned 3178 QBP123
DISCHARGE TUBE - SPIRAL Unsigned 3504 QBP230
DISCHARGE TUBE - THOMSON Unsigned 1026 QBC036
DISCHARGER - JOINTED Elliott Brothers 0180 UGP060
DISCHARGER - JOINTED Unsigned 0892 UDP158
DISCHARGER - JOINTED Unsigned 1740 MAY223
DISCHARGER - JOINTED Unsigned 2811 UCP264
DISCHARGER - JOINTED Unsigned 3158 QBP103
DISCHARGER - JOINTED Unsigned 3821 NMC222
DISCHARGER - POINTED Unsigned 0387 RDS058
DISCHARGER - UNIVERSAL Unsigned 0027 UCP009
DISCHARGER - UNIVERSAL Unsigned 1146 TDP073
DISCHARGER - UNIVERSAL Unsigned 2207 NMD120
DISCHARGER - UNIVERSAL Unsigned 3392 NMC023
DISCHARGER - UNIVERSAL Unsigned 3572 NMC068
DIVIDED CIRCLE Yeates & Son 2146 UDP235
DIVIDED CIRCLE Unsigned 2140 UDP229
DIVIDED CIRCLE Unsigned 2141 UDP230
DIVIDED CIRCLE WITH REVOLVING DISC Unsigned 3985 ARM059
DIVIDERS Unsigned 0504 IDG022
DIVIDERS Unsigned 1791 MAY274
DIVIDERS Unsigned 2966 NMD197
DIVIDERS - NAVIGATIONAL Unsigned 3914 ULS011
DIVIDERS - NAVIGATIONAL Unsigned 3915 ULS012
DIVIDERS - PROPORTIONAL Barker, F. & Son 4231 PRI250
DIVIDERS - PROPORTIONAL Hopgood, R.J. 0620 NMD268
DIVIDERS - PROPORTIONAL Jones, T. 2409 BIR085
DIVIDERS - PROPORTIONAL Mason, J. & J. 0313 Ex0313
DIVIDERS - PROPORTIONAL Seward 0206 Ex0206
DIVIDERS - PROPORTIONAL Unsigned 0378 RDS021
DIVIDERS - PROPORTIONAL Unsigned 1381 TDE064
DIVIDERS - WINGED Wynn, W. & C. 4467 PRI279
DIVIDERS/PAIR OF COMPASSES Unsigned 3863 UDE180
DIVIDING ENGINE Yeates & Son 1065 MAY041
DIVIDING ENGINE Unsigned 1258 TDP157
DIVIDING ENGINE Unsigned 2148 UDP237
DOME - ASTRONOMICAL Grubb, H. 0246 Ex0246
DOME - ASTRONOMICAL Grubb, H. 0250 Ex0250
DOME - ASTRONOMICAL Grubb, H. 0248 Ex0248
DOME - ASTRONOMICAL Grubb, H. 0222 Ex0242
DOME - ASTRONOMICAL Grubb, H. 0249 Ex0249
DOME - ASTRONOMICAL Grubb, H. 0243 Ex0243
DOME - ASTRONOMICAL Grubb, H. 0245 Ex0245
DOME - ASTRONOMICAL Grubb, H. 0244 Ex0244
DOME - ASTRONOMICAL Grubb, H. 0241 Ex0241
DRAWING CURVES Stanley 4496 CIL009
DRAWING INSTRUMENTS - SET Aston & Mander 1387 TDE069
DRAWING INSTRUMENTS - SET Aston & Mander 4398 PRI226

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DRAWING INSTRUMENTS - SET Dixon & Hempenstall 1376 TDE053
DRAWING INSTRUMENTS - SET Dixon & Hempenstall 2581 PRI215
DRAWING INSTRUMENTS - SET Harling 4395 PRI254
DRAWING INSTRUMENTS - SET Harling 4396 PRI255
DRAWING INSTRUMENTS - SET Harling, W.H. 0379 RDS020
DRAWING INSTRUMENTS - SET Holtzapffel & Co. 1231 TDP162
DRAWING INSTRUMENTS - SET Spear & Co. 0296 Ex0296
DRAWING INSTRUMENTS - SET Tryon, H. 0622 NMD266
DRAWING INSTRUMENTS - SET Walker 0210 Ex0210
DRAWING INSTRUMENTS - SET Walker 0586 Ex0586
DRAWING INSTRUMENTS - SET Unsigned 2277 PRI163
DRAWING INSTRUMENTS - SET Unsigned 2410 BIR086
DRAWING INSTRUMENTS - SET Unsigned 3708 MIS011
DRAWING INSTRUMENTS - SET Unsigned 4117 UFM032
DRUM RECORDER Cambridge Co. 0813 UDP079
DRUM RECORDER Cambridge Co. 1298 TDP056
DRUM RECORDER Cambridge Co. 1304 TDP058
DYNAMETER Dollond 1836 DUN018
DYNAMOMETER Hennessy 0358 Ex0358
DYNAMOMETER Hennessy 0359 Ex0359
EAR MODEL Baillere, Tindall & Cox 3907 QBP268
EAR TRUMPET Weiss & Son 1736 MAY219
EAR TRUMPET Unsigned 1905 UGP174
EARTH INDUCTOR Kohl, M. 2951 UGP359
EARTH INDUCTOR - BARLOW GLOBE Elliott Brothers 0169 UGP048
EARTH INDUCTOR - DELEZENNE CIRCLE Elliott Brothers 3883 QBP244
EARTH INDUCTOR - DELEZENNE CIRCLE Gambrell Brothers 2231 UDP309
EARTH INDUCTOR - DELEZENNE CIRCLE Yeates & Son 1504 UGP072
EARTH INDUCTOR - DELEZENNE CIRCLE Yeates & Son 2230 UDP308
EARTH INDUCTOR - DELEZENNE CIRCLE Unsigned 2810 UCP263
EIDOGRAPH Dunn 1102 TDE026
EIDOGRAPH Unsigned 1789 MAY272
ELECTRIC DISCHARGE DEMONSTRATION Ernecke, F. 0794 UDP060
ELECTRIC EGG Baird & Tatlock 3160 QBP105
ELECTRIC EGG Yeates & Son 0297 CWC038
ELECTRIC EGG Yeates & Son 1700 MAY187
ELECTRIC EGG Yeates & Son 2072 BLA052
ELECTRIC EGG Unsigned 0101 UCP057
ELECTRIC EGG Unsigned 0163 UGP042
ELECTRIC EGG Unsigned 1699 MAY186
ELECTRIC EGG Unsigned 2024 BLA013
ELECTRIC EGG Unsigned 2594 NMD121
ELECTRIC EGG Unsigned 2595 NMD208
ELECTRIC EGG Unsigned 3371 NMC002
ELECTRIC LATHE Unsigned 3542 NMC038
ELECTRIC MOTOR AC 3139 UDE164
ELECTRIC MOTOR Central Electric Co. 3415 BIR117
ELECTRIC MOTOR Clement, A. 4124 UFM039
ELECTRIC MOTOR Crocker-Wheeler 2419 BIR094
ELECTRIC MOTOR Ducretet, E. 2145 UDP234
ELECTRIC MOTOR Elliott Brothers 1907 UGP176
ELECTRIC MOTOR McClintock, F. 1654 MAY141
ELECTRIC MOTOR McClintock, F. 1652 MAY139
ELECTRIC MOTOR Murphy, P. 1653 MAY140
ELECTRIC MOTOR Yeates & Son 0168 UGP047
ELECTRIC MOTOR Yeates & Son 1657 MAY144
ELECTRIC MOTOR Yeates & Son 1673 MAY160
ELECTRIC MOTOR Yeates & Son 1805 MAY288
ELECTRIC MOTOR Yeates & Son 3003 UDE029
ELECTRIC MOTOR Unsigned 0915 UDP180
ELECTRIC MOTOR Unsigned 0928 UDP193
ELECTRIC MOTOR Unsigned 1454 UCP133
ELECTRIC MOTOR Unsigned 1655 MAY142
ELECTRIC MOTOR Unsigned 1656 MAY143
ELECTRIC MOTOR Unsigned 2102 BLA090
ELECTRIC MOTOR Unsigned 2103 BLA091
ELECTRIC MOTOR Unsigned 2132 UDP226
ELECTRIC MOTOR Unsigned 2239 UDP317
ELECTRIC MOTOR Unsigned 2746 TDP290
ELECTRIC MOTOR Unsigned 3136 UDE161
ELECTRIC MOTOR Unsigned 3137 UDE162
ELECTRIC MOTOR Unsigned 3138 UDE163
ELECTRIC MOTOR Unsigned 3539 NMC035
ELECTRIC MOTOR Unsigned 3558 NMC054
ELECTRIC MOTOR - MODEL Unsigned 3364 UCP364
ELECTRIC PERFORATOR Unsigned 0751 UCP111
ELECTRIC PISTOL Elliott Brothers 1497 UGP078
ELECTRIC PISTOL Unsigned 0909 UDP174
ELECTRIC PISTOL Unsigned 1448 UCP128
ELECTRIC PISTOL Unsigned 1584 MAY073
ELECTRIC PISTOL Unsigned 1704 MAY191
ELECTRIC SEE-SAW Unsigned 1427 UCP149
ELECTRIC SPRING Unsigned 3172 QBP117
ELECTRIC TROUGH Ducretet, E. & Cie 2154 UDP243
ELECTRICAL MACHINE Quin, A.H. 3300 UCP300

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ELECTRICAL MACHINE Sanderson Brothers 3061 UDE087
ELECTRICAL MACHINE Unsigned 3062 UDE088
ELECTRICAL MACHINE Unsigned 3538 NMC034
ELECTRICAL MACHINE - CLARKE Fannin & Co. 4086 UFM004
ELECTRICAL MACHINE - CLARKE Gray, J. & Son 4088 UFM006
ELECTRICAL MACHINE - CLARKE King, R. (Fannin & Co) 2025 BLA014
ELECTRICAL MACHINE - CLARKE Pawson & Brailsford 1163 TDP174
ELECTRICAL MACHINE - CLARKE Pawson & Brailsford 1392 NMD021
ELECTRICAL MACHINE - CLARKE Pawson & Brailsford 4089 UFM007
ELECTRICAL MACHINE - CLARKE Pawson & Brailsford 4291 RCS041
ELECTRICAL MACHINE - CLARKE Pawson & Brailsford (Mason) 4292 RCS042
ELECTRICAL MACHINE - CLARKE Robinson, J. & Sons 4087 UFM005
ELECTRICAL MACHINE - CLARKE Spear 1669 MAY156
ELECTRICAL MACHINE - CLARKE Yeates & Son 0029 UCP058
ELECTRICAL MACHINE - CLARKE Unsigned 1674 MAY161
ELECTRICAL MACHINE - CLARKE Unsigned 2026 BLA015
ELECTRICAL MACHINE - CLARKE Unsigned 4090 UFM008
ELECTRICAL MACHINE - GRAMME Breguet 0079 UGP028
ELECTRICAL MACHINE - GRAMME Breguet 1197 TDP006
ELECTRO DYNAMOMETER Cambridge Co. 0929 UDP194
ELECTRO DYNAMOMETER King, Mendham & Co. 0081 UCP067
ELECTRO DYNAMOMETER Siemens Brothers & Co. 0224 QBP018
ELECTRO DYNAMOMETER Siemens Brothers & Co. 1069 MAY045
ELECTRO DYNAMOMETER Siemens Brothers & Co. 2724 TDP268
ELECTRO DYNAMOMETER Siemens Brothers & Co. 3024 UDE050
ELECTRO DYNAMOMETER Siemens Brothers & Co. 3025 UDE051
ELECTRO DYNAMOMETER Siemens Brothers & Co. 3394 NMC025
ELECTROLYSIS APPARATUS Unsigned 0003 UCP073
ELECTROLYSIS APPARATUS Unsigned 0870 UDP206
ELECTROMAGNET Callan, N. 1797 MAY280
ELECTROMAGNET Callan, N. 4142 MAY340
ELECTROMAGNET Kohl, M. 2525 UGP231
ELECTROMAGNET Yeates & Son 1722 MAY205
ELECTROMAGNET Yeates & Son 2670 TDP214
ELECTROMAGNET Unsigned 0571 UCP150
ELECTROMAGNET Unsigned 2128 UDP188
ELECTROMAGNET Unsigned 2214 UDP292
ELECTROMAGNET Unsigned 2395 BIR071
ELECTROMAGNET Unsigned 2534 UGP240
ELECTROMAGNET Unsigned 2535 UGP241
ELECTROMAGNET Unsigned 2703 TDP247
ELECTROMAGNET Unsigned 2754 TDP298
ELECTROMAGNET FOR STRING GALVANOMETER Cambridge Co. 2842 TDP303
ELECTROMAGNETIC APPARATUS Yeates & Son 3035 UDE061
ELECTROMAGNETIC APPARATUS Unsigned 3320 UCP320
ELECTROMAGNETIC BALANCE Yeates & Son 1072 MAY048
ELECTROMAGNETIC ENGINE Unsigned 3381 NMC012
ELECTROMAGNETIC ENGINE Unsigned 3531 NMC027
ELECTROMAGNETIC ESCAPEMENT Unsigned 2778 UCP231
ELECTROMAGNETIC INDUCTION APPARATUS Ducretet, E. & Cie 0694 UDP022
ELECTROMAGNETIC ROTATION APPARATUS Ducretet 0922 UDP187
ELECTROMAGNETIC ROTATION APPARATUS Harvey & Peak 0908 UDP173
ELECTROMAGNETIC ROTATION APPARATUS Yeates & Son 0415 Ex0415
ELECTROMAGNETIC ROTATION APPARATUS Yeates & Son 1630 MAY117
ELECTROMAGNETIC ROTATION APPARATUS Yeates & Son 2199 UDP285
ELECTROMAGNETIC ROTATION APPARATUS Yeates & Son 2558 MAY305
ELECTROMAGNETIC ROTATION APPARATUS Unsigned 1291 TDP196
ELECTROMAGNETIC ROTATION APPARATUS Unsigned 1451 UCP131
ELECTROMAGNETIC ROTATION APPARATUS Unsigned 1896 UGP165
ELECTROMAGNETIC ROTATION APPARATUS Unsigned 2902 UGP310
ELECTROMAGNETIC ROTATION APPARATUS Unsigned 3636 NMC132
ELECTRO-MEDICAL APPARATUS Yeates & Son 0108 UCP029
ELECTROMETER Cambridge Co. 1996 RDS133
ELECTROMETER Paul, R.W. 3532 NMC028
ELECTROMETER Spindler & Hoyer (Mason) 1997 RDS134
ELECTROMETER White, J. 3191 QBP136
ELECTROMETER Unsigned 3164 QBP109
ELECTROMETER Unsigned 3165 QBP110
ELECTROMETER - BRAUN Unsigned 2564 UGP264
ELECTROMETER - BRAUN Unsigned 3340 UCP340
ELECTROMETER - CUTHBERTSON DISCHARGE Jones, W. & S. 0014 UGP020
ELECTROMETER - CUTHBERTSON DISCHARGE Unsigned 0006 UCP043
ELECTROMETER - GOLD LEAF Cambridge Co. 0884 UDP150
ELECTROMETER - GOLD LEAF Cambridge Co. 1249 TDP121
ELECTROMETER - GOLD LEAF Griffin & Tatlock LTD 4077 MAY326
ELECTROMETER - GOLD LEAF Newman 3161 QBP106
ELECTROMETER - GOLD LEAF White, J. 0770 UDP038
ELECTROMETER - GOLD LEAF Yeates & Son 3181 QBP126
ELECTROMETER - GOLD LEAF Unsigned 0036 UGP019
ELECTROMETER - GOLD LEAF Unsigned 0301 CWC054
ELECTROMETER - GOLD LEAF Unsigned 0910 UDP175
ELECTROMETER - GOLD LEAF Unsigned 1256 TDP105
ELECTROMETER - GOLD LEAF Unsigned 2075 BLA063
ELECTROMETER - GOLD LEAF Unsigned 2205 NMD122
ELECTROMETER - GOLD LEAF Unsigned 2954 UGP362

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ELECTROMETER - GOLD LEAF Unsigned 3820 NMC221
ELECTROMETER - HARRIS DISCHARGE Elliott Brothers 0016 UGP021
ELECTROMETER - HARRIS UNIT JAR Unsigned 0051 UGP030
ELECTROMETER - HARRIS UNIT JAR Unsigned 1445 UCP125
ELECTROMETER - HENLEY Bennett 0112 UCP021
ELECTROMETER - HENLEY Neeves 0047 UGP022
ELECTROMETER - HENLEY Yeates 1818 MAY301
ELECTROMETER - LINDEMANN Cambridge Co. 1421 SAL004
ELECTROMETER - QUADRANT Elliott Brothers 2739 TDP283
ELECTROMETER - QUADRANT Griffin 0085 UGP029
ELECTROMETER - QUADRANT Griffin 1716 MAY203
ELECTROMETER - QUADRANT Griffin 3569 NMC065
ELECTROMETER - QUADRANT Unsigned 0220 QBP016
ELECTROMETER - QUADRANT Unsigned 0298 CWC030
ELECTROMETER - QUADRANT Unsigned 1717 MAY204
ELECTROMETER - QUADRANT Unsigned 3591 NMC087
ELECTROMETER - QUADRANT, DOLEZALEK Baird & Tatlock 2561 UGP261
ELECTROMETER - QUADRANT, DOLEZALEK Cambridge Co. 0221 QBP017
ELECTROMETER - QUADRANT, DOLEZALEK Cambridge Co. 0932 UDP197
ELECTROMETER - QUADRANT, DOLEZALEK Cambridge Co. 1212 TDP015
ELECTROMETER - QUADRANT, DOLEZALEK Cambridge Co. 2782 UCP235
ELECTROMETER - QUADRANT, DOLEZALEK Harvey & Peak 2854 UGP274
ELECTROMETER - QUADRANT, DOLEZALEK Kohl, M. 2853 UGP273
ELECTROMETER - QUADRANT, DOLEZALEK Pye, W.G. & Co. 0933 UDP198
ELECTROMETER - QUADRANT, DOLEZALEK Pye, W.G. & Co. [Mason] 2783 UCP236
ELECTROMETER - QUADRANT, KELVIN White, J. 0024 UCP074
ELECTROMETER - QUADRANT, THOMSON Elliott Brothers 0087 UCP044
ELECTROMETER - TORSION, COULOMB Bennett 0110 UCP025
ELECTROMETER - TORSION, COULOMB Elliott Brothers 0174 UGP053
ELECTROMETER - TORSION, COULOMB Elliott Brothers 0263 QBP058
ELECTROMETER - TORSION, COULOMB Elliott Brothers 0693 UDP021
ELECTROMETER - TORSION, COULOMB Elliott Brothers 1733 MAY216
ELECTROMETER - TORSION, COULOMB Knight, G. & Co. 0299 CWC027
ELECTROMETER - TORSION, COULOMB Kohl, M. 2865 UGP285
ELECTROMETER - TORSION, COULOMB Watkins & Hill 0300 CWC031
ELECTROMETER - TORSION, COULOMB Yeates & Son 3373 Ex0590
ELECTROMETER - TORSION, COULOMB Yeates & Son 3373 NMC004
ELECTROMETER - TORSION, COULOMB Unsigned 1192 TDP100
ELECTROMETER - WEIGHT Paul, R.W. 0002 UCP075
ELECTROMETER PLATES VOLTAGE ADJUSTER Cambridge Co. 2784 UCP237
ELECTROPHORUS Yeates & Son 1243 TDP119
ELECTROPHORUS Unsigned 1419 UCP148
ELECTROPHORUS Unsigned 2236 UDP314
ELECTROPHORUS Unsigned 3179 QBP124
ELECTROPHORUS Unsigned 3333 UCP333
ELECTROSTATIC CHAMBER Unsigned 1303 TDP146
ELECTROSTATIC GENERATOR Becker, F.E. & Co. 3386 NMC017
ELECTROSTATIC GENERATOR Hayes, F.C. 2104 BLA092
ELECTROSTATIC GENERATOR Unsigned 1742 MAY225
ELECTROSTATIC GENERATOR Unsigned 3189 QBP134
ELECTROSTATIC GENERATOR Unsigned 3395 NMC026
ELECTROSTATIC GENERATOR - CARRÉ Carré, E. 2393 BIR069
ELECTROSTATIC GENERATOR - CARRÉ Carré, E. 3307 UCP307
ELECTROSTATIC GENERATOR - CARRÉ Yeates & Son 0701 UDP029
ELECTROSTATIC GENERATOR - CARRÉ Yeates & Son 1633 MAY120
ELECTROSTATIC GENERATOR - CARRÉ Yeates & Son 2742 TDP286
ELECTROSTATIC GENERATOR - DE WINTER Unsigned 1074 MAY050
ELECTROSTATIC GENERATOR - CUTHBERTSON Bennett, T. 0116 UCP008
ELECTROSTATIC GENERATOR - CUTHBERTSON Harvey & Peak 0699 UDP027
ELECTROSTATIC GENERATOR - CUTHBERTSON Jones, W. & S. 0032 UGP023
ELECTROSTATIC GENERATOR - CUTHBERTSON Robinson, J. & Sons 0698 UDP026
ELECTROSTATIC GENERATOR - CUTHBERTSON Yeates & Son 3345 UCP345
ELECTROSTATIC GENERATOR - HARRIS Elliott Brothers 1496 UGP125
ELECTROSTATIC GENERATOR - HOLTZ Ducretet, E. 0689 UDP017
ELECTROSTATIC GENERATOR - NAIRNE Newman, I. 3391 NMC022
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 0388 RDS080
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 1632 MAY119
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 2203 NMD214
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 2350 BIR036
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 3383 NMC014
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 3384 NMC015
ELECTROSTATIC GENERATOR - NAIRNE Unsigned 3385 NMC016
ELECTROSTATIC GENERATOR - RAMSDEN Unsigned 2202 NMD123
ELECTROSTATIC GENERATOR - VOSS Harvey & Peak 0889 UDP155
ELECTROSTATIC GENERATOR - VOSS Voss, J.R. 1503 UGP085
ELECTROSTATIC GENERATOR - WHEATSTONE Unsigned 3360 UCP360
ELECTROSTATIC GENERATOR - WIMSHURST Dollond 0059 UCP076
ELECTROSTATIC GENERATOR - WIMSHURST Harris, P. & Co. 0940 UDP208
ELECTROSTATIC GENERATOR - WIMSHURST Harvey & Peak 0264 QBP059
ELECTROSTATIC GENERATOR - WIMSHURST Nicolson, W.B. 3358 UCP358
ELECTROSTATIC GENERATOR - WIMSHURST Schall, K. 1073 MAY049
ELECTROSTATIC GENERATOR - WIMSHURST Yeates & Son 0158 UGP037
ELECTROSTATIC GENERATOR - WIMSHURST Yeates & Son 0778 UDP045
ELECTROSTATIC GENERATOR - WIMSHURST Yeates & Son 1583 MAY072
ELECTROSTATIC GENERATOR - WIMSHURST Yeates & Son 2124 UDP054

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ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 0159 UGP038
 ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 0313 CWC022
 ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 0761 UDP030
 ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 2144 UDP233
 ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 2947 UGP355
 ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 3359 UCP359
 ELECTROSTATIC GENERATOR - WIMSHURST Unsigned 3370 NMC001
 ELEVATING FLOOR Grubb, H. 0426 Ex0426
 ELIHU THOMSON APPARATUS Griffin 0937 UDP202
 ELIHU THOMSON APPARATUS Kohl, M. 2520 UGP226
 ELIHU THOMSON APPARATUS Unsigned 1783 MAY266
 ELLIPTOGRAPH Yeates & Son 1100 TDE048
 ENGINE - HEAT Heinrici, L. 1175 TDP163
 EQUATION OF TIME McClintock, R.L. 3878 PRI121
 ERECTOR Yeates & Son 0102 UCP031
 ERECTOR Yeates & Son 0425 RDS032
 ERECTOR Yeates & Son 1324 TDP067
 ERECTOR Yeates & Son 1671 MAY158
 ERECTOR Unsigned 0426 RDS051
 ERECTOR Unsigned 0427 RDS052
 EUDIOMETER - CAVENDISH Baird & Tatlock 3764 NMC165
 EUDIOMETER - CAVENDISH Baird & Tatlock 3764 NMD160
 EUDIOMETER - CAVENDISH Yeates & Son 0359 RDS010
 EUDIOMETER - CAVENDISH Unsigned 1698 MAY185
 EUDIOMETER - CAVENDISH Unsigned 2204 NMD124
 EUDIOMETER - CAVENDISH Unsigned 3765 NMC166
 EUDIOMETER - CAVENDISH Unsigned 4314 TDC010
 EUDIOMETER - URE Unsigned 4313 TDC009
 EXPANSION APPARATUS(?) Hicks 3129 UDE154
 EXPANSION APPARATUS Yeates & Son 0417 Ex0417
 EXPANSION APPARATUS Yeates & Son 1284 TDP044
 EXPANSION APPARATUS Yeates & Son 2180 UDP266
 EXPANSION APPARATUS - BAR BREAKER Gallenkamp 2797 UCP250
 EXPANSION APPARATUS - BAR BREAKER Griffin 3442 QBP168
 EXPANSION APPARATUS - BAR BREAKER Griffin 3610 NMC106
 EXPANSION APPARATUS - BAR BREAKER Maiben, J.M. & Co. 1815 MAY298
 EXPANSION APPARATUS - BAR BREAKER Yeates & Son 3618 Ex0606
 EXPANSION APPARATUS - BAR BREAKER Yeates & Son 0814 UDP080
 EXPANSION APPARATUS - BAR BREAKER Yeates & Son 1077 MAY053
 EXPANSION APPARATUS - BAR BREAKER Yeates & Son 3618 NMC114
 EXPANSION APPARATUS - BAR BREAKER Yeates & Son 4054 MAY317
 EXPANSION APPARATUS - BAR BREAKER Unsigned 2121 BLA109
 EXPANSION APPARATUS - DULONG/PETIT Gallenkamp, A. & Co. 2859 UGP279
 EXPANSION APPARATUS - FERGUSON Elliott Brothers 2795 UCP248
 EXPANSION APPARATUS - FERGUSON Unsigned 0867 UDP133
 EXPANSION APPARATUS - 'S GRAVESANDE Elliott Brothers 2500 UGP206
 EXPANSION APPARATUS - 'S GRAVESANDE Nicolson, W.B. 0772 UDP040
 EXPANSION APPARATUS - 'S GRAVESANDE Nicolson, W.B. 2512 UGP218
 EXPANSION APPARATUS - 'S GRAVESANDE Yeates & Son 2796 UCP249
 EXPANSION APPARATUS - 'S GRAVESANDE Unsigned 1172 TDP155
 EXPANSION APPARATUS - O'TOOLE Harris, P. & Co. 1746 MAY229
 EXPANSION APPARATUS - O'TOOLE Harris, P. & Co. 2084 BLA072
 EXPANSION APPARATUS - O'TOOLE O'Toole, H. 2062 BLA044
 EXPANSION APPARATUS - PULLINGER Townson & Mercer 3788 NMC189
 EXPANSION APPARATUS - RHEAM Griffin 2861 UGP281
 EXPANSION APPARATUS - TWO METALS Yeates & Son 0101 Ex0101
 EXPANSION APPARATUS - TWO METALS Yeates & Son 0416 Ex0416
 EXPANSION APPARATUS - TWO METALS Yeates & Son 0832 UDP098
 EXPANSION APPARATUS - TWO METALS Yeates & Son 1078 MAY054
 EXPOSURE METER Field, R. & Co. 4459 PRI273
 EXPOSURE METER Watkins 2390 BIR066
 EXPOSURE METER Watkins 2389 BIR065
 EXTENSOMETER Adie, P. 1441 MIS014
 EXTENSOMETER Cambridge & Paul 3243 QBE021
 EYE MODEL Bock-Steger 1977 UCP204
 EYE MODEL Bock-Steger 3793 NMC194
 EYE MODEL Jones, W. & S. 1696 MAY183
 EYE MODEL Yeates & Son 2316 QBP082
 EYE MODEL Unsigned 1525 UGP111
 EYE MODEL Unsigned 1691 MAY178
 EYE MODEL Unsigned 3201 QBP146
 EYE MODEL Unsigned 3202 QBP147
 EYEPIECE Rosse, Earl of 0085 Ex0085
 EYEPIECE Rosse, Earl of 0086 Ex0086
 EYEPIECE - DAWES' SOLAR Grubb, H. 0754 UCP114
 EYEPIECE - MICROMETER Grubb, H. 0045 Ex0045
 EYEPIECE - MICROMETER Grubb, H. 0257 Ex0257
 EYEPIECE - MICROMETER Grubb, H. 0458 Ex0458
 EYEPIECE - MICROMETER Grubb, H. 0111 UCP028
 EYEPIECE - MICROMETER Grubb, H. 1462 UCP140
 EYEPIECE - MICROMETER Grubb, H. 1842 DUN024
 EYEPIECE - MICROMETER Grubb, H. 3971 ARM045
 EYEPIECE - MICROMETER Grubb, H. 3972 ARM046
 EYEPIECE - MICROMETER Grubb, T. 0961 BIR025
 EYEPIECE - MICROMETER Jones, T. 4003 ARM077

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EYEPIECE - MICROMETER Ross, A. 4268 RCS018
EYEPIECE - MICROMETER Troughton & Simms 3970 ARM044
EYEPIECE - MICROMETER Watson, W. & Sons 1334 TDP017
EYEPIECE - MICROMETER Yeates & Son 2218 UDP296
EYEPIECE - MICROMETER Unsigned 3973 ARM047
EYEPIECE - MICROMETER Unsigned 3974 ARM048
EYEPIECE - MICROMETER Unsigned 3975 ARM049
EYEPIECE - MICROMETER Unsigned 3978 ARM052
EYEPIECE - MICROMETER Unsigned 4334 MAY347
EYE-SIGHT TESTER(?) Duboscq, J. 3216 QBP161
FARADAY NEEDLE Yeates & Son 0216 QBP012
FARADAY NEEDLE Yeates & Son 1238 TDP187
FARADAY NEEDLE Yeates & Son 1956 UCP191
FARADAY NEEDLE Yeates & Son 2065 BLA047
FARADAY NEEDLE Yeates & Son 4131 MAY335
FARADAY NEEDLE Yeates & Son 2693 TDP237
FARADAY NEEDLE Unsigned 0907 UDP205
FARADAY WHEEL Ducretet, E. & Cie 0768 UDP036
FARADAY WHEEL Harvey & Peak 0927 UDP192
FARINATION APPARATUS Simon, R. 0498 IDG045
FIRE EXTINGUISHER Dublin Japan Works 0513 IDG054
FIRE SYRINGE Yeates & Son 1154 TDP148
FIRE SYRINGE Unsigned 0837 UDP103
FIRE SYRINGE Unsigned 2030 BLA019
FLASH POINT TESTER Yeates & Son 0360 RDS036
FLASK - DEWAR Unsigned 0412 RDS074
FLASK - DEWAR Unsigned 2646 RDS143
FLEXIBLE CURVE - BROOKS' Brooks 3657 PRI140
FLUID TRANSMISSIBILITY APPARATUS Unsigned 3753 NMC154
FLUID TRANSMISSIBILITY APPARATUS Unsigned 3753 NMD164
FLUXMETER Cambridge Co. 3121 UDE146
FLYWHEEL Unsigned 3443 QBP169
FLYWHEEL WITH COG WHEELS Unsigned 3350 UCP350
FORCEPS - OBSTETRIC Whyte, J. 0514 Ex0514
FOUNTAIN Unsigned 2178 UDP264
FOUNTAIN Unsigned 2927 UGP335
FOUNTAIN Unsigned 3322 UCP322
FOUNTAIN Unsigned 0344 CWC043
FOUNTAIN Unsigned 0343 CWC047
FRACTIONAL DISTILLATION COLUMNS Young, S. 4331 TDC027
FRESNEL BIPRISM Unsigned 1520 UGP102
FRESNEL BIPRISM Unsigned 3321 UCP321
FRESNEL BIPRISM Unsigned 3492 QBP218
FRESNEL RHOMB Harvey & Peak 1493 UGP105
FRESNEL RHOMB Unsigned 1492 UGP106
FRICTION DEMONSTRATION APPARATUS Walton, E.T.S. 4234 NMD190
FRICTION HEATING APPARATUS - CALLENDAR Cambridge Co. 0106 UCP056
FRICTION HEATING APPARATUS - CALLENDAR Cambridge Co. 0700 UDP028
FRICTION HEATING APPARATUS - CALLENDAR Cambridge Co. 1730 MAY213
FRICTION HEATING APPARATUS - CALLENDAR Cambridge Co. 2845 TDP306
FRICTION HEATING APPARATUS - SEARLE Pye, W.G. & Co. 2948 UGP356
FRICTION HEATING APPARATUS - SEARLE Pye, W.G. & Co. 3338 UCP338
FRICTION HEATING APPARATUS - SEARLE Pye, W.G. & Co. 3501 QBP227
FRICTION HEATING APPARATUS - TYNDALL Prescott, G. & Co. 1597 MAY086
FROSTED GLASS DISC ON STAND Unsigned 3335 UCP335
FROSTED GLASS SCREEN Unsigned 2040 BLA029
FUNNELS - GLASS Unsigned 2868 UGP288
FURNACE - GAS Unsigned 4318 TDC014
FURNACE - CARBON ARC Ducretet, E. 0411 RDS062
FURNACE - CARBON ARC Ducretet & Lejeune 3065 UDE091
GALVANOMETER D.R.G.M. 0237 QBP031
GALVANOMETER Edelmann, Dr W. 3126 UDE151
GALVANOMETER Gambrell Brothers 0389 RDS099
GALVANOMETER Gambrell Brothers 1768 MAY251
GALVANOMETER Gambrell Brothers (T. Mason) 2568 UGP268
GALVANOMETER Hartmann & Braun 2550 UGP256
GALVANOMETER King, Mendham & Co. 1467 UCP156
GALVANOMETER Pye, W.G. & Co. 4055 MAY318
GALVANOMETER Sax, J. 2426 BIR102
GALVANOMETER Smith, T. 0996 QBC006
GALVANOMETER Sullivan, H.W. 4061 MAY324
GALVANOMETER Weston Co. 2705 TDP249
GALVANOMETER Yeates & Son 0391 RDS109
GALVANOMETER Yeates & Son 1591 MAY080
GALVANOMETER Unsigned 0165 UGP044
GALVANOMETER Unsigned 2080 BLA068
GALVANOMETER Unsigned 2285 QBC022
GALVANOMETER Unsigned 2830 UCP283
GALVANOMETER Unsigned 3125 UDE150
GALVANOMETER Unsigned 3127 UDE152
GALVANOMETER Unsigned 3128 UDE153
GALVANOMETER - ASTATIC Elliott Brothers 0055 UCP052
GALVANOMETER - ASTATIC Elliott Brothers 3098 UDE124
GALVANOMETER - ASTATIC West London Co. 2554 UGP259
GALVANOMETER - ASTATIC MIRROR Cambridge Co. 3478 QBP204

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GALVANOMETER - ASTATIC MIRROR Cambridge Co. 0791 UDP057
 GALVANOMETER - ASTATIC MIRROR Cambridge Co. 0792 UDP058
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 0022 UCP034
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 0046 UGP026
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 0049 UCP051
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 1206 TDP004
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 1207 TDP005
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 1767 MAY250
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 2552 UGP257
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 3082 UDE108
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 3085 UDE111
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 3120 UDE145
 GALVANOMETER - ASTATIC MIRROR Elliott Brothers 3622 NMC118
 GALVANOMETER - ASTATIC MIRROR Griffin 0305 CWC028
 GALVANOMETER - ASTATIC MIRROR Nalder Brothers & Co. 2857 UGP277
 GALVANOMETER - ASTATIC MIRROR Nalder Brothers & Co. 3096 UDE122
 GALVANOMETER - ASTATIC MIRROR Nalder Brothers & Co. 3119 UDE144
 GALVANOMETER - ASTATIC MIRROR Pye, W.G. & Co. 2562 UGP262
 GALVANOMETER - ASTATIC MIRROR Pye, W.G. & Co. 3099 UDE125
 GALVANOMETER - ASTATIC MIRROR Stuart, Professor 2852 UGP272
 GALVANOMETER - ASTATIC MIRROR Yeates & Son 0783 UDP050
 GALVANOMETER - ASTATIC MIRROR Yeates & Son 1715 MAY202
 GALVANOMETER - ASTATIC MIRROR Yeates & Son 3026 UDE052
 GALVANOMETER - ASTATIC MIRROR Yeates & Son 3097 UDE123
 GALVANOMETER - ASTATIC MIRROR Unsigned 0034 UCP069
 GALVANOMETER - ASTATIC MIRROR Unsigned 2851 UGP271
 GALVANOMETER - ASTATIC MIRROR Unsigned 3084 UDE110
 GALVANOMETER - ASTATIC MIRROR Unsigned 3134 UDE159
 GALVANOMETER - ASTATIC, NOBILI Baird & Tatlock 2206 NMD213
 GALVANOMETER - ASTATIC, NOBILI Breton Frères 3589 NMC085
 GALVANOMETER - ASTATIC, NOBILI Elliott Brothers 0015 UCP045
 GALVANOMETER - ASTATIC, NOBILI Elliott Brothers 0063 UGP024
 GALVANOMETER - ASTATIC, NOBILI Elliott Brothers 1220 TDP011
 GALVANOMETER - ASTATIC, NOBILI Elliott Brothers 3219 QBP164
 GALVANOMETER - ASTATIC, NOBILI Griffin 2856 UGP276
 GALVANOMETER - ASTATIC, NOBILI Griffin & Sons (Percival) 3568 NMC064
 GALVANOMETER - ASTATIC, NOBILI Griffin & Sons (Percival) 3568 NMD147
 GALVANOMETER - ASTATIC, NOBILI Harris, P. & Co. 0747 UCP107
 GALVANOMETER - ASTATIC, NOBILI Harris, P. & Co. 0748 UCP108
 GALVANOMETER - ASTATIC, NOBILI Knight 0037 UCP047
 GALVANOMETER - ASTATIC, NOBILI Knight 0084 UCP046
 GALVANOMETER - ASTATIC, NOBILI Ruhmkorff 0998 QBC008
 GALVANOMETER - ASTATIC, NOBILI Siemens Brothers 3590 NMC086
 GALVANOMETER - ASTATIC, NOBILI Watkins & Hill 1208 TDP013
 GALVANOMETER - ASTATIC, NOBILI Yeates & Son 0302 CWC032
 GALVANOMETER - ASTATIC, NOBILI Yeates & Son 0392 RDS075
 GALVANOMETER - ASTATIC, NOBILI Yeates & Son 2028 BLA017
 GALVANOMETER - ASTATIC, NOBILI Yeates & Son 3066 UDE092
 GALVANOMETER - ASTATIC, NOBILI Unsigned 0303 CWC034
 GALVANOMETER - ASTATIC, NOBILI Unsigned 0304 CWC053
 GALVANOMETER - ASTATIC, NOBILI Unsigned 1211 TDP014
 GALVANOMETER - ASTATIC, NOBILI Unsigned 1218 TDP094
 GALVANOMETER - ASTATIC, NOBILI Unsigned 1599 MAY088
 GALVANOMETER - ASTATIC, NOBILI Unsigned 2334 QBP100
 GALVANOMETER - AYRTON MATHER Baird & Tatlock 1223 TDP027
 GALVANOMETER - AYRTON MATHER Cambridge Co. 0227 QBP021
 GALVANOMETER - AYRTON MATHER Cambridge Co. 1221 TDP029
 GALVANOMETER - AYRTON MATHER Cambridge Co. 2675 TDP219
 GALVANOMETER - AYRTON MATHER Cambridge Co. 2848 UGP289
 GALVANOMETER - AYRTON MATHER Griffin 0934 UDP199
 GALVANOMETER - AYRTON MATHER Griffin 3122 UDE147
 GALVANOMETER - AYRTON MATHER Griffin & Sons 3123 UDE148
 GALVANOMETER - AYRTON MATHER Kipp 0390 RDS094
 GALVANOMETER - AYRTON MATHER Paul, R.W. 1222 TDP026
 GALVANOMETER - AYRTON MATHER Paul, R.W. 1754 MAY237
 GALVANOMETER - AYRTON MATHER Paul, R.W. 3115 UDE140
 GALVANOMETER - AYRTON MATHER Paul, R.W. 3124 UDE149
 GALVANOMETER - AYRTON MATHER Paul, R.W. 3170 QBP115
 GALVANOMETER - AYRTON MATHER Paul, R.W. 3116 UDE141
 GALVANOMETER - AYRTON MATHER Tinsley, H. & Co. 1225 TDP052
 GALVANOMETER - AYRTON MATHER Tinsley, H. & Co. 2674 TDP218
 GALVANOMETER - AYRTON MATHER Tinsley, H. & Co. 3030 UDE056
 GALVANOMETER - AYRTON MATHER Unsigned 0844 UDP110
 GALVANOMETER - AYRTON MATHER Unsigned 1732 MAY215
 GALVANOMETER - AYRTON MATHER Unsigned 3132 UDE157
 GALVANOMETER - BALLISTIC MIRROR Pye, W.G. & Co. 0035 UCP050
 GALVANOMETER - BROCA Cambridge Co. 0228 QBP022
 GALVANOMETER - BROCA Cambridge Co. 0935 UDP200
 GALVANOMETER - BROCA Cambridge Co. 1219 TDP021
 GALVANOMETER - BROCA Cambridge Co. 2566 UGP266
 GALVANOMETER - CAMPBELL VIBRATION Paul, R.W. 0936 UDP201
 GALVANOMETER - CURRENT White, J. 0219 QBP015
 GALVANOMETER - CURRENT White, J. 0925 UDP190
 GALVANOMETER - CURRENT White, J. 3079 UDE105
 GALVANOMETER - D'ARSONVAL Cambridge Co. 1169 TDP149

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GALVANOMETER - D'ARSONVAL Cambridge Co. 1952 UCP179
 GALVANOMETER - D'ARSONVAL Carpentier, J. 0679 UDP007
 GALVANOMETER - D'ARSONVAL Ducretet, E. 1205 TDP046
 GALVANOMETER - D'ARSONVAL Elliott Brothers 3091 UDE117
 GALVANOMETER - D'ARSONVAL Gambrell 2850 UGP270
 GALVANOMETER - D'ARSONVAL Gambrell Brothers 2211 UDP289
 GALVANOMETER - D'ARSONVAL Gambrell Brothers 2560 UGP260
 GALVANOMETER - D'ARSONVAL Gambrell Brothers 2880 UCP296
 GALVANOMETER - D'ARSONVAL Gambrell Brothers & Co. 1224 TDP050
 GALVANOMETER - D'ARSONVAL Gambrell Brothers & Co. 1970 UCP197
 GALVANOMETER - D'ARSONVAL Nalder Brothers & Co. 1233 TDP031
 GALVANOMETER - D'ARSONVAL Nalder Brothers & Co. 1983 MAY304
 GALVANOMETER - D'ARSONVAL Nalder Brothers & Co. 2157 UDP246
 GALVANOMETER - D'ARSONVAL Nalder Brothers & Co. 2553 UGP258
 GALVANOMETER - D'ARSONVAL Nalder Brothers & Co. 3029 UDE055
 GALVANOMETER - D'ARSONVAL Pitkin, J. 0276 QBP071
 GALVANOMETER - D'ARSONVAL Pitkin, J. 0931 UDP196
 GALVANOMETER - D'ARSONVAL Unsigned 3556 NMC052
 GALVANOMETER - D'ARSONVAL POINTER Mason, T. 2714 TDP258
 GALVANOMETER - DEAD BEAT MIRROR Pye, W.G. & Co. 0930 UDP195
 GALVANOMETER - DEFLECTION Gent & Co. 4519 MET018
 GALVANOMETER - DETECTOR Kershaw, A. & Son 3599 NMC095
 GALVANOMETER - DETECTOR Unsigned 3588 NMC084
 GALVANOMETER - DRYSDALE-TINSLEY Tinsley, H. & Co. 1232 TDP020
 GALVANOMETER - DUDELL OSCILLOGRAPH Cambridge Co. 2708 TDP252
 GALVANOMETER - MIRROR Crompton & Co. 3117 UDE142
 GALVANOMETER - MIRROR Crompton & Co. 3118 UDE143
 GALVANOMETER - MIRROR Yeates & Son 2549 UGP255
 GALVANOMETER - MIRROR Unsigned 4060 MAY323
 GALVANOMETER - POTENTIAL White, J. 0218 QBP014
 GALVANOMETER - POTENTIAL White, J. 0924 UDP189
 GALVANOMETER - POTENTIAL White, J. 3078 UDE104
 GALVANOMETER - TANGENT Baird & Tatlock 3336 UCP336
 GALVANOMETER - TANGENT Elliott Brothers 1512 UGP090
 GALVANOMETER - TANGENT Elliott Brothers 1908 UGP177
 GALVANOMETER - TANGENT Griffin 2567 UGP267
 GALVANOMETER - TANGENT Griffin 2873 UCP289
 GALVANOMETER - TANGENT Griffin 3328 UCP328
 GALVANOMETER - TANGENT Griffin 3823 NMC224
 GALVANOMETER - TANGENT Griffin, J.J. & Sons 3547 NMC043
 GALVANOMETER - TANGENT Griffin, J.J. & Sons 3724 UGP376
 GALVANOMETER - TANGENT Harris, P. & Co. 2208 NMD125
 GALVANOMETER - TANGENT Harvey & Peak 1317 TDP064
 GALVANOMETER - TANGENT Maiben, J.M. & Co. 2027 BLA016
 GALVANOMETER - TANGENT Paul, R.W. 0061 UCP078
 GALVANOMETER - TANGENT Percival, G. 3375 NMC006
 GALVANOMETER - TANGENT Percival, G. 3375 NMD308
 GALVANOMETER - TANGENT Pye, W.G. & Co. 3171 QBP116
 GALVANOMETER - TANGENT Pye, W.G. & Co. 3817 NMC218
 GALVANOMETER - TANGENT Pye, W.G. (T. Mason) 4163 NMD136
 GALVANOMETER - TANGENT Ruhmkorff 0225 QBP019
 GALVANOMETER - TANGENT Yeates & Son 1580 MAY069
 GALVANOMETER - TANGENT Yeates & Son 1586 MAY075
 GALVANOMETER - TANGENT Unsigned 0077 UCP080
 GALVANOMETER - TANGENT Unsigned 0082 UCP079
 GALVANOMETER - TANGENT Unsigned 2076 BLA064
 GALVANOMETER - TANGENT Unsigned 2077 BLA065
 GALVANOMETER - TANGENT Unsigned 3632 NMC128
 GALVANOMETER - TANGENT, GAUGAIN Elliott Brothers 2152 UDP241
 GALVANOMETER - TANGENT, GAUGAIN Harvey & Peak 2067 BLA049
 GALVANOMETER - TANGENT, GAUGAIN Nalder Brothers & Co. 1752 MAY235
 GALVANOMETER - TANGENT, GAUGAIN Yeates & Son 0782 UDP049
 GALVANOMETER - TANGENT, GAUGAIN Unsigned 0091 UCP060
 GALVANOMETER - TANGENT, GAUGAIN Unsigned 3503 QBP229
 GALVANOMETER - TANGENT, STEWART Griffin 1753 MAY236
 GALVANOMETER - TANGENT, STEWART Groves, W. 2070 BLA051
 GALVANOMETER - TANGENT, STEWART Unsigned 2740 TDP284
 GALVANOMETER - TANGENT, STEWART & GEE Baird & Tatlock 0065 UCP077
 GALVANOMETER - UNIPIVOT NEEDLE Cambridge Co. 0917 UDP182
 GALVANOMETER - UPRIGHT Ducretet, E. & Cie 0765 UDP034
 GALVANOMETER - UPRIGHT Yeates & Son 3564 Ex0598
 GALVANOMETER - UPRIGHT Yeates & Son 0182 UGP062
 GALVANOMETER - UPRIGHT Yeates & Son 0916 UDP181
 GALVANOMETER - UPRIGHT Yeates & Son 1588 MAY077
 GALVANOMETER - UPRIGHT Yeates & Son 1937 UCP164
 GALVANOMETER - UPRIGHT Yeates & Son 2735 TDP279
 GALVANOMETER - UPRIGHT Yeates & Son 3564 NMC060
 GALVANOMETER - UPRIGHT Yeates & Son 4151 TDP317
 GALVANOMETER - UPRIGHT Unsigned 1228 TDP106
 GALVANOMETER - UPRIGHT Unsigned 1687 MAY174
 GALVANOMETER - UPRIGHT Unsigned 3566 NMC062
 GALVANOMETER - VIBRATION Cambridge Co. 3083 UDE109
 GALVANOMETER - WILBERFORCE Pye, W.G. & Co. 1227 TDP065
 GALVANOMETER LAMP HOUSING & SCALE Nalder Brothers & Co. 3763 NMC164
 GALVANOMETER SCALE Cambridge Co. 1522 UGP108

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GALVANOMETER SCALE Gambrell Brothers 3021 UDE047
GALVANOMETER SCALE Maiben, J.M. & Co. 0306 CWC029
GALVANOMETER SCALE Maiben, J.M. & Co. 3002 UDE028
GALVANOMETER SCALE Nalder Brothers 1523 UGP109
GALVANOMETER SCALE Unsigned 2223 UDP301
GALVANOSCOPE - WEINHOLD Griffin 0050 UCP081
GAS EXPLOSION PIPETTE - HEMPEL Unsigned 4133 MAY337
GAS GENERATOR Unsigned 1034 QBC016
GAS GENERATOR Unsigned 3648 NMC144
GAS GENERATOR Unsigned 3648 NMD168
GAS GENERATOR - KIPPS Unsigned 0364 RDS072
GAS GENERATOR - KIPPS Unsigned 3647 NMC143
GAS GENERATOR - KIPPS Unsigned 3745 NMC146
GAS GENERATOR - KIPPS Unsigned 3745 NMD166
GAS GENERATOR - KIPPS Unsigned 4484 STL012
GAS GOVERNOR - BALANCE Unsigned 0479 RDS108
GAS HOLDER Griffin, J.J. & Sons 3755 NMC156
GAS HOLDER Griffin, J.J. & Sons 3755 NMD163
GAS HOLDER Unsigned 3756 NMC157
GAS HOLDER Unsigned 3756 NMD162
GAS METER Croll Rait & Co. 1341 TDP023
GAS METER Sugg, W. 0746 UCP106
GAS MIXING APPARATUS Unsigned 3644 NMC140
GAS MIXING APPARATUS Unsigned 3644 NMD170
GAS PRESSURE REGULATOR Beard 0482 RDS083
GAS PRESSURE REGULATOR Beard 2556 BIR104
GAS PRESSURE REGULATOR Manchester Oxygen Co. 2557 BIR105
GAS PRESSURE REGULATOR Steward, J.H. 3412 BIR114
GAS PRESSURE REGULATOR Suter 2501 UGP207
GAS REGULATOR(?) Sehr 0010 UCP062
GAS VALVE - SCHIFF Unsigned 4327 TDC023
GAUGES Rosse, Earl of 0578 Ex0578
GEISSLER TUBE SPINNER Unsigned 3448 QBP174
GEM STONE REPLICAS Unsigned 2692 TDP236
GENERATOR - PORTABLE Evershed & Vignoles 3147 UDE172
GEOMETRICAL MODELS Yeates & Son 1380 TDE062
GEOMETRICAL MODELS Unsigned 2513 UGP219
GEOMETRICAL MODELS Unsigned 2702 TDP246
GERBER TUBE Hammusihmidt 0361 RDS098
GLASS BELL Unsigned 3637 NMC133
GLASS BELL JAR Unsigned 0342 CWC058
GLASS BELL JAR Unsigned 2167 UDP253
GLASS BELL JAR Unsigned 2697 TDP241
GLASS BELL JAR Unsigned 3410 BIR112
GLASS BELL JARS Unsigned 0478 RDS014
GLASS BELL JARS Unsigned 2112 BLA100
GLASS BELL JARS Unsigned 2806 UCP259
GLASS BELL JARS Unsigned 2894 UGP302
GLASS BELL JARS Unsigned 3778 NMC179
GLASS BELL JARS Unsigned 3778 NMD153
GLASS BELL JARS Unsigned 4311 TDC007
GLASS GLOBE Unsigned 0347 CWC005
GLASS GLOBE Unsigned 0480 RDS048
GLASS GLOBE Unsigned 1972 UCP199
GLASS GLOBE Unsigned 2945 UGP353
GLASS GLOBE Unsigned 3455 QBP181
GLASS GLOBE Unsigned 3456 QBP182
GLASS GOBLET ON METAL BASE Unsigned 3574 NMC070
GLASS GOBLET ON METAL BASE Unsigned 3574 NMD165
GLASS TANK Unsigned 3462 QBP188
GLASS TRAY Unsigned 3767 NMC168
GLASS TRAY Unsigned 3767 PRI228
GLASS VESSEL Unsigned 2877 UCP293
GLASS VESSEL Unsigned 3596 NMC092
GLOBE - CELESTIAL Adams, D. 1721 SAL008
GLOBE - CELESTIAL Bardin, W. & T.M. 3989 ARM063
GLOBE - CELESTIAL Cary, J. & W. 0355 MIS017
GLOBE - CELESTIAL Cary, J. & W. 1514 UGP092
GLOBE - CELESTIAL Cary, J. & W. 1623 MAY111
GLOBE - CELESTIAL Cary, J. & W. 3994 ARM068
GLOBE - CELESTIAL Cary, J. & W. 1661 MAY148
GLOBE - CELESTIAL Malby & Son 0062 UCP083
GLOBE - CELESTIAL Newton Son & Berry 3990 ARM064
GLOBE - CELESTIAL Smith & Sons 0786 NMD218
GLOBE - TERRESTRIAL Adams, D. 1720 SAL007
GLOBE - TERRESTRIAL Arnold, E.J. & Son 0558 Ex0558
GLOBE - TERRESTRIAL Arnold, E.J. & Son 0302 Ex0302
GLOBE - TERRESTRIAL Cary 1513 UGP091
GLOBE - TERRESTRIAL Cary, G. & J. 0648 NMD242
GLOBE - TERRESTRIAL Cary, J. & W. 1428 MIS016
GLOBE - TERRESTRIAL Cary, J. & W. 1662 MAY149
GLOBE - TERRESTRIAL Joslin, G. 4141 SAL082
GLOBE - TERRESTRIAL Lynch & Son 0204 Ex0204
GLOBE - TERRESTRIAL Malby, T. & Son 1529 UGP116
GLOBE - TERRESTRIAL McNally, R. 4390 SAL090

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GLOBE - TERRESTRIAL Newton Son & Berry 1834 DUN016
 GLOBE - TERRESTRIAL Smith & Sons 0649 NMD241
 GLOBES - CELESTIAL & TERRESTRIAL Adams, D. 3429 BIR131
 GLOBES - CELESTIAL & TERRESTRIAL Kirkwood 0003 Ex0003
 GLOBES - CELESTIAL & TERRESTRIAL Lane 2365 NMD070
 GLOBES - CELESTIAL & TERRESTRIAL Mason, T. (Cary) 0477 Ex0477
 GNOMON Yeates 0338 Ex0338
 GNOMON Unsigned 2458 NMD105
 GOBLET Unsigned 2149 UDP238
 GOLD LEAF FILM Unsigned 3965 ARM039
 GONIOMETER - CRYSTAL Elliott Brothers 1043 MAY017
 GONIOMETER - CRYSTAL Fuess, R. 1044 MAY018
 GONIOMETER - CRYSTAL Lerebours 0362 RDS082
 GONIOMETER - CRYSTAL Secretan 0009 UCP053
 GONIOMETER - CRYSTAL Yeates & Son 1041 MAY015
 GONIOMETER - CRYSTAL Unsigned 1155 TDP183
 GONIOMETER - CRYSTAL, WOLLASTON Cary 0363 RDS055
 GONIOMETER - CRYSTAL, WOLLASTON Elliott Brothers 0172 UGP051
 GONIOMETER - CRYSTAL, WOLLASTON Elliott Brothers 4039 UGG001
 GONIOMETER - CRYSTAL, WOLLASTON Fuess, R. 4043 UGG005
 GONIOMETER - CRYSTAL, WOLLASTON Robinson 0995 QBC005
 GONIOMETER - CRYSTAL, WOLLASTON Spencer & Son 1047 MAY023
 GONIOMETER - CRYSTAL, WOLLASTON Yeates 1048 MAY024
 GONIOMETER - CRYSTAL, WOLLASTON Yeates & Son 0824 UDP090
 GONIOMETER - CRYSTAL, WOLLASTON Yeates & Son 1046 MAY022
 GONIOMETER - CRYSTAL, WOLLASTON Yeates & Son 2315 QBP081
 GONIOMETER - REFRACTION Griffin 1888 UGP157
 GONIOMETER - REFRACTION Yeates & Son 0332 CWC007
 GONIOMETER - SEARL Pye, W.G. & Co. 1315 TDP068
 GRAIN SIZER(?) Roby, R. 0576 IDG075
 GRAPHITE CRUCIBLE Plumbago Co. 3836 BIR145
 GRAPHITE FLASK Faure 3422 BIR124
 GRAPHOMETER Butterfield 0639 NMD250
 GRAPHOMETER Butterfield 0923 NMD026
 GRAPHOMETER Hicks, J. (Grubb Patent) 1360 TDE033
 GRAPHOMETER Hicks, J. (Grubb Patent) 3232 QBE010
 GRAPHOMETER Molteno Aine 2012 BLA001
 GRAPHOMETER Unsigned 2139 UDP228
 GRATING - DIFFRACTION Beck, R. & J. 1395 UCP143
 GRATING - DIFFRACTION Chapman, D.C. 1145 TDP184
 GRATING - DIFFRACTION Merton 3486 QBP212
 GRATING - DIFFRACTION Rowland 0691 UDP019
 GRATING - DIFFRACTION Rowland 2126 UDP178
 GRATING - DIFFRACTION Rowland, H.A. 0135 QBP004
 GRATING - DIFFRACTION Rowland, H.A. 1835 DUN017
 GRATING - DIFFRACTION Thorp 0692 UDP020
 GRATING - DIFFRACTION Thorp 1953 UCP180
 GRATING - DIFFRACTION Thorp 3485 QBP211
 GRATING - DIFFRACTION Thorp 3827 NMC228
 GRATING - DIFFRACTION Yeates & Son 0776 UDP043
 GRATING - DIFFRACTION Unsigned 3487 QBP213
 GRATING - DIFFRACTION, MOUNTED ON PRISM Thorp 3496 QBP222
 GRATING - ECHELON Hilger, A. 0724 UCP121
 GRATING - ECHELON Hilger, A. 2127 UDP179
 GRAVITY TRACK Unsigned 1321 TDP062
 GRINDING TOOL Rosse, Earl of 0579 Ex0579
 GUINEA & FEATHER APPARATUS Unsigned 1665 MAY152
 GUINEA & FEATHER APPARATUS Unsigned 2038 BLA027
 GUINEA & FEATHER APPARATUS(?) Unsigned 2194 UDP280
 GUNNER'S CALLIPERS Deane, W. 0621 NMD267
 GUNNER'S CALLIPERS Spear 0073 Ex0073
 GUNNER'S CALLIPERS Spear 0303 Ex0303
 GUNNER'S CALLIPERS Spear 0518 Ex0518
 GUNNER'S CALLIPERS Spear 0620 Ex0620
 GUNNER'S CALLIPERS Spear 0644 Ex0644
 GUNNER'S CALLIPERS Spear 1389 PRI020
 GUNNER'S RULE Unsigned 3920 ULS017
 GYROSCOPE Newton & Co. 0812 UDP078
 GYROSCOPE Newton & Co. 2319 QBP085
 GYROSCOPE Newton & Co. 3445 QBP171
 GYROSCOPE Yeates & Son 0815 UDP081
 GYROSCOPE Unsigned 2228 UDP306
 GYROSCOPE Unsigned 3444 QBP170
 HALDAT APPARATUS Elliott Brothers 1510 UGP088
 HALDAT APPARATUS Spencer & Son 1054 MAY030
 HAND AND BLADDER GLASS Unsigned 2898 UGP306
 HARDNESS TESTER Yeates & Son 1675 MAY162
 HEAD WITH HAIR Unsigned 2794 UCP247
 HELIOMETER Grubb, H. 0201 Ex0201
 HELIOMETER Grubb, H. 0159 Ex0159
 HELIOMETER Grubb, H. 0448 Ex0448
 HELIOSTAT Grubb, H. 634 Ex0634
 HELIOSTAT Grubb, H. 0196 Ex0196
 HELIOSTAT Grubb, H. 0468 Ex0468
 HELIOSTAT Potter 0154 UGP033

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HELIOSTAT Unsigned 3951 ARM025
HELIOSTAT - SILBERMANN Duboscq, J. 0137 QBP002
HELIOSTAT - STONEY Spencer & Son 0074 Ex0074
HELIOSTAT - STONEY Spencer & Son 0075 Ex0075
HELIOSTAT - STONEY Spencer & Son 0106 Ex0106
HELIOSTAT - STONEY Spencer & Son 0124 Ex0124
HELIOSTAT - STONEY Spencer & Son 0572 Ex0572
HELIOSTAT - STONEY Spencer & Son 0673 UDP001
HELIOSTAT - STONEY Watson, W. & Sons 0428 RDS016
HELIOSTAT - STONEY Yeates & Son 0043 Ex0043
HELIOSTAT - STONEY Yeates & Son 0155 UGP034
HELIOSTAT - STONEY Yeates & Son 0429 RDS006
HELIOSTAT - STONEY Yeates & Son 1058 MAY034
HELIOSTAT - STONEY Yeates & Son 1435 MAY055
HEMPEL FLASK Unsigned 3768 NMC169
HEMPEL FLASK Unsigned 3768 NMD158
HEMPEL FLASK Unsigned 3769 NMC170
HEMPEL FLASK Unsigned 3769 NMD157
HEMPEL GAS ABSORPTION BULBS Unsigned 3772 NMC173
HEMPEL GAS ABSORPTION BULBS Unsigned 3772 NMD155
HOPE APPARATUS Unsigned 1806 MAY289
HOPE APPARATUS Unsigned 2256 UDP334
HORIZONTAL INSTRUMENT Unsigned 3685 NMD131
HORN Automatic Telephone Co. 3500 QBP226
HORN Brown, S.G. 2888 UGP296
HOUSING Maiben, J.M. & Co. 2002 CWC019
HYDRAULIC BELLOWS Unsigned 3481 QBP207
HYDRAULIC RAM Unsigned 3482 QBP208
HYDROMETER Argent 2053 BLA042
HYDROMETER Buckley & Co. 0527 IDG031
HYDROMETER Capps, J. 0054 Ex0054
HYDROMETER Dicas (Marratt & Ellis) 1961 UCP187
HYDROMETER Dring & Fage 1438 NMD110
HYDROMETER Dring & Fage 2017 BLA006
HYDROMETER Griffin 2657 RDS155
HYDROMETER Hicks 2054 BLA043
HYDROMETER Hicks, J. 0070 UCP084
HYDROMETER Hicks, J. 0528 IDG049
HYDROMETER Long, J. 0529 IDG040
HYDROMETER Mason, T. 1637 MAY124
HYDROMETER Riddell, L. 2312 QBP078
HYDROMETER Robinson, J. & Sons 2049 BLA038
HYDROMETER Stevenson, P. 1611 MAY100
HYDROMETER Townson & Mercer 2055 BLA054
HYDROMETER Yeates 1604 MAY093
HYDROMETER Yeates & Son 1292 TDP197
HYDROMETER Yeates & Son 1636 MAY123
HYDROMETER Yeates & Son 2311 QBP077
HYDROMETER Yeates & Son 2720 TDP264
HYDROMETER Unsigned 0526 IDG057
HYDROMETER Unsigned 0531 IDG056
HYDROMETER Unsigned 1868 UGP137
HYDROMETER Unsigned 1869 UGP138
HYDROMETER Unsigned 1879 UGP148
HYDROMETER Unsigned 2052 BLA041
HYDROMETER Unsigned 2275 UDP353
HYDROMETER Unsigned 2656 RDS154
HYDROMETER Unsigned 2662 RDS160
HYDROMETER Unsigned 2721 TDP265
HYDROMETER Unsigned 2819 UCP272
HYDROMETER Unsigned 2820 UCP273
HYDROMETER Unsigned 3473 QBP199
HYDROMETER Unsigned 3640 NMC136
HYDROMETER - BATTERY TESTING Hicks 2818 UCP271
HYDROMETER - BATTERY TESTING Yeates & Son 3523 SAL046
HYDROMETER - DIABETES Unsigned 2050 BLA039
HYDROMETER - FAHRENHEIT Unsigned 2044 BLA033
HYDROMETER - NICHOLSON Unsigned 1610 MAY098
HYDROMETER - NICHOLSON Unsigned 1963 UCP189
HYDROMETER - NICHOLSON Unsigned 2046 BLA035
HYDROMETER - NICHOLSON Unsigned 2047 BLA036
HYDROMETER - NICHOLSON Unsigned 2313 QBP079
HYDROMETER - NICHOLSON Unsigned 2941 UGP349
HYDROMETER - NICHOLSON Unsigned 3774 NMC175
HYDROMETER - O'TOOLE Unsigned 2045 BLA034
HYDROMETER - RECORDING Cambridge Co. 0542 IDG028
HYDROMETER - RECORDING Cambridge & Paul Co. 0543 IDG033
HYDROMETER - SIKES Baird & Tatlock (Dring & Fage) 0532 IDG012
HYDROMETER - SIKES Bate (Loftus) 2967 PRI076
HYDROMETER - SIKES Bennett, T. 0415 NMD035
HYDROMETER - SIKES Buss 0533 IDG021
HYDROMETER - SIKES Buss 0993 PRI144
HYDROMETER - SIKES Buss 3726 PRI111
HYDROMETER - SIKES Buss 4028 SAL077
HYDROMETER - SKIES Buss, T.O. 3924 ULS021

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HYDROMETER - SIKES Buss 4110 UFM025
HYDROMETER - SIKES Dring & Fage 0534 IDG010
HYDROMETER - SIKES Dring & Fage 0535 IDG015
HYDROMETER - SIKES Dring & Fage 3943 SAL060
HYDROMETER - SIKES Dring & Fage 4477 STL005
HYDROMETER - SIKES Edmonds, W.G. & Co. 1414 NMD063
HYDROMETER - SIKES Farrow & Jackson 2291 PRI171
HYDROMETER - SIKES Fox, J. & Co. 3942 SAL059
HYDROMETER - SIKES Jordi, M. & Co. 0711 NMD010
HYDROMETER - SIKES Jordi, M. & Co. 2613 PRI047
HYDROMETER - SIKES Jordi, M. & Co. (Mason & Son) 4289 RCS039
HYDROMETER - SIKES Loftus 1962 UCP188
HYDROMETER - SIKES Loftus 3927 ULS024
HYDROMETER - SIKES Long, J. 0536 IDG013
HYDROMETER - SIKES Long, J. 4109 UFM024
HYDROMETER - SIKES Mason, T. 2629 PRI064
HYDROMETER - SIKES Mason, T. 4478 STL006
HYDROMETER - SIKES Neill, S.D. 0505 Ex0505
HYDROMETER - SIKES Reeves, W. 0530 IDG050
HYDROMETER - SIKES Yeates & Son 1634 MAY121
HYDROMETER - SIKES Unsigned 0538 IDG044
HYDROMETER - SIKES Unsigned 0539 IDG070
HYDROMETER - SIKES Unsigned 2664 PRI072
HYDROMETER - SIKES Unsigned 4227 PRI245
HYDROMETER - TAR TESTER Hutchinson 4479 STL007
HYDROMETER - TWADDELL Mason 1635 MAY122
HYDROMETER - TWADDELL Thomson, Skinner & Hamilton 2301 PRI175
HYDROMETER - TWADDELL Twaddell, W. 2310 QBP076
HYDROMETER - TWADDELL White, J. 0540 IDG043
HYDROMETER - TWADDELL Yeates & Son 0416 RDS085
HYDROMETER - TWADDELL Unsigned 0541 IDG036
HYDROMETER - TWADDELL Unsigned 0871 UDP136
HYDROMETER - TWADDELL Unsigned 2048 BLA037
HYDROSTATIC CHAMBER Unsigned 2526 UGP232
HYDROSTATIC VALVE APPARATUS Unsigned 3339 UCP339
HYGROMETER - DANIELL Unsigned 0019 UCP086
HYGROMETER - DANIELL Unsigned 0020 UCP085
HYGROMETER - DANIELL Unsigned 1177 TDP001
HYGROMETER - DANIELL Unsigned 1607 MAY096
HYGROMETER - DANIELL Unsigned 1871 UGP140
HYGROMETER - DANIELL Unsigned 1881 UGP150
HYGROMETER - DANIELL Unsigned 2078 BLA066
HYGROMETER - DANIELL Unsigned 2079 BLA067
HYGROMETER - DANIELL Unsigned 2809 UCP262
HYGROMETER - DANIELL Unsigned 3309 UCP309
HYGROMETER - DANIELL Unsigned 3773 NMC174
HYGROMETER - DINES Casella, L. 3355 UCP355
HYGROMETER - DINES Casella, L. 0808 UDP074
HYGROMETER - DINES Casella, L. 0951 UDP118
HYGROMETER - DINES Casella, L. 3311 UCP311
HYGROMETER - DINES Yeates & Son 1666 MAY153
HYGROMETER - DINES Yeates & Son 2699 TDP243
HYGROMETER - DINES Unsigned 1667 MAY154
HYGROMETER - DINES Unsigned 2685 TDP229
HYGROMETER - EDNEY PAPER Edney 4082 QBP270
HYGROMETER - HAIR Casella 0562 IDG039
HYGROMETER - HAIR Negretti & Zambra 0563 IDG038
HYGROMETER - MASON Bennett, T. 0105 UCP020
HYGROMETER - MASON Greiner, J.G. 1183 TDP002
HYGROMETER - MASON Griffin 1878 UGP147
HYGROMETER - MASON Hicks, J. 1960 UCP186
HYGROMETER - MASON Mason & Son 1179 TDP140
HYGROMETER - MASON Negretti & Zambra 1252 TDP142
HYGROMETER - MASON Nicolson, W.B. 4083 QBP271
HYGROMETER - MASON Spencer & Son 1190 TDP114
HYGROMETER - MASON Williams & Woods 2042 BLA031
HYGROMETER - MASON Yeates & Son 1608 MAY097
HYGROMETER - MASON Yeates & Son 2398 BIR074
HYGROMETER - MASON, VENTILATED Lambrecht, W. 3723 UGP375
HYGROMETER - REGNAULT Elliott Brothers 0017 UCP038
HYGROMETER - REGNAULT Yeates & Son 0807 UDP073
HYGROMETER - SAUSSURE Hicks, J. 1958 UCP184
HYGROMETER - TWIRLING Casella 1967 UCP194
HYPSONETER Cary, W. 1000 QBC010
HYPSONETER Unsigned 2190 UDP276
HYPSONETER Unsigned 2499 UGP205
ICE MOULD Unsigned 0838 UDP104
ICE MOULD Unsigned 1458 UCP136
IMPACT APPARATUS(?) Becker, F.E. & Co. 1511 UGP089
IMPACT APPARATUS Watkins & Hill 3734 UGP385
IMPEDANCE ARCH Unsigned 0845 UDP111
INCLINED PLANE Unsigned 0338 CWC002
INCLINED PLANE Unsigned 2798 UCP251
INCUBATOR Leitz, E. 4297 RCS047
INDUCED CURRENT HEATING RING Unsigned 0906 UDP172

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INDUCTANCE Cambridge Co. 3111 UDE136
INDUCTANCE - VARIABLE Nalder Brothers & Co. 3104 UDE130
INDUCTANCE - VARIABLE Sullivan, H.W. 2709 TDP253
INDUCTANCE BOX Cambridge Co. 3072 UDE098
INHALER Godfrey 2292 PRI180
INHALER Lynch & Co. 1567 MIS023
INHALER Lynch & Co. 2620 SAL001
INHALER Lynch & Co. 2973 NEW003
INHALER Maw, S., Son & Thompson 0559 IDG069
INSTRUMENT COMPENDIUM Yeates, S. 0559 Ex0559
INSTRUMENT COMPENDIUM Yeates, S. 1719 SAL006
INTERRUPTOR Callan, N. 1723 MAY206
INTERRUPTOR Ducretet, E. 0004 UCP089
INTERRUPTOR Pye, W.G. & Co. 1724 MAY207
INTERRUPTOR Twickenham Co. 2871 UCP287
INTERRUPTOR Unsigned 1460 UCP138
INTERRUPTOR Unsigned 1787 MAY270
INTERRUPTOR Unsigned 2123 BLA111
INTERRUPTOR Unsigned 2221 UDP299
INTERRUPTOR Unsigned 2519 UGP225
INVERTED PENDULUM APPARATUS Walton, E.T.S. 4235 NMD191
KALEIDOPHONE - WHEATSTONE Koenig, R. 0803 UDP069
KALEIDOSCOPE Arm, P.K. 0496 Ex0496
KALEIDOSCOPE Duboscq, J. 0245 QBP040
KALEIDOSCOPE London Stereoscope Co. 1693 MAY180
KALEIDOSCOPE Unsigned 1692 MAY179
KALEIDOSCOPE Unsigned 2073 BLA061
KEY Merne, J.G. 4174 NMC244
KEY Merne, J.G. 4174 PRI232
KINORA Kinora 0788 PRI016
LAMP Oldham 0556 IDG046
LAMP Stocks 1778 MAY261
LAMP Wells, A.C. & Co. 1708 MAY195
LAMP - CANDLE Unsigned 4220 PRI246
LAMP - CARBON ARC Borland, F.J. 2521 UGP227
LAMP - CARBON ARC Crompton & Pochin 3143 UDE168
LAMP - CARBON ARC Deleuil 1712 MAY199
LAMP - CARBON ARC Kalee 0433 RDS120
LAMP - CARBON ARC Ladd, W. 1711 MAY198
LAMP - CARBON ARC Leitz, E. 2528 UGP234
LAMP - CARBON ARC Paul, R.W. 2522 UGP228
LAMP - CARBON ARC Sauter Frères 0841 UDP107
LAMP - CARBON ARC Serrin 1338 TDP075
LAMP - CARBON ARC Steward, J.H. 0431 RDS100
LAMP - CARBON ARC Warwick Trading Co. 3356 UCP356
LAMP - CARBON ARC Unsigned 0013 UCP007
LAMP - CARBON ARC Unsigned 0434 RDS122
LAMP - CARBON ARC Unsigned 0435 RDS121
LAMP - CARBON ARC Unsigned 1325 TDP074
LAMP - CARBON ARC Unsigned 1339 TDP055
LAMP - CARBON ARC Unsigned 1777 MAY260
LAMP - CARBON ARC Unsigned 2881 UCP297
LAMP - CARBON ARC Unsigned 3559 NMC055
LAMP - CARBON ARC, BROCKIE Johnson & Phillips 0012 UCP012
LAMP - CARBON ARC, BROCKIE Johnson & Phillips 0432 RDS081
LAMP - CARBON ARC, BROCKIE Johnson & Phillips 3193 QBP138
LAMP - DOBEREINER Schlesinge 0100 UCP033
LAMP - ELECTRIC Ducretet, E. 0953 UDP156
LAMP - ELECTRIC Edison 0238 QBP032
LAMP - ELECTRIC Edison & Swan Co. 3145 UDE170
LAMP - ELECTRIC Ediswan 0315 CWC063
LAMP - ELECTRIC GEC [General Electric Company] 3141 UDE166
LAMP - ELECTRIC Sunbeam 1798 MAY281
LAMP - ELECTRIC Sunbeam 2407 BIR083
LAMP - ELECTRIC Sunbeam 3634 NMC130
LAMP - GALVANOMETER Kipp 0395 RDS095
LAMP - GALVANOMETER Maiben, J.M. & Co. 3000 UDE026
LAMP - GALVANOMETER Unsigned 3001 UDE027
LAMP - GAS Schott & Genossen 3752 NMC153
LAMP - GAS Unsigned 3762 NMC163
LAMP - LIME LIGHT Lawson, W. 0066 UCP065
LAMP - LIME LIGHT Oxygen Co. 2427 BIR103
LAMP - LIME LIGHT Unsigned 2327 QBP093
LAMP - LIME LIGHT Unsigned 4330 TDC026
LAMP - MAGNESIUM Solomon, J. 0436 RDS061
LAMP - MAGNESIUM Solomon, J. 2100 BLA088
LAMP - MICROSCOPE Watson & Sons 3910 ULS007
LAMP - MICROSCOPE Yeates & Son 0744 UCP104
LAMP - MICROSCOPE Unsigned 0593 NMD293
LAMP - MINER SAFETY Naylor 1558 STR017
LAMP - MINER SAFETY Newman 0437 RDS028
LAMP - MINER SAFETY Premier Lamp Co. 1683 MAY170
LAMP - MINER SAFETY Unsigned 0883 UDP149
LAMP - MINER SAFETY Unsigned 1682 MAY169
LAMP - MINER SAFETY Unsigned 1925 UGP194

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LAMP - MINER SAFETY Unsigned 2507 UGP213
LAMP - OIL Ausfeld, H. 2356 BIR042
LAMP - OIL Hughes, W.C. 4228 PRI247
LAMP - OIL Lancaster 4229 PRI248
LAMP - OIL Unsigned 1906 UGP175
LAMP - OIL Unsigned 3953 ARM027
LAMP - OXY HYDROGEN Unsigned 1707 MAY194
LAMP - PENTANE Woodhouse & Rawson Co. 2642 RDS140
LAMP - PENTANE Woodhouse & Rawson Co. 3142 UDE167
LAMP - SODIUM Unsigned 0076 UCP010
LAND CHAIN Chesterman, J.C. 1361 TDE035
LAND CHAIN Chesterman, J.C. 1790 MAY273
LAND CHAIN Hennessy 0357 Ex0357
LANTERN - BIUNIAL Newton & Co. 1152 TDP048
LANTERN - BIUNIAL Yeates & Son 1780 MAY263
LANTERN - DOUBLE Carpenter & Westley 4440 ULS061
LANTERN - TRIUNIAL Hughes, W.C. 2375 BIR051
LANTERN - TRIUNIAL Newton & Co. 0439 RDS002
LANTERN - TRIUNIAL Newton & Co. 2756 TDP300
LANTERN - TRIUNIAL Newton & Co. 4041 UGG003
LANTERN - UNIAL Clarke, E.M. 1779 MAY262
LANTERN - UNIAL GBN 4434 NMD185
LANTERN - UNIAL Lizars, J. 0252 QBP048
LANTERN - UNIAL Mason, T. (Beck) 0438 RDS067
LANTERN - UNIAL Newton & Co. 1200 TDP041
LANTERN - UNIAL Newton & Co. 1974 UCP201
LANTERN - UNIAL Newton & Co. 3519 MAY308
LANTERN - UNIAL Riley Brothers 1982 RDS132
LANTERN - UNIAL Riley Brothers 4080 ULS039
LANTERN - UNIAL S., J. 4435 NMD178
LANTERN - UNIAL W, J. 0443 RDS068
LANTERN - UNIAL Watson, W. & Sons (T. Mason) 2889 UGP297
LANTERN - UNIAL Unsigned 2874 UCP290
LANTERN - UNIAL Unsigned 3925 ULS022
LANTERN - UNIAL Unsigned 4081 ULS040
LANTERN - UNIAL Unsigned 4123 UFM038
LENGTH MEASURING DEVICE Whitehurst, J. 3961 ARM035
LENS Grubb, H. 0451 Ex0451
LENS Grubb, H. 0585 Ex0585
LENS Grubb, H. 0625 Ex0625
LENS Grubb, T. 0584 Ex0584
LENS - BICONVEX Hilger, A. 2181 UDP267
LENS - BICONVEX Unsigned 0957 UDP160
LENS - BICONVEX Unsigned 1305 TDP033
LENS - BICONVEX Unsigned 1548 STR007
LENS - BICONVEX Unsigned 3598 NMC094
LENS - BULL'S EYE Yeates, H. 0557 Ex0557
LENS - BULL'S EYE Unsigned 3507 QBP233
LENS - BULL'S EYE Unsigned 3661 PRI141
LENS - BULL'S EYE Unsigned 3662 PRI093
LENS - BULL'S EYE Unsigned 3666 PRI094
LENS - BULL'S EYE Unsigned 4254 RCS004
LENS - CONCAVE CONVEX Dallmeyer, J.H. 2380 BIR056
LENS - CONCAVE CONVEX Grubb, H. 2379 BIR055
LENS - CONCAVE CONVEX Grubb, T. 2378 BIR054
LENS - CONCAVE CONVEX Yeates & Son 0825 UDP091
LENS - CONCAVE CONVEX Yeates & Son 2647 RDS144
LENS - CONVEX Dallmeyer, J.H. 3833 NMC234
LENS - CYLINDRICAL Unsigned 3508 QBP234
LENS - FACETTED Unsigned 3479 QBP205
LENS - MOUNTED Unsigned 3981 ARM055
LENS - PLANO CONCAVE Unsigned 3167 QBP112
LENS - PLANO CONVEX Bland & Long 2386 BIR062
LENS - PLANO CONVEX Dollond, P. 4004 ARM078
LENS - PLANO CONVEX Lerebours & Secretan 2387 BIR063
LENS - PLANO CONVEX Lerebours & Secretan 4075 BIR166
LENS - PLANO CONVEX Ross, A. 2382 BIR058
LENS - PLANO CONVEX Unsigned 1153 TDP054
LENS - PLANO CONVEX Unsigned 1281 TDP191
LENS ON STAND Duboscq, J. 0687 UDP015
LENS ON STAND Ladd, W. 0978 BIR019
LENS ON STAND Yeates & Son 0445 RDS040
LENS ON STAND Yeates & Son 0071 UCP088
LENS ON STAND Yeates & Son 1188 TDP178
LENS ON STAND Unsigned 0325 CWC074
LENS ON STAND Unsigned 1478 UGP099
LENS ON STAND Unsigned 1479 UGP107
LENS HOLDER Baird & Tatlock 1453 UCP132
LENS HOLDER Unsigned 0868 UDP134
LENS HOLDER Unsigned 3799 NMC200
LENS MEASURER Unsigned 1840 DUN022
LENS MODELS Unsigned 0177 UGP057
LENS SYSTEM Cussons & Co. 2514 UGP220
LENS SYSTEM Dallmeyer, J.H. 1546 STR005
LENS SYSTEM Dallmeyer, J.H. 1547 STR006

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LENS SYSTEM Grubb, H. 1545 STR004
LENS SYSTEM Grubb, T. 0318 Ex0318
LENS SYSTEM Grubb, T. 0447 RDS029
LENS SYSTEM Grubb, T. 1853 PRI026
LENS SYSTEM Grubb, T. 3680 PRI109
LENS SYSTEM Jamin 1248 TDP061
LENS SYSTEM Liesegang, E. 2376 BIR052
LENS SYSTEM Newton & Co. 0440 RDS124
LENS SYSTEM Robinson, J. & Sons 0448 RDS065
LENS SYSTEM Ross 2162 NMD217
LENS SYSTEM Ross 2381 BIR057
LENS SYSTEM Watson, W. & Sons 2388 BIR064
LENS SYSTEM Unsigned 0444 RDS066
LENS SYSTEM Unsigned 0446 RDS093
LENS SYSTEM Unsigned 1852 DUN034
LENS SYSTEM Unsigned 3106 UDE131
LENS SYSTEM Unsigned 3562 NMC058
LENS SYSTEM Unsigned 4002 ARM076
LENS SYSTEM Unsigned 4062 BIR153
LENS SYSTEM Unsigned 4063 BIR154
LENS SYSTEM Unsigned 4074 BIR165
LENS SYSTEM ON STAND Unsigned 3812 NMC213
LENSES Dallmeyer, J.H. 2377 BIR053
LENSES Harvey & Peak 2937 UGP345
LENSES Rouch, W.W. & Co. 2515 UGP221
LENSES Yeates & Son 0828 UDP094
LENSES Unsigned 2251 UDP329
LENSES Unsigned 2816 UCP269
LENSES Unsigned 2882 UGP290
LENSES Unsigned 2938 UGP346
LENSES - MICROSCOPE Seibert 4424 PRI258
LESLIE CUBE Unsigned 0864 UDP130
LESLIE CUBE Unsigned 1883 UGP152
LESLIE CUBE Unsigned 1940 UCP167
LEVEL - BUREL Unsigned 1080 TDE030
LEVEL - HAND Hicks, J. (Grubb Patent) 1359 TDE031
LEVEL - HAND Stanley 3230 QBE008
LEVEL - SPIRIT Booth Brothers 3521 SAL044
LEVEL - SPIRIT Marshall 4140 SAL081
LEVEL - SPIRIT McNeill, H. & Co. 3522 SAL045
LEVEL - SPIRIT Thornton, A.G. 2480 PRI201
LEVEL - SPIRIT Yeates & Son 0640 Ex0640
LEVEL - SPIRIT Unsigned 1738 MAY221
LEVEL - SPIRIT Unsigned 1965 UCP192
LEVEL - SPIRIT Unsigned 3308 UCP308
LEVEL - SPIRIT Unsigned 3416 BIR118
LEVEL - SPIRIT Unsigned 3548 NMC044
LEVEL - TELESCOPIC Adie 0206 UGE017
LEVEL - TELESCOPIC Adie 0207 UGE018
LEVEL - TELESCOPIC Adie 0209 UGE020
LEVEL - TELESCOPIC Adie, A. 2971 NEW001
LEVEL - TELESCOPIC Buckley 0329 Ex0329
LEVEL - TELESCOPIC Buckley 0334 Ex0334
LEVEL - TELESCOPIC Buckley 4193 DCM004
LEVEL - TELESCOPIC Buckley, J. 0969 BIR009
LEVEL - TELESCOPIC Cooke 2475 PRI196
LEVEL - TELESCOPIC Davis 1442 MIS004
LEVEL - TELESCOPIC Davis, J. & Son 2476 PRI197
LEVEL - TELESCOPIC Mason 2474 PRI195
LEVEL - TELESCOPIC Mason, T. 0065 Ex0065
LEVEL - TELESCOPIC Mason, T. 1366 TDE040
LEVEL - TELESCOPIC Mason & Co. 0278 Ex0278
LEVEL - TELESCOPIC Moore, F.M. 3234 QBE012
LEVEL - TELESCOPIC Pallant, I. 4011 SAL068
LEVEL - TELESCOPIC Spencer 0413 NMD033
LEVEL - TELESCOPIC Spencer & Son 2472 PRI193
LEVEL - TELESCOPIC Spencer & Son 0400 Ex0400
LEVEL - TELESCOPIC Spencer & Son 0402 Ex0402
LEVEL - TELESCOPIC Spencer & Son 0403 Ex0403
LEVEL - TELESCOPIC Sprenger, E. 4209 DCM005
LEVEL - TELESCOPIC Stanley 1365 TDE038
LEVEL - TELESCOPIC Stanley 3862 UDE179
LEVEL - TELESCOPIC Street, T. (Holst, H.E.) 3251 QBE028
LEVEL - TELESCOPIC Thornton, A.G. 3250 QBE027
LEVEL - TELESCOPIC Thornton, A.G. 3252 QBE029
LEVEL - TELESCOPIC Troughton & Simms 0201 UGE012
LEVEL - TELESCOPIC Troughton & Simms 0569 IDG005
LEVEL - TELESCOPIC Troughton & Simms 2574 PRI209
LEVEL - TELESCOPIC Troughton & Simms 3235 QBE013
LEVEL - TELESCOPIC Troughton & Simms 3249 QBE026
LEVEL - TELESCOPIC Troughton & Simms 3253 QBE030
LEVEL - TELESCOPIC Troughton & Simms 3254 QBE031
LEVEL - TELESCOPIC Troughton & Simms 3255 QBE032
LEVEL - TELESCOPIC Troughton & Simms 4428 PRI263
LEVEL - TELESCOPIC Yeates & Son 0404 Ex0404

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LEVEL - TELESCOPIC Yeates & Son 637 Ex0637
 LEVEL - TELESCOPIC Yeates & Son 0486 NMD034
 LEVEL - TELESCOPIC Unsigned 2785 UCP238
 LEVEL - TELESCOPIC Zeiss, C. 4217 DCM006
 LEVEL - WATER Hicks, J.J. 0627 NMD261
 LEVEL - Y Jones, T. 0732 MAY007
 LEVEL - Y Negretti & Zambra 3225 QBE003
 LEVEL - Y Spencer & Son 0629 NMD260
 LEVEL - Y Spencer & Son 3224 QBE002
 LEVEL - Y Troughton 0630 NMD259
 LEVEL - Y Troughton & Simms 2486 SAL035
 LEVEL - Y Troughton & Simms 1079 TDE039
 LEVEL - Y Watkins & Hill 0197 UGE008
 LEYDEN JAR Kohl, M. 4132 MAY336
 LEYDEN JAR Unsigned 0898 UDP164
 LEYDEN JAR Unsigned 1316 TDP080
 LEYDEN JAR Unsigned 1776 MAY259
 LEYDEN JAR Unsigned 2071 BLA053
 LEYDEN JAR Unsigned 2406 BIR082
 LEYDEN JAR Unsigned 2645 RDS142
 LEYDEN JAR Unsigned 2963 NMD126
 LEYDEN JAR Unsigned 3163 QBP108
 LEYDEN JAR Unsigned 3631 NMC127
 LEYDEN JAR BATTERY Harvey & Peak 0900 UDP166
 LEYDEN JAR BATTERY Unsigned 1470 UCP158
 LEYDEN JAR BATTERY Unsigned 2744 TDP288
 LEYDEN JAR BATTERY Unsigned 2957 UGP365
 LEYDEN JAR BATTERY Unsigned 3735 UGP386
 LEYDEN JAR BATTERY Unsigned 2743 TDP287
 LEYDEN JAR BATTERY Unsigned 2745 TDP289
 LEYDEN JAR BATTERY Unsigned 3188 QBP133
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 0310 CWC023
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 1245 TDP115
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 1727 MAY210
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 2147 UDP236
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 2903 UGP311
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 3162 QBP107
 LEYDEN JAR WITH REMOVABLE COATINGS Unsigned 3314 UCP314
 LEYDEN JAR WITH ROMOVABLE COATINGS Unsigned 3822 NMC223
 LEYDEN JAR WITH WIRE GAUZE COATINGS Elliott Brothers 3716 UGP368
 LIFTING FRAME FOR BATTERIES[?] Unsigned 3749 NMC150
 LIGHT INTERFERENCE SLIT Unsigned 2970 TDP309
 LIGHT RECOMBINATION MIRRORS Unsigned 1050 MAY026
 LIGHT RECOMBINATION MIRRORS Unsigned 1215 TDP124
 LIGHTENING CONDUCTOR - MODEL Unsigned 2822 UCP275
 LINEN PROVER Casartelli, J. & Son 3931 ULS028
 LINEN PROVER Frith, P. 2573 PRI208
 LINEN PROVER Neill Brothers 2572 PRI207
 LINEN PROVER Seward 0705 NMD004
 LINESMAN'S DETECTOR Siemens Brothers & Co. 2587 PRI221
 LODESTONE Unsigned 0887 UDP153
 LODESTONE Unsigned 1312 TDP179
 LOG BOX Holm, P. 1138 NMD046
 LORRAIN GLASS Mason 3682 NMD130
 MAGDEBURG HEMISPHERES Yeates & Son 1971 UCP198
 MAGDEBURG HEMISPHERES Unsigned 0186 UGP066
 MAGDEBURG HEMISPHERES Unsigned 0346 CWC004
 MAGDEBURG HEMISPHERES Unsigned 1267 TDP103
 MAGDEBURG HEMISPHERES Unsigned 2031 BLA020
 MAGDEBURG HEMISPHERES Unsigned 2225 UDP303
 MAGNET Lewis, W. 0060 Ex0060
 MAGNET Unsigned 0905 UDP171
 MAGNET Unsigned 1466 UCP155
 MAGNET Unsigned 1902 UGP171
 MAGNET Unsigned 2011 CWC083
 MAGNET Unsigned 3776 NMC177
 MAGNET - ROTATING Yeates & Son 0274 QBP069
 MAGNET - ROTATING Yeates & Son 1575 MAY064
 MAGNET - ROTATING Yeates & Son 2694 TDP238
 MAGNET - ROTATING Unsigned 1447 UCP127
 MAGNET - ROTATING Unsigned 1889 UGP158
 MAGNET - ROTATING Unsigned 1890 UGP159
 MAGNET - ROTATING Unsigned 1898 UGP167
 MAGNET & ROTATING CONDUCTOR Elliott Brothers 1895 UGP164
 MAGNET & ROTATING CONDUCTOR Unsigned 0270 QBP065
 MAGNET & ROTATING CONDUCTOR Unsigned 1577 MAY066
 MAGNET & ROTATING CONDUCTOR Unsigned 1893 UGP162
 MAGNET & ROTATING WHEEL Harvey & Peak 3168 QBP113
 MAGNETIC DIAGRAMS Faraday, M. 0217 QBP013
 MAGNETIC NEEDLE Kohl, M. 1891 UGP160
 MAGNETIC NEEDLE - PIVOTED Unsigned 3638 NMC134
 MAGNETIC NEEDLE SUPPORT Ducretet, E. & Cie 2242 UDP320
 MAGNETIC PERMEABILITY APPARATUS Ewing 3095 UDE121
 MAGNETIC PERMEABILITY APPARATUS Unsigned 3110 UDE135
 MAGNETIC PERMEABILITY APPARATUS Unsigned 3140 UDE165

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MAGNETOMETER Cambridge & Paul Co. 3094 UDE120
MAGNETOMETER Holtzappel & Co. 2111 BLA099
MAGNETOMETER Pye, W.G. 2565 UGP265
MAGNETOMETER White, J. 3080 UDE106
MAGNETOMETER Unsigned 1819 MAY302
MAGNETOMETERS Grubb, T. 0310 Ex0310
MAGNETOMETER - EWLES' DAMPING Reynolds & Branson 1802 MAY285
MAGNETOMETER - KEW PATTERN Dover Charlton Kent 4518 MET017
MAGNETOMETER - KEW PATTERN Jones, T. 1171 TDP158
MAGNETOMETER - SUSPENSION Elliott Brothers 2864 UGP284
MAGNETOMETER - VIBRATION Unsigned 3826 NMC227
MALLETT Unsigned 1288 TDP090
MANOMETER Mason, T. 2191 UDP277
MANOMETER Watkins & Hill 2826 UCP279
MANOMETER Unsigned 2166 UDP252
MANOMETER Unsigned 3557 NMC053
MANOMETER Unsigned 3736 UGP387
MANOMETER Unsigned 3960 ARM034
MANOMETERS Unsigned 3577 Ex0616
MANOMETERS Unsigned 3577 NMC073
MANOMETER - DOUBLE BULB Unsigned 4339 TDC030
MANOMETER - FICK SPRING Hawksley 0021 UCP063
MANOMETRIC FLAME APPARATUS Griffin 1921 UGP190
MANOMETRIC FLAME APPARATUS Koenig, R. 2159 UDP248
MANOMETRIC FLAME APPARATUS - ANALYSER Koenig, R. 0684 UDP012
MANOMETRIC FLAME APPARATUS - ANALYSER Koenig, R. 2309 QBP075
MANOMETRIC FLAME APPARATUS - BURNER Koenig, R. 3454 QBP180
MANOMETRIC FLAME APPARATUS - CAPSULE Koenig, R. 0686 UDP014
MANOMETRIC FLAME APPARATUS - CAPSULE Koenig, R. 2179 UDP265
MANOMETRIC FLAME APPARATUS - CAPSULE Yeates & Son 1075 MAY051
MANOMETRIC FLAME APPARATUS - CAPSULE Unsigned 1920 UGP189
MANOMETRIC FLAME APPARATUS - CAPSULE Unsigned 3534 NMC030
MANOMETRIC FLAME APPARATUS - TROMBONE Koenig, R. 0678 UDP006
MANOMETRIC FLAME APPARATUS - TROMBONE Koenig, R. 1646 MAY133
MARINE AZIMUTH INSTRUMENT Ainsley, T.L. 1116 PRI007
MARINE AZIMUTH INSTRUMENT Kelvin & White, J. 2485 SAL034
MARINE AZIMUTH INSTRUMENT Kelvin & White, J. 3284 NMM024
MARINE AZIMUTH INSTRUMENT Lilley, J. & Gillie 3737 PRI112
MARINE AZIMUTH INSTRUMENT Moore, F.M. 4489 CIL002
MARINE AZIMUTH INSTRUMENT Unsigned 4122 UFM037
MASSON APPARATUS Gerhardt, C. 0045 UCP003
MASSON APPARATUS Unsigned 0869 UDP135
MATERIA MEDICA CABINET Evans, Lescher & Webb 3876 NEW006
MAXWELL TOP Harvey & Peak 2326 QBP092
MEASURING CYLINDER Negretti & Zambra 2418 BIR093
MEASURING CYLINDERS Unsigned 4323 TDC019
MEASURING CYLINDER - GAS Collardeau 2289 QBC026
MEASURING CYLINDER - GAS Unsigned 0358 RDS084
MEASURING FLASK Unsigned 0365 RDS015
MEASURING TABLE Unsigned 4296 RCS046
MECCA DIRECTION FINDER Unsigned 4526 CBL003
MECHANICAL INTEGRATOR - AMSLER Elliott Brothers 3247 QBE024
MECHANICAL MODEL - ANGLED COG-WHEELS Yeates & Son 2990 UDE016
MECHANICAL MODEL - ARC MOTION Yeates & Son 2995 UDE021
MECHANICAL MODEL - ARCHIMEDES' SCREW Unsigned 3374 NMC005
MECHANICAL MODEL - BEAM ENGINE Clarke, E.M. 3149 UDE174
MECHANICAL MODEL - BEAM ENGINE Watkins & Hill 3729 UGP380
MECHANICAL MODEL - BEAM ENGINE Williams' Perran Co. 3150 UDE175
MECHANICAL MODEL - BOILER Watkins & Hill 3733 UGP384
MECHANICAL MODEL - CAM & BEAM Yeates & Son 2983 UDE009
MECHANICAL MODEL - CLOCK ESCAPEMENT Booth Brothers 4019 NMC237
MECHANICAL MODEL - CLOCK ESCAPEMENT Booth Brothers 4019 NMD182
MECHANICAL MODEL - COG WHEELS Yeates & Son 2996 UDE022
MECHANICAL MODEL - COG WHEELS Unsigned 2997 UDE023
MECHANICAL MODEL - CROSS CAM Yeates & Son 2991 UDE017
MECHANICAL MODEL - DOUBLE CRANK-SHAFT Unsigned 3006 UDE032
MECHANICAL MODEL - DRILL Yeates & Son 2985 UDE011
MECHANICAL MODEL - DROP VALVE ENGINE Unsigned 3151 UDE176
MECHANICAL MODEL - GIRDER BRIDGE Dixon & Hempenstall 1357 TDE028
MECHANICAL MODEL - GIRDER BRIDGE Yeates & Son 1356 TDE027
MECHANICAL MODEL - LIFT PUMP Cahill, P. 4022 NMC240
MECHANICAL MODEL - LIFT PUMP Cahill, P. 4022 NMD184
MECHANICAL MODEL - LINEAR COGS Yeates & Son 2984 UDE010
MECHANICAL MODEL - PISTON Yeates & Son 2982 UDE008
MECHANICAL MODEL - PISTON Yeates & Son 2988 UDE014
MECHANICAL MODEL - PISTON Yeates & Son 2992 UDE018
MECHANICAL MODEL - PISTON ENGINE Bennett, J. 3613 NMC109
MECHANICAL MODEL - PISTON ENGINE Bennett, J. 3613 MIS076
MECHANICAL MODEL - PISTON ENGINE Watkins & Hill 3730 UGP381
MECHANICAL MODEL - PISTON ENGINE Unsigned 3611 NMC107
MECHANICAL MODEL - PISTON ENGINE Unsigned 3612 NMC108
MECHANICAL MODEL - PISTON ENGINE Unsigned 3612 NMD173
MECHANICAL MODEL - PUMP Watkins & Hill 3298 UCP298
MECHANICAL MODEL - PUMP Watkins & Hill 3299 UCP299
MECHANICAL MODEL - PUNCH Yeates & Son 2981 UDE007

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MECHANICAL MODEL - RAILWAY SIGNAL LEVERS Schröder, J. 3088 UDE114
MECHANICAL MODEL - REVOLVING CROSS Yeates & Son 2987 UDE013
MECHANICAL MODEL - REVOLVING CYLINDER Yeates & Son 2986 UDE012
MECHANICAL MODEL - REVOLVING CYLINDERS Yeates & Son 3005 UDE031
MECHANICAL MODEL - ROTATION DIRECTION Yeates & Son 3007 UDE033
MECHANICAL MODEL - SPIRAL & COG-WHEEL Yeates & Son 2989 UDE015
MECHANICAL MODEL - STEAM ENGINE Trevithick, R. (West, W.) 4471 MIS077
MECHANICAL MODEL - STEAM LOCOMOTIVE Watkins & Hill 3731 UGP382
MECHANICAL MODEL - THREE WAY MOTION Yeates & Son 2993 UDE019
MECHANICAL MODEL - TRIANGULAR CRANK Unsigned 2998 UDE024
MECHANICAL MODEL - TURBINE Yeates & Son 1640 MAY127
MECHANICAL MODEL - VERTICAL MOTION Yeates & Son 2994 UDE020
MECHANICAL MODEL - VERTICAL ROD DRIVE Yeates & Son 3004 UDE030
MECHANICAL MODEL - WATER WHEEL Cahill, P. 3748 NMC149
MECHANICAL MODEL - WATER WHEEL Cahill, P. 4020 NMC238
MECHANICAL MODEL - WATER WHEEL Cahill, P. 3748 NMD180
MECHANICAL MODEL - WATER WHEEL Cahill, P. 4020 NMD183
MECHANICAL MODEL - WATER WHEEL Watkins & Hill 3732 UGP383
MECHANICAL MODEL - WATER WHEEL Unsigned 3357 UCP357
MEDICAL PHOTOGRAPHS Robinson, J. 0005 Ex0005
MEDICINE CHEST Bewley & Evans 0335 Ex0335
MELDOMETER - JOLY Cambridge Co. 2687 TDP231
MELDOMETER - JOLY Yeates & Son 0589 Ex0589
MELDOMETER - JOLY Yeates & Son 2975 UDE001
MELLONI APPARATUS Ducretet, E. & Cie 0680 UDP008
MELLONI APPARATUS Elliott Brothers 2942 UGP350
MELLONI APPARATUS Elliott Brothers 3361 UCP361
MERCURY DIFFUSING CUP Ladd, W. 0184 UGP064
MERCURY DIFFUSING CUP Unsigned 2095 BLA083
MERCURY DIFFUSING CUP Unsigned 2828 UCP281
MERCURY DIFFUSING CUP Unsigned 3459 QBP185
MERCURY SHOWER TUBE Unsigned 3604 NMC100
MERCURY TROUGH KPM 3781 NMC182
MERCURY TROUGH Porzellan Manufactur 0481 RDS060
MERCURY TROUGH Unsigned 3782 NMC183
MERCURY TROUGH Unsigned 3782 NMD152
MERIDIAN CALENDAR Unsigned 3992 ARM066
MERIDIAN CIRCLE Grubb, H. 0741 UCP101
MERIDIAN CIRCLE Ramsden, J. 1440 DUN001
MERIDIAN SOLAR GUN Unsigned 1668 MAY155
METAL CHAMBERS WITH SLIDING TOPS Unsigned 3843 BIR152
METAL GLOBE Unsigned 2899 UGP307
METAL GLOBE Unsigned 3362 UCP362
METAL PLATE - ENAMELLED Unsigned 3750 NMC151
METAL SCREEN ON STAND Unsigned 3493 QBP219
METAL SPIRALS Yeates & Son 3325 UCP325
METAL TANK Griffin 3746 NMC147
METAL TANK Unsigned 3757 NMC158
METAL TANK Unsigned 3760 NMC161
METRONOME Maelzel 3806 NMC207
METRONOME Maelzel 3840 BIR149
METRONOME Verdin, C. 0074 UGP031
METRONOME Unsigned 2779 UCP232
MICROMETER - PIVOT Unsigned 1841 DUN023
MICROMETER - WIRE Yeates & Son 0166 UGP045
MICROMETER SCREW GAUGE Brown & Sharpe Co. 2482 PRI203
MICROMETER SCREW GAUGE Starrett Co. 2481 PRI202
MICROMETER SCREW MODEL Griffin 2090 BLA078
MICROPHONE Yeates & Son 0789 UDP055
MICROPHONE Unsigned 0921 UDP186
MICROSCOPE Unsigned 4299 RCS049
MICROSCOPE - COMPOUND Armstrong & Brother 4284 RCS034
MICROSCOPE - COMPOUND Baker 0587 NMD299
MICROSCOPE - COMPOUND Baker 4278 RCS028
MICROSCOPE - COMPOUND Bancks 2471 PRI192
MICROSCOPE - COMPOUND Beck, R. & J. 0316 CWC017
MICROSCOPE - COMPOUND Beck, R. & J. 2538 UGP244
MICROSCOPE - COMPOUND Bezu, Hausser & Cie 1012 PRI150
MICROSCOPE - COMPOUND Crouch, H. 3326 UCP326
MICROSCOPE - COMPOUND Davidson, F. & Co. 1393 PRI024
MICROSCOPE - COMPOUND Davis, E. 0973 BIR014
MICROSCOPE - COMPOUND Elliott Brothers 0979 BIR020
MICROSCOPE - COMPOUND Gardner & Neal 0308 Ex0308
MICROSCOPE - COMPOUND Gozzi, A. 1425 MIS015
MICROSCOPE - COMPOUND Grubb, T. 0058 Ex0058
MICROSCOPE - COMPOUND Grubb, T. 0472 Ex0472
MICROSCOPE - COMPOUND Grubb, T. 0508 Ex0508
MICROSCOPE - COMPOUND Grubb, T. 0561 Ex0561
MICROSCOPE - COMPOUND Hartnack, E. 1011 PRI149
MICROSCOPE - COMPOUND Knott & Co. 1125 PRI013
MICROSCOPE - COMPOUND Ladd, W. 3687 MIS055
MICROSCOPE - COMPOUND Leitz 0317 CWC016
MICROSCOPE - COMPOUND Leitz, E. 0449 RDS024
MICROSCOPE - COMPOUND Leitz, E. 0592 NMD294
MICROSCOPE - COMPOUND Leitz, E. 3846 SAL054

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MICROSCOPE - COMPOUND Leitz, E. (Baker, C.) 3852 UCP368
 MICROSCOPE - COMPOUND Leitz, E. (Robinson, J. & Sons) 4412 NBG013
 MICROSCOPE - COMPOUND Leitz, E. 4267 RCS017
 MICROSCOPE - COMPOUND Leitz, E. (Becker, F.E.) 4403 NBG006
 MICROSCOPE - COMPOUND Leitz, E. 4282 RCS032
 MICROSCOPE - COMPOUND Leitz, E. (Becker, F.E.) 4405 NBG007
 MICROSCOPE - COMPOUND Leitz, E. 4283 RCS033
 MICROSCOPE - COMPOUND Leitz, E. (Becker, F.E.) 4406 NBG008
 MICROSCOPE - COMPOUND Leitz, E. 4266 RCS016
 MICROSCOPE - COMPOUND Leitz, E. (Becker, F.E.) 4408 NBG009
 MICROSCOPE - COMPOUND Leitz, E. 4270 RCS020
 MICROSCOPE - COMPOUND Leitz, E. (Becker, F.E.) 4409 NBG010
 MICROSCOPE - COMPOUND Leitz, E. 4271 RCS021
 MICROSCOPE - COMPOUND Leitz, F. 4411 NBG012
 MICROSCOPE - COMPOUND Leitz, E. 4410 NBG011
 MICROSCOPE - COMPOUND Lynch 0090 Ex0090
 MICROSCOPE - COMPOUND Mason & Co. 0375 Ex0375
 MICROSCOPE - COMPOUND Maude & Keys 0556 Ex0556
 MICROSCOPE - COMPOUND Nachet 1649 MAY136
 MICROSCOPE - COMPOUND Nachet 4040 UGG002
 MICROSCOPE - COMPOUND Newton & Co. 0986 BIR027
 MICROSCOPE - COMPOUND Pillischer 2338 SAL021
 MICROSCOPE - COMPOUND Powell & Lealand 0583 NMD302
 MICROSCOPE - COMPOUND Powell & Lealand 4399 NBG002
 MICROSCOPE - COMPOUND Prazmowski, A. 0372 NMD029
 MICROSCOPE - COMPOUND Prazmowski, A. 1713 MAY200
 MICROSCOPE - COMPOUND Pritchard, A. 4258 RCS008
 MICROSCOPE - COMPOUND Robinson, J. 0646 Ex0646
 MICROSCOPE - COMPOUND Ross 0318 CWC015
 MICROSCOPE - COMPOUND Ross, A. 0450 RDS011
 MICROSCOPE - COMPOUND Ross, A. 0972 BIR013
 MICROSCOPE - COMPOUND Ross, A. 4250 MIS075
 MICROSCOPE - COMPOUND Ross, A. 4252 RCS002
 MICROSCOPE - COMPOUND Smith & Beck 4276 RCS026
 MICROSCOPE - COMPOUND Spencer 0044 Ex0044
 MICROSCOPE - COMPOUND Spencer, J. 0008 Ex0008
 MICROSCOPE - COMPOUND Spencer & Son 1066 MAY042
 MICROSCOPE - COMPOUND Spencer & Son 2837 NMD107
 MICROSCOPE - COMPOUND Swift, J. & Son 0557 IDG004
 MICROSCOPE - COMPOUND Swift, J. & Son 3683 MIS054
 MICROSCOPE - COMPOUND Swift, J. & Son 3909 ULS006
 MICROSCOPE - COMPOUND Swift, J. & Son 4273 RCS023
 MICROSCOPE - COMPOUND Swift, J. & Son 4413 NBG014
 MICROSCOPE - COMPOUND Wands 0319 CWC045
 MICROSCOPE - COMPOUND Watson & Sons 2600 NMD205
 MICROSCOPE - COMPOUND Watson, W. & Sons 4272 RCS022
 MICROSCOPE - COMPOUND Watson, W. & Sons 4044 UGG006
 MICROSCOPE - COMPOUND Yeates, H. 0120 Ex0120
 MICROSCOPE - COMPOUND Yeates, W. 0098 Ex0098
 MICROSCOPE - COMPOUND Yeates & Son 0573 Ex0573
 MICROSCOPE - COMPOUND Unsigned 0320 CWC018
 MICROSCOPE - COMPOUND Unsigned 1013 PRI151
 MICROSCOPE - COMPOUND Unsigned 3560 NMC056
 MICROSCOPE - COMPOUND Unsigned 3911 ULS008
 MICROSCOPE - COMPOUND Unsigned 4253 RCS003
 MICROSCOPE - COMPOUND Unsigned 4264 RCS014
 MICROSCOPE - COMPOUND Unsigned 4275 RCS025
 MICROSCOPE - COMPOUND, WITH MICRO-SPECTROSCOPE Zeiss, C. (Mason, T.H.) 4482 STL010
 MICROSCOPE - COMPOUND, BINOCULAR Baker 0134 QBP001
 MICROSCOPE - COMPOUND, BINOCULAR Beck, R. & J. 1176 TDP141
 MICROSCOPE - COMPOUND, BINOCULAR Collins, C. 2689 TDP233
 MICROSCOPE - COMPOUND, BINOCULAR Crouch, H. 0025 UCP090
 MICROSCOPE - COMPOUND, BINOCULAR Crouch, H. 0591 NMD295
 MICROSCOPE - COMPOUND, BINOCULAR Crouch, H. 4277 RCS027
 MICROSCOPE - COMPOUND, BINOCULAR Robinson 0397 Ex0397
 MICROSCOPE - COMPOUND, BINOCULAR Ross 4256 RCS006
 MICROSCOPE - COMPOUND, BINOCULAR Smith, Beck & Beck 0451 RDS047
 MICROSCOPE - COMPOUND, BINOCULAR Watson & Sons 4026 MIS045
 MICROSCOPE - COMPOUND, CUFF Adams, G. 4257 RCS007
 MICROSCOPE - COMPOUND, CUFF Cuff, J. 0577 NMD307
 MICROSCOPE - COMPOUND, CUFF Unsigned 0578 NMD306
 MICROSCOPE - COMPOUND, CULPEPER Clarke, E. 1433 RCS001
 MICROSCOPE - COMPOUND, CULPEPER Lynch 0312 Ex0312
 MICROSCOPE - COMPOUND, CULPEPER Lynch 0368 Ex0368
 MICROSCOPE - COMPOUND, CULPEPER Lynch, J. & Son 0580 NMD312
 MICROSCOPE - COMPOUND, CULPEPER Mason, T. 0366 Ex0366
 MICROSCOPE - COMPOUND, CULPEPER Scarlett, E. 0374 NMD030
 MICROSCOPE - COMPOUND, CULPEPER Unsigned 1052 MAY028
 MICROSCOPE - COMPOUND, CULPEPER Unsigned 4274 RCS024
 MICROSCOPE - COMPOUND, DRUM Crichton, J. 4260 RCS010
 MICROSCOPE - COMPOUND, DRUM Hartnack, E. 4261 RCS011
 MICROSCOPE - COMPOUND, DRUM Spencer, J. 3663 NMD128
 MICROSCOPE - COMPOUND, DRUM Unsigned 1014 PRI152
 MICROSCOPE - COMPOUND, DRUM Unsigned 2627 PRI061
 MICROSCOPE - COMPOUND, GOULD Cary 0585 NMD301

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MICROSCOPE - COMPOUND, GOULD Cary 4458 PRI272
MICROSCOPE - COMPOUND, GOULD Dollond 4259 RCS009
MICROSCOPE - COMPOUND, GOULD Harris, T. & Son 0581 NMD304
MICROSCOPE - COMPOUND, GOULD Spear 0072 Ex0072
MICROSCOPE - COMPOUND, GOULD Spear 0091 Ex0091
MICROSCOPE - COMPOUND, GOULD West 2972 NEW002
MICROSCOPE - COMPOUND, GOULD Unsigned 0399 NMD032
MICROSCOPE - COMPOUND, GOULD Unsigned 0586 NMD300
MICROSCOPE - COMPOUND, GOULD Unsigned 4265 RCS015
MICROSCOPE - COMPOUND, JONES Carpenter 1132 NMD040
MICROSCOPE - COMPOUND, JONES Clarke 0582 NMD303
MICROSCOPE - COMPOUND, JONES Dollond 0588 NMD298
MICROSCOPE - COMPOUND, JONES Dollond 4281 RCS031
MICROSCOPE - COMPOUND, MUSEUM Watson, W. & Sons 2367 NMD072
MICROSCOPE - COMPOUND, MUSEUM Watson, W. & Sons 4079 ULS001
MICROSCOPE - DISSECTING Bausch & Lomb Co. 0452 RDS025
MICROSCOPE - DISSECTING Bausch & Lomb Co. 1807 MAY290
MICROSCOPE - DISSECTING Leitz, E. 4400 NBG003
MICROSCOPE - DISSECTING Leitz, E. 4401 NBG004
MICROSCOPE - DISSECTING Yeates & Son 0089 Ex0089
MICROSCOPE - DISSECTING Zeiss, C. (Baker, C.) 4402 NBG005
MICROSCOPE - PROJECTING Newton & Co. 0442 RDS126
MICROSCOPE - PROJECTING Newton & Co. 1151 TDP049
MICROSCOPE - PROJECTING Newton & Co. 4042 UGG004
MICROSCOPE - PROJECTING Ross 1209 TDP043
MICROSCOPE - PROJECTING Yeates & Son 0407 Ex0407
MICROSCOPE - PROJECTING Yeates & Son 2649 RDS146
MICROSCOPE - SCREW BARREL Mann, J. 1135 NMD043
MICROSCOPE - SCREW BARREL Unsigned 0579 NMD305
MICROSCOPE - SCREW-BARREL Unsigned 1136 NMD044
MICROSCOPE - SIMPLE Baker 1647 MAY134
MICROSCOPE - SIMPLE Bausch & Lomb 4279 RCS029
MICROSCOPE - SIMPLE Leitz, E. 1648 MAY135
MICROSCOPE - SIMPLE Lutz, E. 4226 PRI244
MICROSCOPE - SIMPLE Pillischer 0453 RDS127
MICROSCOPE - SIMPLE Unsigned 0992 PRI143
MICROSCOPE - SIMPLE Unsigned 1023 PRI160
MICROSCOPE - SIMPLE Unsigned 1137 NMD045
MICROSCOPE - SIMPLE Unsigned 2088 BLA076
MICROSCOPE - SIMPLE Unsigned 2101 BLA089
MICROSCOPE - SIMPLE Unsigned 2281 PRI167
MICROSCOPE - SIMPLE Unsigned 2582 PRI216
MICROSCOPE - SIMPLE, COMPASS Unsigned 2592 NMD210
MICROSCOPE - SIMPLE, COMPASS Unsigned 4280 RCS030
MICROSCOPE - SOLAR Dollond 0589 NMD297
MICROSCOPE - SOLAR Duboscq, J. 1486 UGP100
MICROSCOPE - SOLAR Jones, W. & S. 2058 BLA057
MICROSCOPE - SOLAR Margas 0095 Ex0095
MICROSCOPE - SOLAR Pixii Père & Fils 0858 UDP124
MICROSCOPE - SOLAR Ross 0590 NMD296
MICROSCOPE - SOLAR Shuttleworth 3977 ARM051
MICROSCOPE - SOLAR Yeates, S. 0009 Ex0009
MICROSCOPE - TRAVELLING Becker 0018 UCP071
MICROSCOPE - TRAVELLING Elliott Brothers 0775 UDP042
MICROSCOPE - TRAVELLING Griffin 2539 UGP245
MICROSCOPE - TRAVELLING Griffin 2803 UCP256
MICROSCOPE - TRAVELLING Griffin 2860 UGP280
MICROSCOPE - TRAVELLING Kohl, M. 3727 UGP378
MICROSCOPE - TRAVELLING Lucas 4051 MAY314
MICROSCOPE - TRAVELLING Wilson, W. 0259 QBP054
MICROSCOPE - TRAVELLING Yeates & Son 0167 UGP046
MICROSCOPE - TRAVELLING Unsigned 1331 TDP201
MICROSCOPE - TRAVELLING Unsigned 2252 UDP330
MICROSCOPE - TRAVELLING Unsigned 3728 UGP379
MICROSCOPE/CAMERA/TELESCOPE Davidson, F. & Co. 4438 PRI236
MICROSCOPE ACCESSORIES Unsigned 4302 RCS052
MICROSCOPE LENSES Unsigned 4263 RCS013
MICROSCOPE SLIDE Yeates & Son 0562 Ex0562
MICROSCOPE SLIDES Carpenter & Westley 4285 RCS035
MICROSCOPE SLIDES Möller, I.D. 4468 PRI280
MICROSCOPE SLIDES Suter, R. 2300 PRI174
MICROSCOPE SLIDES Watson, W. & Sons 2354 BIR040
MICROSCOPE SLIDES Unsigned 2654 RDS151
MICROSCOPE SLIDES Unsigned 2655 RDS152
MICROSCOPE SLIDES Unsigned 2690 TDP234
MICROSCOPE SLIDES Unsigned 4255 RCS005
MICROSCOPE STAGE WITH THERMOSTAT Unsigned 4469 PRI281
MICROSCOPE WHEELS OF APERTURES Unsigned 4300 RCS050
MICROTOME Booth Brothers 0110 Ex0110
MINERALS - COLLECTION OF Unsigned 3791 NMC192
MINERAL SPECIMENS - POLISHED Unsigned 3553 NMC049
MIRROR Unsigned 1831 DUN013
MIRROR Unsigned 2232 UDP310
MIRROR Unsigned 3998 ARM072
MIRROR - ANAMORPHIC Unsigned 0068 UCP091

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MIRROR - ANAMORPHIC Unsigned 1166 TDP145
MIRROR - ANAMORPHIC Unsigned 1167 TDP144
MIRROR - ANAMORPHIC Unsigned 2193 UDP279
MIRROR - ANAMORPHIC Unsigned 3480 QBP206
MIRROR - ANGLED Unsigned 3597 NMC093
MIRROR - CONCAVE Becker 2548 UGP254
MIRROR - CONCAVE Parsons, C.A. & Co 2361 BIR047
MIRROR - CONCAVE Unsigned 0321 CWC006
MIRROR - CONCAVE Unsigned 0949 UDP217
MIRROR - CONCAVE Unsigned 1345 TDP166
MIRROR - CONCAVE Unsigned 1941 UCP168
MIRROR - CONCAVE Unsigned 1947 UCP174
MIRROR - CONCAVE Unsigned 2115 BLA103
MIRROR - CONCAVE Unsigned 2695 TDP239
MIRROR - CONCAVE Unsigned 3536 NMC032
MIRROR - CONCAVE Unsigned 3576 NMC072
MIRROR - CONCAVE Unsigned 4064 BIR155
MIRROR - CONCAVE & CONVEX Pye, W.G. & Co. 1519 UGP101
MIRROR - CONCAVE & CONVEX Pye, W.G. & Co. 2175 UDP261
MIRROR - CONCAVE & CONVEX Unsigned 2543 UGP249
MIRROR - CONVEX Harvey & Peak 2174 UDP260
MIRROR - CONVEX Harvey & Peak 2544 UGP250
MIRROR - CONVEX Unsigned 3185 QBP130
MIRROR - CONVEX Unsigned 3409 BIR111
MIRROR - CONVEX Unsigned 3830 NMC231
MIRROR - ROCKING Yeates & Son 3550 Ex0596
MIRROR - ROCKING Yeates & Son 3550 NMC046
MIRROR - ROTATING CUBIC Harris, P. & Co. 3627 NMC123
MIRROR - ROTATING CUBIC Yeates & Son 0350 CWC039
MIRROR - ROTATING CUBIC Yeates & Son 1195 TDP040
MIRROR - ROTATING CUBIC Yeates & Son 1917 UGP186
MIRROR - ROTATING CUBIC Yeates & Son 1935 UCP162
MIRROR - ROTATING CUBIC Yeates & Son 2021 BLA010
MIRROR - ROTATING CUBIC Unsigned 0944 UDP212
MIRROR - ROTATING CUBIC Unsigned 2953 UGP361
MIRROR - ROTATING CUBIC Unsigned 3217 QBP162
MIRROR - SPECULUM METAL Grubb, H. 0455 Ex0455
MIRROR - SPECULUM METAL Herschel, W. 3980 ARM054
MIRROR - SPECULUM METAL Rosse, Earl of 3839 BIR148
MIRROR - SPECULUM METAL Rosse, Earl of 0083 Ex0083
MIRROR - SPECULUM METAL Rosse, Earl of 0085 Ex0084
MIRROR - SPECULUM METAL Rosse, Earl of 0577 Ex0577
MIRROR - SPECULUM METAL Unsigned 3439 BIR141
MIRRORS - ANGLED Unsigned 0857 UDP123
MIRRORS - ANGLED Unsigned 1216 TDP129
MIRRORS - ANGLED Unsigned 2113 BLA101
MIRRORS - ANGLED Unsigned 2125 UDP177
MIRRORS - ANGLED Unsigned 2781 UCP234
MIRRORS - ANGLED Unsigned 4171 NMC241
MIRROR GRINDER Unsigned 3441 BIR143
MODEL - DOMESTIC WATER SYSTEM Cahill, P. 4021 NMC239
MODEL - DOMESTIC WATER SYSTEM Cahill, P. 4021 PRI230
MOMENTS DEMONSTRATION APPARATUS Unsigned 2220 UDP298
MOMENTS DEMONSTRATION APPARATUS Unsigned 2222 UDP300
MOMENTS DEMONSTRATION APPARATUS Unsigned 2952 UGP360
MOON SURFACE MODEL Blunt, H. 3966 ARM040
MORSE KEY Reid 2404 BIR080
MORSE KEY Unsigned 0311 CWC068
MORSE KEY Unsigned 1766 MAY249
MORSE KEY Unsigned 2424 BIR099
MORSE SIGNAL MEMENTO Unsigned 4372 ULS059
MORTAR Unsigned 2414 BIR097
MORTAR & PESTLE IW; CHA; Unsigned 1024 PRI161
MORTAR & PESTLE Wedgwood 0367 RDS111
MORTAR & PESTLE Unsigned 0368 RDS059
MORTAR & PESTLE Unsigned 1554 STR013
MORTAR & PESTLE Unsigned 4175 NMC245
MORTAR & PESTLE Unsigned 4175 NMD144
MURAL CIRCLE Jones, T. (Grubb, T.) 3690 ARM003
MUSIC BOX Chancellor, J. 0618 Ex0618
MUSIC BOX Unsigned 3795 NMC196
MUSICAL GLASSES Unsigned 1628 NMD069
NAPIER BONES Unsigned 2022 BLA011
NAVIGATIONAL PLOTTER Bete, C. 3952 ARM026
NEEDLES Unsigned 1268 TDP127
NEPHOSCOPE - HILL'S MIRROR Cambridge Co 4522 MET021
NEWTON RINGS APPARATUS Newton & Co. 0275 QBP070
NEWTON RINGS APPARATUS[?] Yeates & Son 3561 Ex0597
NEWTON RINGS APPARATUS Yeates & Son 0827 UDP093
NEWTON RINGS APPARATUS[?] Yeates & Son 3561 NMC057
NEWTON RINGS APPARATUS Unsigned 1508 UGP084
NOCTURNAL Unsigned 0671 NMD220
NOOTH APPARATUS Unsigned 3641 NMC137
NOOTH APPARATUS Unsigned 3641 NMD172
OBJECT GLASS - DIVIDED MICROMETER Blunt, T. 3969 ARM043

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OBSERVATORY FRAMEWORK Grubb, H. 0253 Ex0253
 OBSERVATORY FRAMEWORK Grubb, H. 0252 Ex0252
 OBSERVATORY FRAMEWORK Grubb, H. 0251 Ex0251
 OCTANT Bennett 0516 Ex0516
 OCTANT Bennett 0588 Ex0588
 OCTANT Bennett, T. 0126 Ex0126
 OCTANT Berge 4091 UFM009
 OCTANT Buckley 0328 Ex0328
 OCTANT Buckley 1131 NMD039
 OCTANT Buckley, J. 0330 Ex0330
 OCTANT Buckley, J. (T. Bennett) 0115 UCP023
 OCTANT Condry, B. 0609 NMD279
 OCTANT Dollond 4465 PRI277
 OCTANT Elliott Brothers 1064 MAY040
 OCTANT Fitton, F. 0055 Ex0055
 OCTANT Fitton, W. 0259 Ex0259
 OCTANT Gardner & Neil 0056 Ex0056
 OCTANT Gregory & Wright 0488 RDS013
 OCTANT Hicks, T. 0642 Ex0642
 OCTANT Kidd 3792 NMC193
 OCTANT King 3223 QBE001
 OCTANT King, W. 0115 Ex0115
 OCTANT King, W. 0587 Ex0587
 OCTANT Mason, J. 0290 Ex0290
 OCTANT Moore, F. 1062 MAY038
 OCTANT Moore, F.M. 0635 Ex0635
 OCTANT Neill Brothers 0389 Ex0389
 OCTANT Neill & Son 636 Ex0636
 OCTANT Rahtjen, G. 2593 NMD209
 OCTANT Robinson 2106 BLA094
 OCTANT Rodgeron & Co. 3263 NMM003
 OCTANT Sweeny 0105 Ex0105
 OCTANT Troughton 4092 UFM010
 OCTANT Yeates 1045 MAY021
 OCTANT Yeates 1130 NMD038
 OCTANT Unsigned 0610 NMD278
 OCTANT Unsigned 1082 TDE003
 OCTANT Unsigned 1390 PRI021
 OCTANT Unsigned 4018 NMC236
 OERSTED APPARATUS Elliott Brothers 2933 UGP341
 OERSTED APPARATUS Elliott Brothers 3722 UGP374
 OERSTED APPARATUS Unsigned 1455 UCP134
 OERSTED APPARATUS Unsigned 1578 MAY067
 OHMMETER Paterson & Cooper 1157 TDP059
 OMNIMETER - ECKHOLD Eckhold 3873 UDE190
 OPERA GLASS Unsigned 2082 BLA070
 OPERA GLASSES Spear 0069 Ex0069
 OPHTHALMOSCOPE Prescott, G. 0621 Ex0621
 OPTICAL BENCH Duboscq, J. 0322 CWC009
 OPTICAL BENCH Duboscq, J. & Pellin 0454 RDS039
 OPTICAL BENCH Percival, G. 3573 NMC069
 OPTICAL BENCH Percival, G. 3573 NMD148
 OPTICAL BENCH Secretan 0743 UCP103
 OPTICAL BENCH Unsigned 2946 UGP354
 OPTICAL BENCH Unsigned 3502 QBP228
 OPTICAL CELL Cambridge Co. 1250 TDP193
 OPTICAL CELL Golaz, L. 2969 TDP308
 OPTICAL COMPARATOR Zeiss, C. 3520 MAY309
 OPTICAL DISC - HARTL Welch 0695 UDP023
 OPTICAL DISC - HARTL Welch 1973 UCP200
 OPTICAL ELEMENT Clarke, E.M. 1627 MAY115
 OPTICAL ELEMENT Soleil 0323 CWC070
 OPTICAL ELEMENT Tisley, S.C. & Co. 2171 UDP257
 OPTICAL ELEMENT Yeates & Son 2219 UDP297
 OPTICAL ELEMENT Unsigned 1954 UCP181
 OPTICAL ELEMENT Unsigned 1955 UCP182
 OPTICAL ELEMENT Unsigned 2209 UDP287
 OPTICAL ELEMENT Unsigned 2210 UDP288
 OPTICAL ELEMENT Unsigned 3800 NMC201
 OPTICAL ELEMENTS Klein 2651 RDS148
 OPTICAL ELEMENTS Soleil 3205 QBP150
 OPTICAL ELEMENTS Yeates & Son 3497 QBP223
 OPTICAL MODEL Jones, W. & S. 0178 UGP058
 OPTICAL MODEL Robinson, J. 0004 Ex0004
 OPTICAL MODEL Unsigned 1480 UGP083
 OPTICAL MODEL Unsigned 1481 UGP079
 OPTICAL MODEL Unsigned 1482 UGP080
 OPTICAL MODEL Unsigned 1483 UGP081
 OPTICAL MODEL Unsigned 1484 UGP082
 OPTICAL MODEL Unsigned 1750 MAY233
 OPTICAL SQUARE(?) Watts, E.R. & Son 2588 PRI222
 OPTICAL SQUARE Zeiss, C. 1367 TDE041
 OPTICAL SQUARE Unsigned 0330 PRI001
 OPTICAL STAND Chevalier, A. 1185 TDP009
 OPTICAL STAND Dallmeyer, J.H. 1726 MAY209

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OPTICAL STAND Ducretet, E. & Cie 2143 UDP232
OPTICAL STAND Ladd, W. 1241 TDP038
OPTICAL STAND Mason & Son 1333 TDP019
OPTICAL STAND Yeates & Son 3533 Ex0594
OPTICAL STAND Yeates & Son 3533 NMC029
OPTICAL STAND Unsigned 0459 RDS070
OPTICAL STAND Unsigned 2325 QBP091
OPTICAL STAND Unsigned 2516 UGP222
OPTICAL STAND Unsigned 2541 UGP247
OPTICAL STAND Unsigned 2542 UGP248
ORGAN - DEMONSTRATION Harvey & Peak 2764 UCP217
ORGAN - DEMONSTRATION Kohl, M. 3186 QBP131
ORGAN - DEMONSTRATION Unsigned 2787 UCP240
ORGAN BELLOWS Yeates & Son 2761 UCP214
ORGAN BELLOWS Unsigned 1201 TDP091
ORGAN BELLOWS Unsigned 2751 TDP295
ORGAN PIPE - BLOCK Harvey & Peak 0798 UDP064
ORGAN PIPE - BLOCK Koenig, R. 2008 CWC073
ORGAN PIPE - BLOCK Koenig, R. 3901 QBP262
ORGAN PIPE - BLOCK Spencer & Son 2672 TDP216
ORGAN PIPE - BLOCK Yeates & Son 3900 QBP261
ORGAN PIPE - BLOCK Unsigned 0960 UDP219
ORGAN PIPE - BLOCK Unsigned 1263 TDP097
ORGAN PIPE - CYLINDER Unsigned 3898 QBP259
ORGAN PIPE - CYLINDER Unsigned 3899 QBP260
ORGAN PIPE - REED Harvey & Peak 2896 UGP304
ORGAN PIPE - REED Koenig, R. 3905 QBP266
ORGAN PIPE - REED Yeates & Son 3585 Ex0604
ORGAN PIPE - REED Yeates & Son 2895 UGP303
ORGAN PIPE - REED Yeates & Son 3306 UCP306
ORGAN PIPE - REED Yeates & Son 3585 NMC081
ORGAN PIPE - REED Unsigned 2131 UDP222
ORGAN PIPE - REED Unsigned 4158 MAY342
ORGAN PIPE WITH MANOMETRIC CAPSULE Koenig, R. 3904 QBP265
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 3583 Ex0615
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 0797 UDP063
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 1261 TDP099
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 1816 MAY299
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 1931 UGP136
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 2007 CWC079
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 2786 UCP239
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 3583 NMC079
ORGAN PIPE WITH MANOMETRIC CAPSULE Yeates & Son 3583 NMD149
ORGAN PIPE WITH MANOMETRIC CAPSULES Griffin 2130 UDP221
ORGAN PIPE WITH MANOMETRIC CAPSULES Koenig, R. 2009 CWC065
ORGAN PIPE WITH MANOMETRIC CAPSULES Koenig, R. 3903 QBP264
ORGAN PIPE WITH MANOMETRIC CAPSULES Leybold, E. 0796 UDP062
ORGAN PIPE WITH MANOMETRIC CAPSULES Yeates & Son 3584 Ex0603
ORGAN PIPE WITH MANOMETRIC CAPSULES Yeates & Son 2129 UDP209
ORGAN PIPE WITH MANOMETRIC CAPSULES Yeates & Son 3305 UCP305
ORGAN PIPE WITH MANOMETRIC CAPSULES Yeates & Son 3584 NMC080
ORGAN PIPE WITH MANOMETRIC CAPSULES Unsigned 1262 TDP095
ORGAN PIPE WITH MANOMETRIC CAPSULES Unsigned 2765 UCP218
ORGAN PIPE WITH STOPS Unsigned 4159 MAY343
ORGAN PIPE MOUTHPIECE Koenig, R. 3902 QBP263
ORRERY Gilkerson & Co. (LANE Globe) 3699 ARM012
ORRERY Jones, W. & S. 0646 PRI102
ORRERY Jones, W. & S. 1844 DUN026
ORRERY Newton & Son 0645 NMD244
ORRERY Philip, G. & Son 3997 ARM071
ORRERY Unsigned 0349 CWC056
OSCILLATION TRANSFORMER Sullivan, H.W. 2731 TDP275
OSCILLATOR - HERTZ(?) Miller & Woods 0048 UGP018
OSCILLATOR - HERTZ Unsigned 0895 UDP161
OSCILLOGRAPH - DUDDELL Cambridge Co. 3087 UDE113
OSCILLOGRAPH - IRWIN-PAUL Paul, R.W. 3086 UDE112
OXY-HYDROGEN CAPSTAN VALVE Hughes 3316 UCP316
PAINTING de la Joue, J. 1430 MIS019
PANMETRON Jordan, J. 0261 Ex0261
PANTOGRAPH Buckley 0478 Ex0478
PANTOGRAPH Conte, J. 2425 BIR100
PANTOGRAPH Dixon & Hempenstall 0505 IDG073
PANTOGRAPH Elliott Brothers 3183 QBP128
PANTOGRAPH Elliott Brothers 3273 NMM013
PANTOGRAPH Jones, W. & S. 0200 UGE011
PANTOGRAPH Spencer & Son 0401 Ex0401
PANTOGRAPH Troughton & Simms 0965 BIR005
PANTOGRAPH Watkins, J. & W. 0623 NMD265
PARALLEL RULE Adie 0208 UGE019
PARALLEL RULE Elliott Brothers 1378 TDE058
PARALLEL RULE Robson 2578 PRI213
PARALLEL RULE Spencer & Son 1369 TDE045
PARALLEL RULE Unsigned 1375 TDE052
PASSAGE TOMB - NEWGRANGE Unsigned 2133 MIS035
PATENT PAPERS OF NICHOLAS CALLAN Victoria, Queen 4059 MAY322

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PEDOMETER Robinson, J. & Sons 1585 MAY074
PELORUS Davies, R. 3271 NMM011
PELORUS Unsigned 1117 PRI008
PEN Spencer 0380 RDS114
PEN - ELECTRICAL RECORDING Cambridge Co. 2320 QBP086
PENDULUM Shew 1556 STR015
PENDULUM Unsigned 1461 UCP139
PENDULUM - COMPENSATED Sharp, C. 3692 ARM005
PENDULUM - CYCLOIDAL CHEEKS Watkins & Hill 2307 QBP073
PENDULUM - GRIDIRON Unsigned 1709 MAY196
PENDULUM - GRIDIRON Unsigned 2235 UDP313
PENDULUM - GRIDIRON, MODEL Unsigned 2875 UCP291
PENDULUM - GRIDIRON, MODEL Unsigned 2886 UGP294
PENDULUM - KATER REVERSIBLE Pye, W.G. & Co. 3184 QBP129
PENDULUM - SIPHON BAROMETER Romney Robinson, T. 4005 ARM079
PENDULUM - TISLEY COMPOUND Tisley & Spiller 1349 TDP047
PERISCOPE Beck, R. & J. 1643 MAY130
PERISCOPE Goerz, C.P. 4078 MAY327
PHILOSOPHICAL BUBBLES Marmoni, A. 0994 PRI145
PHILOSOPHICAL BUBBLES Marmony, A. 4221 PRI240
PHONIC WHEEL Lucas 1749 MAY232
PHONIC WHEEL Lucas 2768 UCP221
PHONIC WHEEL Veeder Co. 1340 TDP205
PHONIC WHEEL Unsigned 1929 UGP198
PHONIC WHEEL Unsigned 2268 UDP346
PHONOGRAPH Edison 0214 QBP010
PHONOGRAPH Edison, T.A. 1641 MAY128
PHONOGRAPH Edison, T.A. 3796 NMC197
PHONOGRAPH Fielding, C.F. 2766 UCP219
PHONOGRAPH Unsigned 3034 UDE060
PHOSPHORESCENT CHEMICALS AC 1277 TDP111
PHOSPHOROSCOPE Yeates & Son 0823 UDP089
PHOSPHOROSCOPE Yeates & Son 1624 MAY112
PHOSPHOROSCOPE Yeates & Son 1625 MAY113
PHOSPHOROSCOPE - BECQUEREL Duboscq, J. 3220 QBP165
PHOSPHOROSCOPE - BECQUEREL Unsigned 1149 TDP171
PHOTOGRAPHIC CHANGING BOX Hare, G. 2391 BIR067
PHOTOMETER Simmance-Abady 1948 UCP175
PHOTOMETER Sugg, W. 1946 UCP173
PHOTOMETER Unsigned 1332 TDP198
PHOTOMETER Unsigned 3499 QBP225
PHOTOMETER - BUNSEN Unsigned 0848 UDP114
PHOTOMETER - BUNSEN Unsigned 1728 MAY211
PHOTOMETER - JOLY Griffin 1524 UGP110
PHOTOMETER - JOLY Griffin 1801 MAY284
PHOTOMETER - JOLY Yeates & Son 0817 UDP083
PHOTOMETER - JOLY Yeates & Son 1521 UGP103
PHOTOMETER - JOLY Yeates & Son 1697 MAY184
PHOTOMETER - LUMMER BRODHUN Unsigned 1517 UGP095
PHOTOMETER - LUMMER-BRODHUN Unsigned 3892 QBP243
PHOTOMETER - WHEATSTONE Duboscq, J. 3215 QBP160
PHOTOMETER - WHEATSTONE Elliott Brothers 0183 UGP063
PHOTOMETER - WHEATSTONE Unsigned 0983 BIR024
PIEZOMETER Unsigned 1509 UGP087
PIEZOMETER Unsigned 3319 UCP319
PITH BALL STAND Unsigned 3315 UCP315
PITH BALL STAND[?] Unsigned 3818 NMC219
PITH FIGURINES Unsigned 3180 QBP125
PLANIMETER Mason, T. 0109 Ex0109
PLANIMETER Yeates & Son 0576 Ex0576
PLANIMETER Unsigned 1097 TDE055
PLANIMETER - AMSLER Dixon & Hempenstall 2580 PRI214
PLANIMETER - AMSLER Dixon & Hempenstall 3242 QBE020
PLANIMETER - AMSLER Elliott Brothers 0212 UGE023
PLANIMETER - AMSLER Elliott Brothers 2345 BIR031
PLANIMETER - AMSLER Elliott Brothers 3865 UDE182
PLANIMETER - AMSLER Stanley 4391 PRI251
PLANIMETER - AMSLER Yeates & Son 4437 PRI235
PLANIMETER - AMSLER Unsigned 1096 TDE054
PLATE MEASURER Spencer 3948 ARM022
PLATE MEASURER Troughton & Simms 3947 ARM021
PLATE MEASURER Troughton & Simms 1850 DUN032
PLATE MEASURER Troughton & Simms 1851 DUN033
PLATE MEASURER Troughton & Simms 2843 TDP304
PLOTING RULE Stanley 3417 BIR119
PLUMB BOB & TRIPOD BASE Unsigned 2839 TDE073
PNEUMATIC SHELF Griffin 3784 NMC185
PNEUMATIC SHELF Griffin 3784 NMD150
PNEUMATIC SHELF - BEEHIVE Harris, P. & Co. 3783 NMC184
PNEUMATIC SHELF - BEEHIVE Harris, P. & Co. 3783 NMD151
POINT AND PLATE VALVE Callan, N. 4143 MAY341
POINT AND PLATE VALVE Unsigned 4057 MAY320
POISSON'S COEFFICIENT BAR Unsigned 3449 QBP175
POLARIMETER Becker, F.E. & Co. 0779 MAY020
POLARIMETER Becker, F.E. & Co. (T.H. Mason) 2135 UDP227

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POLARIMETER Duboscq, J. 0248 QBP044
POLARIMETER Fric, J. & J. 4466 PRI278
POLARIMETER Harris, P. & Co. 0231 QBP025
POLARIMETER Harris, P. & Co. 0370 RDS043
POLARIMETER Reichert, C. 0249 QBP045
POLARIMETER Reichert, C. 1150 TDP181
POLARIMETER Schmidt, F. & Haensch 1781 MAY264
POLARIMETER Schmidt, F. & Haensch 1936 UCP163
POLARIMETER Schmidt, F. & Haensch 4347 TDC038
POLARIMETER Spencer, J. & Son 0369 RDS037
POLARIMETER Unsigned 2039 BLA028
POLARIMETER & SACCHARIMETER Jobin, A. 0499 IDG008
POLARISATION ANALYSER - GUÉRARD Duboscq, J. 0277 QBP072
POLARISCOPE Apps 0971 BIR012
POLARISCOPE Cambridge Co. 0955 UDP223
POLARISCOPE Highley 1436 MAY056
POLARISCOPE Ruhmkorff 3200 QBP145
POLARISCOPE Watkins & Hill 0331 CWC010
POLARISCOPE Watkins & Hill 1934 UCP161
POLARISCOPE Yeates & Son 0821 UDP087
POLARISCOPE Yeates & Son 1516 UGP094
POLARISCOPE Unsigned 0093 UCP017
POLARISCOPE Unsigned 0244 QBP039
POLARISCOPE Unsigned 0764 UDP033
POLARISCOPE Unsigned 0882 UDP148
POLARISCOPE Unsigned 1800 MAY283
POLARISCOPE Unsigned 4298 RCS048
POLARISCOPE - DUBOSCQ Duboscq, J. 0246 QBP041
POLARISCOPE - DUBOSCQ Duboscq, J. 324 CWC008
POLARISCOPE - DUBOSCQ Duboscq Soleil 0147 UGP010
POLARISCOPE - ELBOW Newton & Co. 0253 QBP049
POLARISCOPE - ELBOW Watson, W. & Sons 1307 TDP051
POLARISCOPE - ELBOW Yeates & Son 0455 RDS107
POLARISCOPE - NORREMBERG Duboscq, J. 0247 QBP042
POLARISCOPE - NORREMBERG Duboscq, J. 1751 MAY234
POLARISCOPE - NORREMBERG Duboscq & Pellin 0735 MAY010
POLARISCOPE - NORREMBERG Elliott Brothers 0150 UGP013
POLARISCOPE - NORREMBERG Negretti & Zambra 0818 UDP084
POLARISCOPE - NORREMBERG Spencer & Son 1049 MAY025
POLARISCOPE - NORREMBERG Yeates & Son 1933 UCP160
POLARISCOPE - SOLEIL Lerebours & Secretan 0092 UCP032
POLARISCOPE - TOURMALINE Unsigned 0860 UDP126
POLARISCOPE - TOURMALINE PINCETTES Unsigned 0849 UDP115
POLARISCOPE - TOURMALINE PINCETTES Unsigned 2817 UCP270
POLARISCOPE - TOURMALINE PINCETTES Unsigned 3207 QBP152
POLE INDICATOR Unsigned 0510 IDG065
POLEMOSCOPE Jones 1676 MAY163
POLEMOSCOPE Unsigned 3620 NMC116
POLISHING TOOL Rosse, Earl of 0580 Ex0580
POSITION FINDER Heath & Co. 3279 NMM019
POSITION FINDER Lambert, M. 0360 Ex0360
POSITION FINDER Lambert, M., or Hughes, H. & Son 0570 IDG002
POT - STONEWARE Griffin 0371 RDS087
POTASH BULBS Unsigned 4350 TDC041
POTASH BULBS - LIEBIG Unsigned 4349 TDC040
POTASH BULBS - MOHR Unsigned 3775 NMC176
POTASH BULBS - MOHR Unsigned 3775 NMD154
POTASH BULBS - MOHR Unsigned 4328 TDC024
POTENTIOMETER Cambridge Co. 0239 QBP033
POTENTIOMETER Crompton & Co. (Stanley) 3114 UDE139
POTENTIOMETER Tinsley, H. & Co. 1346 TDP060
POTENTIOMETER - VERNIER Tinsley, H. & Co. 3069 UDE095
POWDER CUP Unsigned 2829 UCP282
POWDER HOUSE Unsigned 0752 UCP112
POWDER HOUSE Unsigned 2596 NMD127
PRESSURE GAUGE Adamson, D. & Co. [Bourdon] 3413 BIR115
PRESSURE GAUGE Bourdon, E. 0064 UCP082
PRESSURE GAUGES Unsigned 0564 IDG048
PRESSURE GAUGES Unsigned 3292 NMM032
PRESSURE GAUGE TESTER Schaffer & Budenberg 0565 IDG011
PRESSURE GLOBE Unsigned 3380 NMC011
PRESSURE VESSEL Unsigned 2290 QBC027
PRESSURE VESSEL Unsigned 2904 UGP312
PRINTING FRAME Middlemiss, W. 0456 RDS057
PRINTING PLATE Unsigned 2644 RDS141
PRISM Baird & Tatlock 0850 UDP116
PRISM Unsigned 1016 PRI154
PRISM Unsigned 1563 STR022
PRISM Unsigned 2074 BLA062
PRISM Unsigned 2150 UDP239
PRISM Unsigned 3495 QBP221
PRISM Unsigned 4342 TDC033
PRISMS Unsigned 3810 NMC211
PRISM - ADJUSTABLE Lerebours & Secretan 0075 UCP004
PRISM - ADJUSTABLE Pixii Père & Fils 0676 UDP004

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PRISM - CONICAL Lerebours & Secretan 0096 UCP015
PRISM - CONICAL Unsigned 1184 TDP194
PRISM - CYANIN Newton & Co. 3489 QBP215
PRISM - FRESNEL Yeates & Son 1189 TDP177
PRISM - HOLLOW Yeates & Son 0373 RDS042
PRISM - HOLLOW Yeates & Son 0829 UDP095
PRISM - HOLLOW Yeates & Son 0830 UDP096
PRISM - HOLLOW Yeates & Son 1755 MAY238
PRISM - HOLLOW Unsigned 0856 UDP122
PRISM - HOLLOW Unsigned 1976 UCP203
PRISM - HOLLOW Unsigned 2704 TDP248
PRISM - HOLLOW Unsigned 2940 UGP348
PRISM - HOLLOW Unsigned 3488 QBP214
PRISM - HOLLOW Unsigned 3537 NMC033
PRISM - HOLLOW Unsigned 3835 BIR144
PRISM - JELLETT Yeates & Son 0185 UGP065
PRISM - MULLER Yeates & Son 3498 QBP224
PRISM - NICOL Duboscq, J. 2545 UGP251
PRISM - NICOL Secretan 2802 UCP255
PRISM - NICOL Unsigned 0861 UDP127
PRISM - RIGHT-ANGLED Duboscq, J. 3491 QBP217
PRISM ON STAND Duboscq, J. 0326 CWC075
PRISM ON STAND Duboscq, J. 1187 TDP104
PRISM ON STAND Duboscq, J. 3505 QBP231
PRISM ON STAND Duboscq, J. 3506 QBP232
PRISM ON STAND Duboscq, J. (Yeates & Son) 0328 CWC077
PRISM ON STAND Duboscq, J. (Yeates & Son) 0329 CWC078
PRISM ON STAND Elliott Brothers 0854 UDP120
PRISM ON STAND Jones, W. & S. 1193 TDP195
PRISM ON STAND Lerebours & Secretan 1488 UGP112
PRISM ON STAND Lerebours & Secretan 1945 UCP172
PRISM ON STAND Yeates & Son 3808 Ex0610
PRISM ON STAND Yeates & Son 0327 CWC076
PRISM ON STAND Yeates & Son 1186 TDP180
PRISM ON STAND Yeates & Son 3808 NMC209
PRISM ON STAND Unsigned 0863 UDP129
PRISM ON STAND Unsigned 1489 UGP135
PRISM ON STAND Unsigned 1490 UGP104
PRISM ON STAND Unsigned 2814 UCP267
PRISM ON STAND Unsigned 3807 NMC208
PRISM - HOUSED Duboscq, J. 0688 UDP016
PRISM - HOUSED Newton 0822 UDP088
PRISM - HOUSED Newton 1210 TDP042
PRISM - HOUSED Yeates & Son 1246 TDP118
PRISM - HOUSED Unsigned 0851 UDP117
PRISM - HOUSED Unsigned 0862 UDP128
PRISM - HOUSED Unsigned 1247 TDP122
PRISM - HOUSED Unsigned 4065 BIR156
PRISM HOUSING Browning, J. 1938 UCP165
PRISM STAND Hilger, A. 2151 UDP240
PROJECTION APPARATUS Yeates & Son 0411 Ex0411
PROOF PLANE Unsigned 1242 TDP117
PROOF PLANE Unsigned 2883 UGP291
PROTRACTOR Buckley 0314 Ex0314
PROTRACTOR Buckley 0332 Ex0332
PROTRACTOR King, W. 0485 Ex0485
PROTRACTOR King, W. 0706 NMD005
PROTRACTOR Negretti & Zambra 1410 NMD059
PROTRACTOR Potter, J. 3861 UDE178
PROTRACTOR Spencer, J. & Son 0520 Ex0520
PROTRACTOR Spear, R. 0300 Ex0300
PROTRACTOR Stanley 1837 DUN019
PROTRACTOR Troughton & Simms 3246 QBE023
PROTRACTOR Yeates 0279 Ex0279
PROTRACTOR - CIRCULAR Baker 2401 BIR077
PROTRACTOR - CIRCULAR Dixon & Hempenstall 2577 PRI212
PROTRACTOR - CIRCULAR Jones, T. 0625 NMD263
PROTRACTOR - CIRCULAR Lee & Son 3245 QBE022
PROTRACTOR - CIRCULAR Mason 4031 PRI129
PROTRACTOR - CIRCULAR Spears & Co. 0617 NMD271
PROTRACTOR - CIRCULAR Troughton 2599 NMD203
PROTRACTOR - CIRCULAR Troughton & Simms 0976 BIR017
PROTRACTOR - CIRCULAR Troughton & Simms 1099 TDE063
PROTRACTOR - CIRCULAR Troughton & Simms 3031 UDE057
PROTRACTOR - CIRCULAR Yeates 0194 UGE005
PROTRACTOR - CIRCULAR Yeates 1101 TDE023
PROTRACTOR - CIRCULAR Unsigned 2598 NMD206
PROTRACTOR - RECTANGULAR Elliott Brothers 2959 NMD201
PROTRACTOR - RECTANGULAR Mason 3654 PRI091
PROTRACTOR - RECTANGULAR Unsigned 3655 PRI092
PROTRACTOR - REFLECTING Cary 1114 PRI005
PROTRACTOR/PLOTTING SQUARE Buckley 0460 Ex0460
PULLEY FRAME Hiysns(?) 0041 UGP032
PULLEY FRAME Unsigned 1950 UCP177
PULLEY WHEEL Unsigned 1784 MAY267

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PULLEY WHEELS Unsigned 2118 BLA106
PULLEY WHEELS Unsigned 3450 QBP176
PULSE GLASS(?) Ducretet, E. & Cie 2247 UDP325
PULSE GLASS(?) Leybold, E. 2248 UDP326
PULSE GLASS Unsigned 1877 UGP146
PULSE GLASS Unsigned 2085 BLA073
PULSE GLASS Unsigned 2559 MAY306
PULVERISER Unsigned 4481 STL009
PUMP - APPOLD'S CENTRIFUGAL Unsigned 3549 NMC045
PUMP - FIRE ENGINE Griffin 3563 NMC059
PUMP - FORCE Unsigned 3545 NMC041
PUMP - LIFT Ladd, W. 2029 BLA018
PUMP - LIFT Unsigned 2509 UGP215
PUMP - LIFT Unsigned 3546 NMC042
PYROMETER - DANIELL Newman, J. (Lynch, J.) 4030 PRI128
PYROMETER - WEDGWOOD Unsigned 0999 QBC009
QUADRANT Burton 3949 ARM023
QUADRANT Hunt, H. 0565 Ex0565
QUADRANT - ARTILLERY Spear 3272 NMM012
QUADRANT - ASTRONOMICAL Rosse, Earl of 0970 BIR011
QUADRANT - ASTRONOMICAL Sisson, J. 3696 ARM009
QUADRANT - HORARY Stokes, G. 0078 Ex0078
QUADRANT - HORARY, GUNTER Williams, L.E. 4218 PRI238
QUINTANT Bennett 0050 Ex0050
RADIOMETER - CROOKES Unsigned 0886 UDP152
RADIOMETER - CROOKES Unsigned 2060 BLA059
RADIUM BUTTON HOLDER Beck, R. & J. 0469 RDS103
RADIUM NEEDLE CYLINDER CASE Unsigned 0470 RDS035
RAILWAY CURVES Unsigned 2589 PRI223
RAIN GAUGE Rollaston, W. 1555 STR014
RAIN GAUGE Yeates & Son 0094 Ex0094
RAIN GAUGE Yeates & Son 0420 Ex0420
RAIN GAUGE Yeates & Son 1579 NMD068
RAIN GAUGE - BECKLEY SELF-RECORDING Hicks, J. 4515 MET014
REACTION VESSEL Unsigned 1007 QBC017
REACTION VESSEL Unsigned 1706 MAY193
REACTION VESSELS Unsigned 0375 RDS131
RECTIFIER(?) Kipp & Zonen 2217 UDP295
RECTIFIER Unsigned 4236 NMD192
REFLECTING CIRCLE Troughton & Simms 1328 TDP012
REFLECTING CIRCLE Troughton & Simms 0606 NMD282
REFLECTION APPARATUS - SEARLE Pye, W.G. & Co. 4050 MAY313
REFLECTORS - CONCAVE Unsigned 2747 TDP291
REFLECTORS - PARABOLIC, HERTZ Ernecke, F. 0784 UDP051
REFLECTORS - PARABOLIC Unsigned 3203 QBP148
REFRACTOMETER - FERY Pellin, P. 0677 UDP005
RELAY Elliott Brothers 1259 TDP034
RELAY GPO 1769 MAY252
RELAY Yeates & Son 0107 UCP026
RELAY Yeates & Son 1763 MAY246
RELAY Unsigned 1260 TDP057
RELAY Unsigned 1594 MAY083
RELAY Unsigned 1764 MAY247
RELAY Unsigned 1765 MAY248
RELAY Unsigned 3552 NMC048
RESERVOIR Unsigned 2116 BLA104
RESISTANCE Cambridge Co. 3075 UDE101
RESISTANCE (?) Spencer & Son 1076 MAY052
RESISTANCE Unsigned 0852 UCP144
RESISTANCE Unsigned 1526 UGP113
RESISTANCE - STANDARD Baird & Tatlock 3081 UDE107
RESISTANCE - STANDARD Cambridge Co. 0233 QBP027
RESISTANCE - STANDARD Cambridge Co. 0234 QBP028
RESISTANCE - STANDARD(?) Cambridge Co. 3332 UCP332
RESISTANCE - STANDARD Elliott Brothers 0753 UCP113
RESISTANCE - STANDARD Elliott Brothers 1342 TDP063
RESISTANCE - STANDARD Elliott Brothers 4335 MAY348
RESISTANCE - STANDARD Gambrell Brothers 3054 UDE080
RESISTANCE - STANDARD Nalder Brothers & Co. 3056 UDE082
RESISTANCE - STANDARD Nalder Brothers & Co. 3073 UDE099
RESISTANCE - STANDARD Nalder Brothers & Co. 3074 UDE100
RESISTANCE - STANDARD Paul, R.W. (T. Mason) 2188 UDP274
RESISTANCE - STANDARD Pye, W.G. & Co. 2265 UDP343
RESISTANCE - STANDARD Pye, W.G. & Co. 3053 UDE079
RESISTANCE - STANDARD Yeates & Son 0787 UDP053
RESISTANCE - VARIABLE Cambridge Co. 3076 UDE102
RESISTANCE - VARIABLE White, J. 3057 UDE083
RESISTANCE BOX Baird & Tatlock 3060 UDE086
RESISTANCE BOX Becker, F.E. & Co. (Pye, W.G. & Co.) 2790 UCP243
RESISTANCE BOX Cambridge Co. 3070 UDE096
RESISTANCE BOX Cambridge Co. 3071 UDE097
RESISTANCE BOX Evershed & Vignoles 3055 UDE081
RESISTANCE BOX Gambrell Brothers (Mason) 2789 UCP242
RESISTANCE BOX Griffin 0893 UDP159
RESISTANCE BOX Harris, P. & Co. 2066 BLA048

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RESISTANCE BOX Harris, P. & Co. 2092 BLA080
RESISTANCE BOX Köhler, F. 2713 TDP257
RESISTANCE BOX Maiben, J.M. & Co. 2003 CWC042
RESISTANCE BOX Paul, R.W. 3058 UDE084
RESISTANCE BOX Pye, W.G. & Co. 2274 UDP352
RESISTANCE BOX Tinsley, H. & Co. 3109 UDE134
RESISTANCE BOX White, J. 1337 TDP208
RESISTANCE BOX Yeates & Son 2004 CWC046
RESISTANCE FRAME Newton & Co. 2753 TDP297
RESISTANCE FRAME Unsigned 0396 RDS110
RESONANCE TOP - FRAHM Unsigned 3446 QBP172
RESONATOR - CUP Unsigned 4336 MAY349
RESONATOR - HELMHOLTZ Koenig, R. 0266 QBP061
RESONATOR - HELMHOLTZ Koenig, R. 1739 MAY222
RESONATOR - HELMHOLTZ Koenig, R. 2769 UCP222
RESONATOR - HELMHOLTZ Unsigned 0945 UDP213
RESONATOR - HELMHOLTZ Unsigned 1928 UGP197
RESONATOR - SAVART Unsigned 1737 MAY220
RESONATOR - UNIVERSAL Koenig, R. 1160 TDP153
RESONATOR SOUNDING BOX Koenig, R. 1265 TDP083
RHEOSTAT Casella, L. 3052 UDE078
RHEOSTAT Elliott Brothers 0490 UCP147
RHEOSTAT Elliott Brothers 1537 UGP129
RHEOSTAT Elliott Brothers 3195 QBP140
RHEOSTAT GPO 1799 MAY282
RHEOSTAT Harris, P. & Co. 0959 UDP218
RHEOSTAT Newton & Co. 1538 UGP130
RHEOSTAT Paul, R.W. 3089 UDE115
RHEOSTAT Pye, W.G. & Co. (T. Mason) 2266 UDP344
RHEOSTAT Yeates & Son 0120 QBP007
RHEOSTAT Unsigned 0397 RDS091
RHEOSTAT Unsigned 1105 UCP146
RHEOSTAT Unsigned 1140 UCP145
RHEOSTAT Unsigned 1710 MAY197
RHEOSTAT Unsigned 1741 MAY224
RHEOSTAT - WHEATSTONE Elliott Brothers 1299 TDP053
ROCKING BAR - TREVELYAN Ladd, W. & Co. 3453 QBP179
ROD - CHARGING Cossor, A.C. 3159 QBP104
ROD - ELECTROSTATIC Unsigned 0902 UDP168
ROD - ELECTROSTATIC Unsigned 1244 TDP116
ROD - GAUGING Long, J. 4394 PRI253
ROLLER FOR INCLINED PLANE Unsigned 3447 QBP173
ROLLERS Watkins & Hill 3204 QBP149
ROOF - OBSERVATORY Grubb, H. 0247 Ex0247
ROTATING BOARD Unsigned 2233 UDP311
ROTATING COLOURED DISCS Childe, H. 4333 MAY346
RUPERT DROPS Unsigned 3471 QBP197
SACCHARIMETER Duboscq, J. 0149 UGP012
SACCHARIMETER Duboscq, Th. & A. 0734 MAY009
SACCHARIMETER - JELLETT Spencer & Son 0292 TDP165
SACCHARIMETER - JELLETT Spencer & Son 0059 Ex0059
SACCHARIMETER - JELLETT Spencer & Son 0513 Ex0513
SACCHAROMETER Bate (Loftus) (Joseph Long) 0545 IDG018
SACCHAROMETER Bate (Oertling, L.) 0547 IDG017
SACCHAROMETER Bate (Oertling, L.) 4476 STL004
SACCHAROMETER Blake, T.O. 0548 IDG006
SACCHAROMETER Buckley & Co. 0549 IDG047
SACCHAROMETER Long, J. 0550 IDG037
SACCHAROMETER Reeves, W. 0551 IDG041
SACCHAROMETER Unsigned 0544 IDG058
SAND GLASS Unsigned 0669 NMD221
SAND GLASS Unsigned 2117 BLA105
SAND GLASS Unsigned 3711 ULS004
SAND GLASS & BUBBLE LEVEL Simonton 3278 NMM018
SAVART DISC Harvey & Peak 1926 UGP195
SAVART DISC Macroby, R.J.T. 0267 QBP062
SAVART DISC Unsigned 0946 UDP214
SAVART DISC Unsigned 0947 UDP215
SAVART DISC Unsigned 0948 UDP216
SAVART DISC MACHINE Yeates & Son 3387 NMC018
SAVART DISC MACHINE Yeates & Son 3387 NMD309
SCALE Adie 0381 RDS116
SCALE Cole 1406 NMD056
SCALE Holtzapffel & Co. 1318 TDP066
SCALE Moore, F.M. 1108 TDE018
SCALE Spear 1109 TDE021
SCALE Spencer 1106 TDE019
SCALE Spencer & Son 1107 TDE017
SCALE Tree, J. 4470 PRI282
SCALE Troughton & Simms 1353 TDE022
SCALE Yeates 1110 TDE020
SCALE Unsigned 0382 RDS022
SCALE Unsigned 2408 BIR084
SCALE - ENGINEERS' Cary 4461 PRI224
SCALE - ENGINEERS' Dixon & Hempenstall 4462 PRI274

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SCALE - ENGINEERS' Negretti & Zambra 4460 PRI038
SCALES - ENGINEERS' Harling, W.H. 1388 TDE042
SCALES - ENGINEERS' Harling, W.H. 4495 CIL008
SCALE - GUNTER Stoakes, G. 0079 Ex0079
SCALE - GUNTER Unsigned 0612 NMD276
SCALE - GUNTER Unsigned 0613 NMD275
SCALE - MARQUOIS Elliott Brothers 1559 STR018
SCALE - MARQUOIS Elliott Brothers 4230 PRI249
SCALE - MARQUOIS Marquois 1385 TDE068
SCALE - MARQUOIS Robinson, J. & Sons 2013 BLA002
SCALE - MARQUOIS Robinson & Sons 2014 BLA003
SCOTOMETER(?) Fannin & Co. 0092 Ex0092
SCREEN Newton & Co. 2182 UDP268
SCREW PRESS Watkins & Hill 1949 UCP176
SCREW PRESS Unsigned 2890 UGP298
SECOHMMETER Nalder Brothers & Co. 2680 TDP224
SECOHMMETER Nalder Brothers & Co. 3146 UDE171
SECTOR Alment, J. 0464 Ex0464
SECTOR Bion, N. 1405 NMD055
SECTOR Elliott, W. 2601 PRI036
SECTOR Heath, T. 0618 NMD270
SECTOR Jacob & Halse 2602 NMD204
SECTOR Maire, P. le 1404 NMD054
SECTOR Moore 3844 SAL052
SECTOR Sisson, J. 0619 NMD269
SECTOR Spear 0712 NMD011
SECTOR Spear 0068 Ex0068
SECTOR Unsigned 1373 TDE050
SECTOR Unsigned 3656 PRI135
SECTOR - ISOGRAPH Stanley 4420 PRI239
SEEBECK RECTANGLE Elliott Brothers 1892 UGP161
SEEBECK RECTANGLE Griffin & Tatlock 0846 UDP112
SEEBECK RECTANGLE Yeates & Son 2198 UDP284
SEEBECK RECTANGLE Yeates & Son 3182 QBP127
SEISMOGRAPH Grubb, H. 1857 MAY303
SELF-INDUCTION STANDARD Nalder Brothers & Co. 2958 UGP366
SELF INDUCTOMETER Ayrton & Perry 1322 TDP022
SELF INDUCTOMETER Unsigned 0235 QBP029
SET SQUARE Pixii 2163 NMD216
SET SQUARES Unsigned 4225 PRI243
SEXTANT Adie 0190 UGE001
SEXTANT Bennett, J. 1083 TDE004
SEXTANT Blair, H.G. & Co. 1112 PRI003
SEXTANT Buckley 0525 Ex0525
SEXTANT Cox, W.C. (J. Lilley & Son) 3283 NMM023
SEXTANT Crichton Brothers 4096 UFM013
SEXTANT Dixon & Hempenstall 0287 TDE005
SEXTANT Dobbie, A. & Son 4494 CIL007
SEXTANT Dollond 3700 ARM013
SEXTANT Elliott Brothers 0974 BIR015
SEXTANT Hayes Brothers 0353 Ex0353
SEXTANT Heath & Co. 1063 MAY039
SEXTANT Heath & Co. 2470 SAL031
SEXTANT Heath & Co. 3525 SAL048
SEXTANT Hughes, H. & Son 0607 NMD281
SEXTANT Hughes, H. & Son 4095 UFM012
SEXTANT Jewitt, W. & Co. 3275 NMM015
SEXTANT Levett, E. 3264 NMM004
SEXTANT Moore, F.M. 0317 Ex0317
SEXTANT Moore, F.M. 0380 Ex0380
SEXTANT Moore, F.M. 3282 NMM022
SEXTANT Neill, S.D. 0384 Ex0384
SEXTANT Neill, S.D. 0385 Ex0385
SEXTANT Norie, J.W. & Co. 0608 NMD280
SEXTANT Plath, C. 3248 QBE025
SEXTANT Sewill 2489 SAL038
SEXTANT Sewill, J. 3276 NMM016
SEXTANT Spear 0482 Ex0482
SEXTANT Spear 0626 NMD262
SEXTANT Troughton 0354 CWC036
SEXTANT Troughton 4094 UFM011
SEXTANT Whitbread, G. 1838 DUN020
SEXTANT Wilson & Gillie 3265 NMM005
SEXTANT Unsigned 1854 PRI027
SEXTANT - ANGLE Hughes, H. & Son 3866 UDE183
SEXTANT - BOX Adie 0195 UGE006
SEXTANT - BOX Bennett 0319 Ex0319
SEXTANT - BOX Cummins, C. 2576 PRI211
SEXTANT - BOX Elliott Brothers 2603 NMD202
SEXTANT - BOX Jones, T. 2385 BIR061
SEXTANT - BOX Lee & Son 0315 Ex0315
SEXTANT - BOX Robinson 1085 TDE008
SEXTANT - BOX Troughton & Simms 1084 TDE007
SEXTANT - BOX West 1113 PRI004
SEXTANT - BOX Yeates 0555 Ex0555

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SEXTANT - BOX Yeates & Son 1086 TDE009
SEXTANT - BOX Unsigned 0196 UGE007
SEXTANT - DOUBLE Hughes, H. & Son 4493 CIL006
SHAFT SPEED INDICATOR Butler 3926 ULS023
SHAFT SPEED INDICATOR Elliott Brothers 2737 TDP281
SHAFT SPEED INDICATOR Packer, T. 0468 RDS027
SHIP SECTION Unsigned 2930 UGP338
SHIP'S LOG Reynolds 3262 NMM002
SHIP'S LOG Cutts, Sutton & Sons 4115 UFM030
SHIP'S LOG Walker, T. 2493 SAL042
SHIP'S LOG Walker, T. 3261 NMM001
SHIP'S LOG REGISTER Walker 2341 SAL024
SHUNT Elliott Brothers 3032 UDE058
SHUNT Elliott Brothers 3196 QBP141
SHUNT Paul, R.W. 3103 UDE129
SHUNT - UNIVERSAL Nalder Brothers & Co. 3327 UCP327
SHUNT - UNIVERSAL Paul, R.W. 0222 QBP003
SIDEROSTAT Grubb, H. 0239 Ex0239
SIGNAL INDICATOR GPO 4135 MAY339
SINGING FLAMES APPARATUS Barrett, W.F. 0323 Ex0323
SINGING FLAMES APPARATUS Barrett, W.F. 0324 Ex0324
SINGING FLAMES APPARATUS Barrett, W.F. 0325 Ex0325
SINGING FLAMES APPARATUS Barrett, W.F. 0326 Ex0326
SINGING FLAMES APPARATUS Yeates & Son 0410 Ex0410
SINGING FLAMES APPARATUS Yeates & Son 3390 Ex0593
SINGING FLAMES APPARATUS Yeates & Son 0268 QBP063
SINGING FLAMES APPARATUS Yeates & Son 0795 UDP061
SINGING FLAMES APPARATUS Yeates & Son 1196 TDP128
SINGING FLAMES APPARATUS Yeates & Son 1476 UGP056
SINGING FLAMES APPARATUS Yeates & Son 1714 MAY201
SINGING FLAMES APPARATUS Yeates & Son 2773 UCP226
SINGING FLAMES APPARATUS Yeates & Son 3390 NMC021
SINGING FLAMES APPARATUS Unsigned 2213 UDP291
SINKING BOWL TIMER Unsigned 3710 ULS003
SIREN Unsigned 0801 UDP067
SIREN - CAGNIARD Harvey & Peak (Yeates & Son) 0802 UDP068
SIREN - CAGNIARD Kerby, F. 1173 TDP156
SIREN - CAGNIARD Koenig, R. 3218 QBP163
SIREN - CAGNIARD Kohl, M. 0187 UGP067
SIREN - CAGNIARD Robinson, J. & Sons 0696 UDP024
SIREN - CAGNIARD Yeates & Son 3376 Ex0591
SIREN - CAGNIARD Yeates & Son 1571 MAY060
SIREN - CAGNIARD Yeates & Son 1809 MAY292
SIREN - CAGNIARD Yeates & Son 1911 UGP180
SIREN - CAGNIARD Yeates & Son 3312 UCP312
SIREN - CAGNIARD Yeates & Son 3376 NMC007
SIREN - CAGNIARD Unsigned 2775 UCP228
SIREN - ELECTRICAL Yeates & Son 1672 MAY159
SIREN - HELMHOLTZ DOUBLE Koenig, R. 0265 QBP060
SIREN - HELMHOLTZ DOUBLE Koenig, R. 0683 UDP011
SIREN - HELMHOLTZ DOUBLE Yeates & Son 1170 TDP159
SIREN - HELMHOLTZ DOUBLE Yeates & Son 1572 MAY061
SIREN - HELMHOLTZ DOUBLE Yeates & Son 2759 UCP212
SIREN - HELMHOLTZ DOUBLE Unsigned 3377 NMC008
SIREN - SEEBECK Harvey & Peak 1927 UGP196
SIREN - SEEBECK Yeates & Son 1060 MAY036
SKETCH PAD & CLINOMETER Houghton-Butcher 3238 QBE016
SLIDE - GRANITE FILM Yeates & Son 0820 UDP086
SLIDES Newton 2229 UDP307
SLIDES Newton 3206 QBP151
SLIDE INSERTER Beard, R. (R.) 0457 RDS073
SLIDE RULE Dring & Fage 0383 RDS018
SLIDE RULE Dring & Fage 0508 IDG019
SLIDE RULE Griffin 2109 BLA097
SLIDE RULE Harris, P. & Co. 2108 BLA096
SLIDE RULE Jones, W. & S. 0614 NMD274
SLIDE RULE Sargent, T. 0260 Ex0260
SLIDE RULE Voster, D. 0107 Ex0107
SLIDE RULE Unsigned 1372 TDE049
SLIDE RULE - BREWER'S Long, J. 4463 PRI275
SLIDE RULE - BREWER'S Long, J. 4464 PRI276
SLIDE RULE - BREWER'S Unsigned 0506 IDG020
SLIDE RULE - BREWER'S Unsigned 1128 NMD036
SLIDE RULE - FULLER CYLINDRICAL Stanley 0384 RDS017
SLIDE RULE - FULLER CYLINDRICAL Stanley 1098 TDE056
SLIDE RULE - FULLER CYLINDRICAL Stanley 1129 NMD037
SLIDE RULE - FULLER CYLINDRICAL Stanley 2962 NMD198
SLIDE RULE - FULLER CYLINDRICAL Stanley 3233 QBE011
SLIDE RULE - HANNYNGTON Aston & Mander 1383 TDE066
SLIDE RULE - HEAD ROD & ULLAGE Unsigned 0507 IDG076
SLIDE RULE - MANNHEIM Farrar, W. 1371 TDE047
SLIDE RULE - POWER & SPEED SCALE Unsigned 4112 UFM027
SLIDE RULE - SPIRAL Lilly, W.E. 1386 TDE061
SLIDE RULE - SPIRAL Lilly, W.E. (Dixon & Hempenstall) 4414 PRI256
SLIDING FRAME Unsigned 2195 UDP281

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SLIT Duboscq, J. 2547 UGP253
SLIT Newton & Co. 0441 RDS125
SLIT Newton & Co. 4106 MAY329
SLIT Unsigned 1335 TDP008
SLITS - FIXED AND SPINNING Unsigned 4152 TDP318
SLIT - SPINNING Unsigned 2716 TDP260
SOAP BUBBLE DRUM - BOYS Griffin 1904 UGP173
SOAP BUBBLE DRUM - BOYS Griffin 3461 QBP187
SOLENOID Unsigned 2187 UDP273
SONOMETER Bennett 2758 UCP211
SONOMETER Pye, W.G. & Co. 1309 TDP072
SONOMETER Robinson, J. & Sons 1308 TDP069
SONOMETER Robinson, J. & Sons 2059 BLA058
SONOMETER Robinson, J. & Sons 2269 UDP347
SONOMETER Yeates & Son 1913 UGP182
SONOMETER Unsigned 3831 NMC232
SONOMETER Unsigned 3906 QBP267
SONOMETER - HUBBARD MONOCHORD Baird & Tatlock 3342 UCP342
SOUND CONE Koenig, R. 3897 QBP258
SOUND CYLINDERS Barrett, W.F. 0327 Ex0327
SOUND CYLINDERS Yeates & Son 0762 UDP031
SOUND CYLINDERS Yeates & Son 1279 TDP132
SOUND CYLINDERS Yeates & Son 1569 MAY058
SOUND INTERFERENCE TUBE - KUNDT Unsigned 3343 UCP343
SOUND PIPE Koenig, R. 3894 QBP255
SOUND TUBE Yeates & Son 3586 Ex0605
SOUND TUBE Yeates & Son 3586 NMC082
SOUND TUBE Unsigned 1915 UGP184
SOUND TUBE Unsigned 2176 UDP262
SOUND TUBE Unsigned 2261 UDP339
SOUND TUBE - HOPKIN'S FORK Harvey & Peak 2196 UDP282
SOUND TUBE - HOPKIN'S FORK Unsigned 3895 QBP256
SOUNDING BOWL Unsigned 1266 TDP085
SOUNDING BOWL Unsigned 2757 UCP210
SOUNDING LEAD Unsigned 3917 ULS014
SOUNDING LEAD Unsigned 3918 ULS015
SOUNDING TUBES White, J. 3287 NMM027
SPANGLED GLASS GLOBE Unsigned 3372 NMC003
SPARK CHAMBER Unsigned 4071 BIR162
SPARK GAP Apps 1067 MAY043
SPARK GAP Kohl. M. 2254 UDP332
SPARK GAP Unsigned 0888 UDP154
SPARK GAP Unsigned 1595 MAY084
SPARK GAP Unsigned 2286 QBC023
SPARK GENERATOR Clarke 0899 UDP165
SPEAR FOR MICROSCOPE SPECIMEN Unsigned 0458 RDS071
SPECIFIC GRAVITY APPARATUS Septems 2212 UDP290
SPECIFIC GRAVITY APPARATUS Yeates & Son 0418 RDS092
SPECIFIC HEAT APPARATUS - REGNAULT Griffin 1745 MAY228
SPECIFIC HEAT APPARATUS - REGNAULT Harris, P. & Co. 2110 BLA098
SPECIFIC HEAT APPARATUS - REGNAULT Harris, P. & Co. 2495 UGP201
SPECIFIC HEAT APPARATUS - REGNAULT Harvey & Peak 1885 UGP154
SPECIFIC HEAT APPARATUS - REGNAULT Yeates & Son 3317 UCP317
SPECIFIC HEAT APPARATUS - REGNAULT Unsigned 2508 UGP214
SPECIFIC GRAVITY FLASK - SCHUMANN Unsigned 4324 TDC020
SPECTACLES Dipple & Conway 4232 NMD188
SPECTACLES Flavelle, H. 0341 Ex0341
SPECTROGRAPH - SOLAR Grubb, H. 0423 Ex0423
SPECTROHELIOGRAPH Grubb, H. 0193 Ex0193
SPECTROSCOPE Grubb, H. 0082 Ex0082
SPECTROSCOPE Grubb, H. 0574 Ex0574
SPECTROSCOPE Grubb, H. (Spencer & Son) 0103 Ex0103
SPECTROSCOPE Grubb, H. 0256 Ex0256
SPECTROSCOPE Grubb, H. 0148 Ex0148
SPECTROSCOPE Grubb, H. 0254 Ex0254
SPECTROSCOPE Grubb, H. 0255 Ex0255
SPECTROSCOPE Grubb, H. 0184 Ex0184
SPECTROSCOPE Grubb, H. 0175 Ex0175
SPECTROSCOPE Merz 1485 UGP098
SPECTROSCOPE Yeates & Son 0412 Ex0412
SPECTROSCOPE Yeates & Son 0414 Ex0414
SPECTROSCOPE Unsigned 2001 CWC035
SPECTROSCOPE - ASTRONOMICAL Browning, J. 0967 BIR007
SPECTROSCOPE - ASTRONOMICAL Grubb & Son 0057 Ex0057
SPECTROSCOPE - ASTRONOMICAL Grubb & Son 0553 Ex0553
SPECTROSCOPE - DIRECT VISION Beck, R. & J. 4262 RCS012
SPECTROSCOPE - DIRECT VISION Browning, J. 0279 CWC011
SPECTROSCOPE - DIRECT VISION Browning, J. 0968 BIR008
SPECTROSCOPE - DIRECT VISION Browning, J. 1306 TDP169
SPECTROSCOPE - DIRECT VISION Browning, J. 2400 BIR076
SPECTROSCOPE - DIRECT VISION Hilger, A. 0133 RDS102
SPECTROSCOPE - DIRECT VISION Hilger, A. 0773 UDP041
SPECTROSCOPE - DIRECT VISION Hilger, A. 1951 UCP178
SPECTROSCOPE - DIRECT VISION Hilger, A. 2812 UCP265
SPECTROSCOPE - DIRECT VISION Hofmann, J.G. 0097 UCP014

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SPECTROSCOPE - DIRECT VISION Hofmann, J.G. 0345 TDP170
SPECTROSCOPE - DIRECT VISION Hofmann, J.G. 2321 QBP087
SPECTROSCOPE - DIRECT VISION Ladd, W. 1020 PRI158
SPECTROSCOPE - DIRECT VISION Lutz, E. 1018 PRI156
SPECTROSCOPE - DIRECT VISION Schmidt, F. & Haensch 0132 RDS033
SPECTROSCOPE - DIRECT VISION Velasquez, M.A. 1019 PRI157
SPECTROSCOPE - DIRECT VISION Winkel 2813 UCP266
SPECTROSCOPE - DIRECT VISION Winkel-Zeiss 1021 PRI159
SPECTROSCOPE - DIRECT VISION Yeates & Son 0131 RDS049
SPECTROSCOPE - DIRECT VISION Yeates & Son 0140 UGP003
SPECTROSCOPE - DIRECT VISION Yeates & Son 0281 CWC052
SPECTROSCOPE - DIRECT VISION Yeates & Son 0966 BIR006
SPECTROSCOPE - DIRECT VISION Yeates & Son 1042 MAY016
SPECTROSCOPE - DIRECT VISION Yeates & Son 1147 TDP172
SPECTROSCOPE - DIRECT VISION Unsigned 2276 PRI162
SPECTROSCOPE - DIRECT VISION, GRACE Browning, J. 0138 UGP001
SPECTROSCOPE - DIRECT VISION, McCLEAN Browning, J. 3837 BIR146
SPECTROSCOPE - DIRECT VISION, McCLEAN Browning, J. 3838 BIR147
SPECTROSCOPE - DIRECT VISION, McCLEAN McClean 2324 QBP090
SPECTROSCOPE - MICRO Baker 0495 PRI142
SPECTROSCOPE - MICRO Browning, J. 0141 UGP004
SPECTROSCOPE - MICRO Browning, J. 2298 PRI172
SPECTROSCOPE - MICRO Browning, J. 4269 RCS019
SPECTROSCOPE - MICRO Zeiss, C. 4483 STL011
SPECTROSCOPE - PHOTOGRAPHIC Hilger, A. 0124 QBP038
SPECTROSCOPE - PHOTOGRAPHIC Hilger, A. 1156 TDP164
SPECTROSCOPE - PHOTOGRAPHIC Unsigned 0122 QBP052
SPECTROSCOPE - PHOTOGRAPHIC Unsigned 3884 QBP245
SPECTROSCOPE - PHOTOGRAPHIC, LITTRON Bellingham & Stanley 2841 TDP302
SPECTROSCOPE - PHOTOGRAPHIC, LITTRON Unsigned 0774 QBC003
SPECTROSCOPE - PROJECTION Lerebours & Secretan 0148 UGP011
SPECTROSCOPE - PROJECTION Secretan 0099 UCP016
SPECTROSCOPE - PROJECTION Yeates & Son 0413 Ex0413
SPECTROSCOPE - PROJECTION Yeates & Son 0094 UCP018
SPECTROSCOPE - PROJECTION Yeates & Son 0095 UCP019
SPECTROSCOPE - PROJECTION Yeates & Son 0127 RDS041
SPECTROSCOPE - PROJECTION Yeates & Son 0128 RDS090
SPECTROSCOPE - PROJECTION Unsigned 2169 UDP255
SPECTROSCOPE - PROJECTION Unsigned 4146 TDP312
SPECTROSCOPE - TABLE Browning, J. 0123 QBP043
SPECTROSCOPE - TABLE Browning, J. 0142 UGP005
SPECTROSCOPE - TABLE Browning, J. 1327 TDP016
SPECTROSCOPE - TABLE Browning, J. 1330 TDP176
SPECTROSCOPE - TABLE Browning, J. 2760 UCP213
SPECTROSCOPE - TABLE Browning, J. 3829 NMC230
SPECTROSCOPE - TABLE Browning, J. 4341 TDC032
SPECTROSCOPE - TABLE Duboscq, J. 0125 QBP037
SPECTROSCOPE - TABLE George, W. & J. & Becker 1022 QBC032
SPECTROSCOPE - TABLE Griffin 0146 UGP009
SPECTROSCOPE - TABLE Griffin 0278 CWC013
SPECTROSCOPE - TABLE Grubb, H. 0117 UCP001
SPECTROSCOPE - TABLE Grubb, H. 0129 RDS004
SPECTROSCOPE - TABLE Grubb, H. 0130 RDS104
SPECTROSCOPE - TABLE Harvey & Peak 0144 UGP007
SPECTROSCOPE - TABLE Hilger, A. 0088 UCP039
SPECTROSCOPE - TABLE Hilger, A. 0777 UDP044
SPECTROSCOPE - TABLE Hilger, A. 1039 MAY013
SPECTROSCOPE - TABLE Hilger, A. 3198 QBP143
SPECTROSCOPE - TABLE Kohl, M. 0143 UGP006
SPECTROSCOPE - TABLE Nicolson, W.B. 4149 TDP315
SPECTROSCOPE - TABLE Pye, W.G. & Co. 4148 TDP314
SPECTROSCOPE - TABLE Spencer & Son (Grubb) 0104 Ex0104
SPECTROSCOPE - TABLE Troughton & Simms 2844 TDP305
SPECTROSCOPE - TABLE Yeates & Son 1040 MAY014
SPECTROSCOPE - TABLE Yeates & Son 1420 SAL005
SPECTROSCOPE - TABLE Yeates & Son 4480 STL008
SPECTROSCOPE - TABLE Yeates & Son 2487 SAL036
SPECTROSCOPE - TABLE Unsigned 0089 UCP036
SPECTROSCOPE - TABLE Unsigned 0139 UGP002
SPECTROSCOPE - TABLE Unsigned 0145 UGP008
SPECTROSCOPE - TABLE Unsigned 1017 PRI155
SPECTROSCOPE - TABLE Unsigned 1980 UCP207
SPECTROSCOPE - TABLE Unsigned 3334 UCP334
SPECTROSCOPE - TABLE Unsigned 4147 TDP313
SPECTROSCOPE - ULTRA VIOLET Beck, R. & J. 0126 RDS113
SPECTROSCOPE - ULTRA VIOLET Yeates & Son 0102 Ex0102
SPECTROSCOPE COLLIMATOR Unsigned 4067 BIR158
SPECTRUM Hartley, W. 2304 PRI178
SPECTRUM Unsigned 2652 RDS149
SPHEROGRAPH Saxby, S.M., Wood, H. & Co. 3288 NMM028
SPHEROMETER Baird & Tatlock 2318 QBP084
SPHEROMETER Griffin 2517 UGP223
SPHEROMETER Harris, P. & Co. 2091 BLA079
SPHEROMETER Maiben & Co 4431 MAY351
SPHEROMETER Rossin 1350 TDP202

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SPHEROMETER Yeates & Son 2317 QBP083
SPHEROMETER Yeates & Son 4160 MAY344
SPINNER Yeates & Son 1495 MAY057
SPINNER Unsigned 1494 UGP117
SPINNER Unsigned 2168 UDP254
SPINNER Unsigned 2240 UDP318
SPINNER Unsigned 2267 UDP345
SPINNER Unsigned 2314 QBP080
SPINNER Unsigned 2417 BIR092
SPINTHARISCOPE Beck, R. & J. 2282 PRI168
SPINTHARISCOPE Watson, W. & Sons 1550 STR009
SPIRIT LEVEL APPARATUS Spencer, J. & Son 1103 TDE001
SPIROMETER Casella, L. 4295 RCS045
SPOUTING VESSEL Elliott Brothers 1473 UGP122
SPOUTING VESSEL Unsigned 0697 UDP025
SPYGLASS Bleuler 3681 SAL051
SPYGLASS Moschino, G. 4246 NMD194
SPYGLASS Unsigned 0604 NMD283
STAND Brown Brothers 2197 UDP283
STAND Elliott Brothers 1887 UGP156
STAND Harris, P. 2119 BLA107
STAND Newton & Co. 2122 BLA110
STAND Unsigned 2718 TDP262
STAND - ADJUSTABLE Unsigned 0840 UDP106
STAND - ADJUSTABLE Unsigned 1323 TDP204
STAND - ADJUSTABLE Unsigned 2710 TDP254
STAND - CONDENSER Baird & Tatlock 4344 TDC035
STAND - INSULATING Harvey & Peak 0897 UDP163
STAND - INSULATING Yeates & Son 0956 UDP224
STAND - INSULATING Unsigned 0288 CWC044
STAND - INSULATING Unsigned 0896 UDP162
STAND - INSULATING Unsigned 2155 UDP244
STAND - INSULATING Unsigned 2238 UDP316
STAND WITH GLASS U-TUBES Elliott Brothers 2932 UGP340
STAND WITH SCREW CLAMP Yeates & Son 3318 UCP318
STANDARD CELL Paul, R.W. 3144 UDE169
STANDARD CELL - WESTON Cambridge Co. (H.M. Dean) 3719 UGP371
STANDARD CELL - ZINC/MERCURY Muirhead 3017 UDE043
STANDARD CELL - ZINC/MERCURY Muirhead 3718 UGP370
STANDARD CELL - ZINC/MERCURY Muirhead & Co. 0911 UDP176
STANDARD CELL - ZINC/MERCURY Paul, R.W. 3018 UDE044
STANDARD LENGTH Hennessy 0356 Ex0356
STANDARD LENGTH - IMPERIAL Troughton 1257 TDP161
STANDARD LENGTH - IMPERIAL Yeates & Son 1439 MIS013
STANDARD METRE Oertling, L. 0755 UCP115
STANDARD VOLUME - IMPERIAL Baird & Tatlock 1994 SAL016
STANDARD VOLUMES - IMPERIAL Austen & Son 3527 SAL050
STANDARD VOLUMES - IMPERIAL De Grave, Short & Co 1992 SAL014
STANDARD VOLUMES - IMPERIAL Gatchell, S. & Sons 0345 Ex0345
STANDARD VOLUMES - IMPERIAL Munster Iron Co. 3541 Ex0595
STANDARD VOLUMES - IMPERIAL Munster Iron Co. 3541 NMC037
STANDARD VOLUMES - IMPERIAL Oertling, L. 0758 UCP118
STANDARD VOLUMES - IMPERIAL Unsigned 0759 UCP119
STANDARD VOLUMES - IMPERIAL Unsigned 1995 SAL017
STANDARD VOLUMES - METRIC Oertling, L. 0757 UCP117
STANDARD VOLUMES - METRIC Unsigned 0847 UDP113
STANDARD VOLUME - PINT Munster Iron Co. 3848 SAL056
STANDARD WEIGHT - IMPERIAL Unsigned 1989 SAL011
STANDARD WEIGHTS - IMPERIAL Bate, R.B. 1990 SAL012
STANDARD WEIGHTS - IMPERIAL Pooley, H. & Son 1993 SAL015
STANDARD WEIGHTS - IMPERIAL Unsigned 1991 SAL013
STANDARD WEIGHTS - METRIC Oertling, L. 0760 UCP120
STANDARD YARD Oertling, L. 0756 UCP116
STANDARD YARD Troughton & Simms 0494 RDS136
STANDARD YARD Troughton & Simms 1230 TDP160
STATION POINTER Adie & Son 0199 UGE010
STATION POINTER Unsigned 1081 TDE014
STATION POINTER Unsigned 0615 NMD273
STATION POINTER Unsigned 4100 UFM017
STEAM ENGINE Unsigned 2510 UGP216
STEAM ENGINE Unsigned 2511 UGP217
STEAM ENGINE - HERO'S AEOLIPILE Unsigned 3208 QBP153
STEAM ENGINE INDICATOR British Engine Co. 4098 UFM015
STEAM ENGINE INDICATOR Crosby Co. 0566 IDG016
STEAM ENGINE INDICATOR Dobbie, McInnes 2478 PRI199
STEAM ENGINE INDICATOR Dobbie, McInnes & Clyde 2479 PRI200
STEAM ENGINE INDICATOR Elliott Brothers 0568 IDG014
STEAM ENGINE INDICATOR M'Kinnell & Buchanan 0567 IDG009
STEAM HEATER Nicolson, W.B. 3875 NEW005
STENCIL PLATES - ENGINEERS Huntley Boorne & Stevens 4426 PRI260
STEREO VIEWER Smith, Beck & Beck 2346 BIR032
STEREO VIEWER Smith, Beck & Beck 3222 QBP167
STEREO VIEWER Swan 4454 PRI268
STEREO VIEWER Underwood & Underwood 4455 PRI269
STEREO VIEWER Watkins & Hill 1469 UCP157

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STEREO VIEWER Unsigned 2278 PRI164
 STEREO VIEWER Unsigned 4433 NMD186
 STEREO VIEWER Unsigned 4452 PRI266
 STEREO VIEWER Unsigned 4120 UFM035
 STEREO VIEWER Unsigned 4456 PRI270
 STEREO VIEWER - BREWSTER Duboscq Soleil 0056 UCP092
 STEREO VIEWER - BREWSTER Duboscq Soleil 1690 MAY177
 STEREO VIEWER - BREWSTER Duboscq Soleil 3221 QBP166
 STEREO VIEWER - BREWSTER Elliott Brothers 1487 UGP074
 STEREO VIEWER - BREWSTER Unsigned 4118 UFM033
 STEREO VIEWER - BREWSTER Unsigned 4453 PRI267
 STEREO VIEWER - BREWSTER Unsigned 4119 UFM034
 STEREO VIEWER - WHEATSTONE Elliott Brothers 2867 UGP287
 STEREO VIEWER - WHEATSTONE Unsigned 4073 BIR164
 STETHOSCOPE - MONAURAL Unsigned 3458 QBP184
 STOOL - INSULATED Harvey & Peak 0903 UDP169
 STOOL - INSULATED Unsigned 1202 TDP186
 STOOL - INSULATED Unsigned 2939 UGP347
 STOOL - INSULATED Unsigned 4161 MAY345
 STOPPER Spencer & Son 2153 UDP242
 STORAGE CASE - STEPPED Unsigned 4345 TDC036
 STURGEON DISC Unsigned 0273 QBP068
 SUNSHINE RECORDER - CAMPBELL-STOKES Unsigned 4506 MET005
 SUNSHINE RECORDER - CAMPBELL-STOKES Unsigned 4514 MET013
 SURGEON'S INSTRUMENTS Read 0393 Ex0393
 SURVEYING INSTRUMENT - POCKET Dixon & Hempenstall 3231 QBE009
 SURVEYING INSTRUMENT Stoakes, G. 3153 NMD109
 SURVEYING INSTRUMENT - UNIVERSAL Schmalcalder 0635 NMD254
 SURVEYING RULE Yeates & Son 0560 Ex0560
 SURVEYING RULE Yeates & Son 1370 TDE046
 SURVEYING STAFF Dixon & Hempenstall 1642 MAY129
 SURVEYING STAFF Spencer & Son 1355 TDE025
 SURVEYING TARGET Unsigned 3867 UDE184
 SWITCH Dixon & Hempenstall 2677 TDP221
 SWITCH Elliott Brothers 0920 UDP185
 SWITCH Mason (Palmer) 2532 UGP238
 SWITCH Sullivan, H. 0226 QBP020
 SWITCH Yeates & Son 1071 MAY047
 SWITCH Yeates & Son 1631 MAY118
 SWITCH Unsigned 0312 CWC069
 SWITCH Unsigned 0400 RDS112
 SWITCH Unsigned 1468 UCP141
 SWITCH Unsigned 1788 MAY271
 SWITCH Unsigned 3107 UDE132
 SWITCH Unsigned 3108 UDE133
 SWITCH Unsigned 3408 BIR110
 SWITCH Unsigned 3437 BIR139
 SWITCH - BATTERY Neville 2717 TDP261
 SWITCH - BATTERY Neville 3411 BIR113
 SWITCH - BATTERY Neville 0398 RDS117
 SWITCH - BATTERY Neville 3407 BIR109
 SWITCH - ELECTROMAGNETIC EXPLODER Yeates & Son 0109 UCP027
 SWITCH - ELECTROMAGNETIC EXPLODER Yeates & Son 1181 TDP112
 SWITCH - ELECTROMAGNETIC EXPLODER Yeates & Son (Breguet) 2978 UDE004
 SWITCH - SERVO-CONTROL Grubb, H. 1446 UCP126
 SWITCH - THOMSON'S REVERSING KEY Unsigned 3100 UDE126
 SYMPIESOMETER Bennett 0114 UCP022
 SYMPIESOMETER Spears & Co. 0293 Ex0293
 TABLES Vacher 1384 TDE067
 TELEGRAPH - ALPHABETICAL Breguet 3570 NMC066
 TELEGRAPH - ALPHABETICAL Breguet 3614 NMC110
 TELEGRAPH - ALPHABETICAL Breguet 3579 NMC075
 TELEGRAPH - ALPHABETICAL Breguet 3615 NMC111
 TELEGRAPH - ALPHABETICAL Deleuil 1600 MAY089
 TELEGRAPH - ALPHABETICAL Froment 2977 UDE003
 TELEGRAPH - ALPHABETICAL Knight 0030 UCP005
 TELEGRAPH - ALPHABETICAL Yeates & Son 0098 UCP055
 TELEGRAPH - ALPHABETICAL Yeates & Son (Breguet) 2018 BLA007
 TELEGRAPH - ALPHABETICAL Yeates & Son 2019 BLA008
 TELEGRAPH - ALPHABETICAL Unsigned 0052 UCP094
 TELEGRAPH - ALPHABETICAL Unsigned 0843 UDP109
 TELEGRAPH - MORSE Elliott Brothers 1886 UGP155
 TELEGRAPH - MORSE GPO 1757 MAY240
 TELEGRAPH - MORSE GPO 3594 NMC090
 TELEGRAPH - MORSE GPO 3595 NMC091
 TELEGRAPH - MORSE Izant, H. 3192 QBP137
 TELEGRAPH - MORSE Yeates & Son 0058 UGP015
 TELEGRAPH - MORSE Yeates & Son (Breguet) 0104 UCP030
 TELEGRAPH - MORSE Yeates & Son 0790 UDP056
 TELEGRAPH - MORSE Yeates & Son 1174 TDP036
 TELEGRAPH - MORSE Yeates & Son 1758 MAY241
 TELEGRAPH - MORSE Yeates & Son 1760 MAY243
 TELEGRAPH - MORSE Yeates & Son 2020 BLA009
 TELEGRAPH - MORSE Yeates & Son 2976 UDE002
 TELEGRAPH - MORSE Unsigned 0078 UCP093

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TELEGRAPH - MORSE Unsigned 1759 MAY242
TELEGRAPH - MORSE Unsigned 1761 MAY244
TELEGRAPH - MORSE Unsigned 1762 MAY245
TELEGRAPH - MORSE, WITH INTERRUPTOR Unsigned 3592 NMC088
TELEGRAPH APPARATUS Casella 3285 NMM025
TELEGRAPH APPARATUS Watkins & Hill 2979 UDE005
TELEGRAPH PRINTER Brasseur, L. 3378 NMC009
TELEGRAPH PRINTER Robinson, J. & Sons 2980 UDE006
TELEGRAPH PRINTER Unsigned 3551 NMC047
TELEPHONE Hunningscone 2749 TDP293
TELEPHONE Yeates, S.M. 0097 Ex0097
TELESCOPE - EQUATORIAL Troughton 3688 ARM001
TELESCOPE - PORTABLE ALTAZIMUTH Adams, G. 3999 ARM073
TELESCOPE - PORTABLE ALTAZIMUTH Gilkerson & Co. 3988 ARM062
TELESCOPE - PORTABLE ALTAZIMUTH Robinson 0975 BIR016
TELESCOPE - READING Elliott Brothers 0335 CWC051
TELESCOPE - READING Elliott Brothers 0749 UCP109
TELESCOPE - READING Horne & Thornthwaite 1329 TDP010
TELESCOPE - READING Smith & Beck 0042 UCP095
TELESCOPE - READING Unsigned 0336 CWC012
TELESCOPE - READING Unsigned 1518 UGP096
TELESCOPE - REFLECTING Adams, G. 0596 NMD290
TELESCOPE - REFLECTING Adams, G. 3963 ARM037
TELESCOPE - REFLECTING Alment, J. 0499 Ex0499
TELESCOPE - REFLECTING Davis, J. 0599 NMD288
TELESCOPE - REFLECTING Dollond 0460 RDS038
TELESCOPE - REFLECTING Grubb, H. 0140 Ex0140
TELESCOPE - REFLECTING Grubb, H. 0142 Ex0142
TELESCOPE - REFLECTING Grubb, H. 0347 Ex0347
TELESCOPE - REFLECTING Grubb, H. 0147 Ex0147
TELESCOPE - REFLECTING Grubb, H. 0427 Ex0427
TELESCOPE - REFLECTING Grubb, H. 0168 Ex0168
TELESCOPE - REFLECTING Grubb, H. 0164 Ex0164
TELESCOPE - REFLECTING Grubb, H. 0422 Ex0422
TELESCOPE - REFLECTING Grubb, T. 3693 ARM006
TELESCOPE - REFLECTING Grubb, T. 0137 Ex0137
TELESCOPE - REFLECTING Grubb, T. 0138 Ex0138
TELESCOPE - REFLECTING Jones, W. & S. (Cuthbert, J.) 0601 NMD286
TELESCOPE - REFLECTING Ottway, W. & Co. 2351 BIR037
TELESCOPE - REFLECTING Rosse, Earl of 0087 Ex0087
TELESCOPE - REFLECTING Rosse, Earl of 0041 Ex0041
TELESCOPE - REFLECTING Rosse, Earl of 0349 Ex0349
TELESCOPE - REFLECTING Rosse, Earl of 0984 BIR001
TELESCOPE - REFLECTING Rosse, Earl of 0988 BIR029
TELESCOPE - REFLECTING Rosse, Earl of 0987 BIR028
TELESCOPE - REFLECTING Short, J. 0594 NMD292
TELESCOPE - REFLECTING Short, J. 1856 PRI029
TELESCOPE - REFLECTING Short, T. 1391 PRI022
TELESCOPE - REFLECTING Short, T. 3697 ARM010
TELESCOPE - REFLECTING Watson, J. 0597 NMD289
TELESCOPE - REFLECTING With 1829 DUN011
TELESCOPE - REFLECTING Unsigned 0251 QBP047
TELESCOPE - REFLECTING Unsigned 2352 BIR038
TELESCOPE - REFLECTING Unsigned 3659 NMD196
TELESCOPE - REFLECTING Unsigned 3701 ARM014
TELESCOPE - REFLECTING Unsigned 3995 ARM069
TELESCOPE - REFLECTING & REFRACTING Grubb, H. 0139 Ex0139
TELESCOPE - REFLECTING & REFRACTING Grubb, H. 0150 Ex0150
TELESCOPE - REFLECTING & REFRACTING Grubb, H. 0575 Ex0575
TELESCOPE - REFLECTING & REFRACTING Grubb, H. 0166 Ex0166
TELESCOPE - REFLECTING & REFRACTING Grubb, H. 0232 Ex0232
TELESCOPE - REFRACTING Ausfeld, H. 0985 BIR026
TELESCOPE - REFRACTING Banks 4010 SAL067
TELESCOPE - REFRACTING Bardou et Fils 3266 NMM006
TELESCOPE - REFRACTING Bennett 0641 Ex0641
TELESCOPE - REFRACTING Berge 2359 BIR045
TELESCOPE - REFRACTING Broadhurst, Clarkson & Co. 1847 DUN029
TELESCOPE - REFRACTING Brown, J. 1506 UGP076
TELESCOPE - REFRACTING Browning, J. 0334 CWC014
TELESCOPE - REFRACTING Cahill 0564 Ex0564
TELESCOPE - REFRACTING Cary 1422 SAL003
TELESCOPE - REFRACTING Clarke, E. 0220 Ex0220
TELESCOPE - REFRACTING Clarke, E.M. 3397 PRI082
TELESCOPE - REFRACTING Dallmeyer, J.H. 1782 MAY265
TELESCOPE - REFRACTING Dollond 0598 PRI055
TELESCOPE - REFRACTING Dollond 2360 BIR046
TELESCOPE - REFRACTING Dollond 3660 NMD195
TELESCOPE - REFRACTING Dollond 3922 ULS019
TELESCOPE - REFRACTING Dollond 3982 ARM056
TELESCOPE - REFRACTING Dollond 3983 ARM057
TELESCOPE - REFRACTING Dollond 4009 SAL066
TELESCOPE - REFRACTING Fraunhofer 1846 DUN028
TELESCOPE - REFRACTING Grubb, H. 0469 Ex0469
TELESCOPE - REFRACTING Grubb, H. 0435 Ex0435
TELESCOPE - REFRACTING Grubb, H. 0141 Ex0141

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TELESCOPE - REFRACTING	Grubb, H.	0183	Ex0183
TELESCOPE - REFRACTING	Grubb, H.	0348	Ex0348
TELESCOPE - REFRACTING	Grubb, H.	0433	Ex0433
TELESCOPE - REFRACTING	Grubb, H.	0202	Ex0202
TELESCOPE - REFRACTING	Grubb, H.	1444	UCP123
TELESCOPE - REFRACTING	Grubb, H.	0351	Ex0351
TELESCOPE - REFRACTING	Grubb, H.	0742	UCP102
TELESCOPE - REFRACTING	Grubb, H.	1464	UCP153
TELESCOPE - REFRACTING	Grubb, H.	0169	Ex0169
TELESCOPE - REFRACTING	Grubb, H.	0456	Ex0456
TELESCOPE - REFRACTING	Grubb, H.	0145	Ex0145
TELESCOPE - REFRACTING	Grubb, H.	0236	Ex0236
TELESCOPE - REFRACTING	Grubb, H.	0180	Ex0180
TELESCOPE - REFRACTING	Grubb, H.	0227	Ex0227
TELESCOPE - REFRACTING	Grubb, H.	0437	Ex0437
TELESCOPE - REFRACTING	Grubb, H.	0181	Ex0181
TELESCOPE - REFRACTING	Grubb, H.	0149	Ex0149
TELESCOPE - REFRACTING	Grubb, H.	0501	Ex0501
TELESCOPE - REFRACTING	Grubb, H.	0438	Ex0438
TELESCOPE - REFRACTING	Grubb, H.	0583	Ex0583
TELESCOPE - REFRACTING	Grubb, H.	0452	Ex0452
TELESCOPE - REFRACTING	Grubb, H.	0445	Ex0445
TELESCOPE - REFRACTING	Grubb, H.	3694	ARM007
TELESCOPE - REFRACTING	Grubb, H.	0071	Ex0071
TELESCOPE - REFRACTING	Grubb, H.	0224	Ex0224
TELESCOPE - REFRACTING	Grubb, H.	0200	Ex0200
TELESCOPE - REFRACTING	Grubb, H.	0231	Ex0231
TELESCOPE - REFRACTING	Grubb, H.	0223	Ex0223
TELESCOPE - REFRACTING	Grubb, H.	0449	Ex0449
TELESCOPE - REFRACTING	Grubb, H.	0447	Ex0447
TELESCOPE - REFRACTING	Grubb, H.	0189	Ex0189
TELESCOPE - REFRACTING	Grubb, H.	0439	Ex0439
TELESCOPE - REFRACTING	Grubb, H.	0151	Ex0151
TELESCOPE - REFRACTING	Grubb, H.	0442	Ex0442
TELESCOPE - REFRACTING	Grubb, H.	0199	Ex0199
TELESCOPE - REFRACTING	Grubb, H.	0430	Ex0430
TELESCOPE - REFRACTING	Grubb, H.	0459	Ex0459
TELESCOPE - REFRACTING	Grubb, H.	0226	Ex0226
TELESCOPE - REFRACTING	Grubb, H.	0157	Ex0157
TELESCOPE - REFRACTING	Grubb, H.	0155	Ex0155
TELESCOPE - REFRACTING	Grubb, H.	0440	Ex0440
TELESCOPE - REFRACTING	Grubb, H.	0153	Ex0153
TELESCOPE - REFRACTING	Grubb, H.	0154	Ex0154
TELESCOPE - REFRACTING	Grubb, H.	0158	Ex0158
TELESCOPE - REFRACTING	Grubb, H.	0156	Ex0156
TELESCOPE - REFRACTING	Grubb, H.	0230	Ex0230
TELESCOPE - REFRACTING	Grubb, H.	0190	Ex0190
TELESCOPE - REFRACTING	Grubb, H.	0160	Ex0160
TELESCOPE - REFRACTING	Grubb, H.	0161	Ex0161
TELESCOPE - REFRACTING	Grubb, H.	0162	Ex0162
TELESCOPE - REFRACTING	Grubb, H.	0177	Ex0177
TELESCOPE - REFRACTING	Grubb, H.	0163	Ex0163
TELESCOPE - REFRACTING	Grubb, H.	0467	Ex0467
TELESCOPE - REFRACTING	Grubb, H.	0165	Ex0165
TELESCOPE - REFRACTING	Grubb, H.	0167	Ex0167
TELESCOPE - REFRACTING	Grubb, H.	4139	PRI189
TELESCOPE - REFRACTING	Grubb, H.	0195	Ex0195
TELESCOPE - REFRACTING	Grubb, H.	0235	Ex0235
TELESCOPE - REFRACTING	Grubb, H.	0234	Ex0234
TELESCOPE - REFRACTING	Grubb, H.	0186	Ex0186
TELESCOPE - REFRACTING	Grubb, H.	0233	Ex0233
TELESCOPE - REFRACTING	Grubb, H.	0198	Ex0198
TELESCOPE - REFRACTING	Grubb, H.	0179	Ex0179
TELESCOPE - REFRACTING	Grubb, H.	0173	Ex0173
TELESCOPE - REFRACTING	Grubb, H.	0425	Ex0425
TELESCOPE - REFRACTING	Grubb, H.	0453	Ex0453
TELESCOPE - REFRACTING	Grubb, H.	0228	Ex0228
TELESCOPE - REFRACTING	Grubb, H.	0258	Ex0258
TELESCOPE - REFRACTING	Grubb, H.	0170	Ex0170
TELESCOPE - REFRACTING	Grubb, H.	0471	Ex0471
TELESCOPE - REFRACTING	Grubb, H.	0182	Ex0182
TELESCOPE - REFRACTING	Grubb, H.	0222	Ex0222
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TELESCOPE - REFRACTING	Grubb, H.	0428	Ex0428
TELESCOPE - REFRACTING	Grubb, H.	0171	Ex0171
TELESCOPE - REFRACTING	Grubb, H.	0172	Ex0172
TELESCOPE - REFRACTING	Grubb, H.	0225	Ex0225
TELESCOPE - REFRACTING	Grubb, H.	0174	Ex0174
TELESCOPE - REFRACTING	Grubb, H.	0178	Ex0178
TELESCOPE - REFRACTING	Grubb, H.	0229	Ex0229
TELESCOPE - REFRACTING	Grubb, H.	0346	Ex0346
TELESCOPE - REFRACTING	Grubb, H.	0187	Ex0187
TELESCOPE - REFRACTING	Grubb, H.	0188	Ex0188
TELESCOPE - REFRACTING	Grubb, H.	0454	Ex0454
TELESCOPE - REFRACTING	Grubb, H.	0191	Ex0191

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TELESCOPE - REFRACTING Grubb, H. 0429 Ex0429
 TELESCOPE - REFRACTING Grubb, H. 0185 Ex0185
 TELESCOPE - REFRACTING Grubb, H. 0431 Ex0431
 TELESCOPE - REFRACTING Grubb, H. 0443 Ex0443
 TELESCOPE - REFRACTING Grubb, H. 0450 Ex0450
 TELESCOPE - REFRACTING Grubb, H. 0444 Ex0444
 TELESCOPE - REFRACTING Grubb, H. 0436 Ex0436
 TELESCOPE - REFRACTING Grubb, H. 0441 Ex0441
 TELESCOPE - REFRACTING Grubb, H. 0582 Ex0582
 TELESCOPE - REFRACTING Grubb, H. 0197 Ex0197
 TELESCOPE - REFRACTING Grubb, H. 0446 Ex0446
 TELESCOPE - REFRACTING Grubb, H. 0424 Ex0424
 TELESCOPE - REFRACTING Grubb, H. 0176 Ex0176
 TELESCOPE - REFRACTING Grubb, H. 0192 Ex0192
 TELESCOPE - REFRACTING Grubb, H. 0432 Ex0432
 TELESCOPE - REFRACTING Grubb, H. 0434 Ex0434
 TELESCOPE - REFRACTING Grubb, T. 0134 Ex0134
 TELESCOPE - REFRACTING Grubb, T. 0135 Ex0135
 TELESCOPE - REFRACTING Grubb, T. 0136 Ex0136
 TELESCOPE - REFRACTING Grubb, T. 2374 NMD078
 TELESCOPE - REFRACTING Grubb, T. 0350 Ex0350
 TELESCOPE - REFRACTING Grubb, T. 1820 DUN002
 TELESCOPE - REFRACTING Hackett, W.A. 0354 Ex0354
 TELESCOPE - REFRACTING Heath 2344 SAL027
 TELESCOPE - REFRACTING Hughes, H. & Son 2490 SAL039
 TELESCOPE - REFRACTING Hunt, H. 0600 NMD287
 TELESCOPE - REFRACTING JB 0474 Ex0474
 TELESCOPE - REFRACTING Lee 0363 Ex0363
 TELESCOPE - REFRACTING Lee & Sons 0364 Ex0364
 TELESCOPE - REFRACTING Lizars, J. 0362 Ex0362
 TELESCOPE - REFRACTING Lynch & Co. 0146 Ex0146
 TELESCOPE - REFRACTING Mason, T. 0370 Ex0370
 TELESCOPE - REFRACTING Mason, T. 0371 Ex0371
 TELESCOPE - REFRACTING Mason, T. 0491 Ex0491
 TELESCOPE - REFRACTING Moore, F.M. (D. Adams) 0489 Ex0489
 TELESCOPE - REFRACTING Moore, F.M. (Dollond) 0379 Ex0379
 TELESCOPE - REFRACTING Neill, S.D. 0386 Ex0386
 TELESCOPE - REFRACTING Neills 0484 Ex0484
 TELESCOPE - REFRACTING Pollock & Co. 4490 CIL003
 TELESCOPE - REFRACTING Prince, A. 0129 Ex0129
 TELESCOPE - REFRACTING (Ramsden, J.) 2968 PRI077
 TELESCOPE - REFRACTING Robinson 0396 Ex0396
 TELESCOPE - REFRACTING Solomons, M.E. 0398 Ex0398
 TELESCOPE - REFRACTING Spear, R. 0301 Ex0301
 TELESCOPE - REFRACTING Spear, R. 0497 Ex0497
 TELESCOPE - REFRACTING Spear, R. 1133 NMD041
 TELESCOPE - REFRACTING Spencer 0490 Ex0490
 TELESCOPE - REFRACTING Steward, J.H. 2339 SAL022
 TELESCOPE - REFRACTING Troughton & Simms 0242 QBP036
 TELESCOPE - REFRACTING Troughton & Simms 1848 DUN030
 TELESCOPE - REFRACTING Tulley 1827 DUN009
 TELESCOPE - REFRACTING Tulley & Sons 0603 NMD284
 TELESCOPE - REFRACTING Watson, W. & Sons 1505 UGP075
 TELESCOPE - REFRACTING Watson & Sons 1553 STR012
 TELESCOPE - REFRACTING Watson & Sons 3440 BIR142
 TELESCOPE - REFRACTING Watts, J. 3874 PRI119
 TELESCOPE - REFRACTING Yeates & Son 4048 MAY311
 TELESCOPE - REFRACTING Unsigned 0260 QBP055
 TELESCOPE - REFRACTING Unsigned 0595 NMD291
 TELESCOPE - REFRACTING Unsigned 1134 NMD042
 TELESCOPE - REFRACTING Unsigned 2069 BLA050
 TELESCOPE - REFRACTING Unsigned 2355 BIR041
 TELESCOPE - REFRACTING Unsigned 2358 BIR044
 TELESCOPE - REFRACTING Unsigned 3274 NMM014
 TELESCOPE - REFRACTING Unsigned 3428 BIR130
 TELESCOPE - REFRACTING Unsigned 3702 ARM015
 TELESCOPE - REFRACTING Unsigned 3923 ULS020
 TELESCOPE - REFRACTING Unsigned 3984 ARM058
 TELESCOPE - REFRACTING Unsigned 3996 ARM070
 TELESCOPE - REFRACTING Unsigned 4001 ARM075
 TELESCOPE - REFRACTING Unsigned 0602 NMD285
 TELESCOPE - REFRACTING Unsigned 0605 PRI062
 TELESCOPE - REFRACTING Unsigned 1865 PRI030
 TELESCOPE - REFRACTING Unsigned 3427 BIR129
 TELESCOPE DRIVE Grubb, H. 1825 DUN007
 TELESCOPE DRIVE Grubb, T. 3964 ARM038
 TELESCOPE DRIVE Unsigned 0963 BIR003
 TELESCOPE DRIVE Unsigned 0989 BIR030
 TELESCOPE DRIVE Unsigned 2353 BIR039
 TELESCOPE DRIVE Unsigned 4068 BIR159
 TELESCOPE DRIVE GOVERNOR Unsigned 3954 ARM028
 TELESCOPE MIRROR Grubb, Parsons & Co. 0569 Ex0569
 TELESCOPE MOUNT Adams 3987 ARM061
 TELESCOPE MOUNT Dallmeyer, J.H. 0241 QBP035
 TELESCOPE MOUNT Plössl 1833 DUN015

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TELESCOPE MOUNT Yeates & Son 0418 Ex0418
TELESCOPE MOUNT Yeates & Son 0333 CWC057
TELESCOPE MOUNT Unsigned 2357 BIR043
TELESCOPE MOUNT Unsigned 3968 ARM042
TELESCOPE MOUNT Unsigned 3979 ARM053
TESLA COIL APPARATUS Ernecke, F. 0939 UDP204
TESLA COIL APPARATUS George, W. & J. 1813 MAY296
TEST-TUBE RACK Unsigned 3761 NMC162
TEST-TUBE RACK Unsigned 3761 NMD161
TESTING SET Elliott Brothers 3101 UDE127
TESTING SET Evershed 3148 UDE173
TESTING SET Telegraph Works 0405 RDS050
TESTING SET Telegraph Works 3093 UDE119
TESTING SET White, J. 3092 UDE118
THEODOLITE Griffin 2540 UGP246
THEODOLITE Lynch, J. 0288 Ex0288
THEODOLITE Spear, R. 0298 Ex0298
THEODOLITE Yeates 0211 Ex0211
THEODOLITE - EVEREST Adie 0204 UGE015
THEODOLITE - EVEREST Troughton & Simms 0633 NMD256
THEODOLITE - PLAIN Adams 0631 NMD258
THEODOLITE - PLAIN Elliott, W. 1094 TDE037
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Adams, D. GLOBE - CELESTIAL 1721 SAL008
Adams, D. GLOBE - TERRESTRIAL 1720 SAL007
Adams, D. GLOBES - CELESTIAL & TERRESTRIAL 3429 BIR131
Adams, G. MICROSCOPE - COMPOUND, CUFF 4257 RCS007
Adams, G. TELESCOPE - PORTABLE ALTAZIMUTH 3999 ARM073
Adams, G. TELESCOPE - REFLECTING 0596 NMD290
Adams, G. TELESCOPE - REFLECTING 3963 ARM037
Adamson, D. & Co. [Bourdon] PRESSURE GAUGE 3413 BIR115
Adie BAROMETER - FORTIN 4509 MET008
Adie BAROMETER - MARINE 4508 MET007
Adie (Dallmeyer) BAROGRAPH - PHOTOGRAPHIC 4511 MET010
Adie LEVEL - TELESCOPIC 0206 UGE017
Adie LEVEL - TELESCOPIC 0207 UGE018
Adie LEVEL - TELESCOPIC 0209 UGE020
Adie PARALLEL RULE 0208 UGE019
Adie SCALE 0381 RDS116
Adie SEXTANT 0190 UGE001
Adie SEXTANT - BOX 0195 UGE006
Adie THEODOLITE - EVEREST 0204 UGE015
Adie THERMOGRAPH - PHOTOGRAPHIC 4512 MET011
Adie THEODOLITE - TRANSIT 0205 UGE016
Adie, A. LEVEL - TELESCOPIC 2971 NEW001
Adie, P. BAROMETER - MARINE 1849 DUN031
Adie, P. EXTENSOMETER 1441 MIS014
Adie & Son CIRCUMFERENTOR 0192 UGE003
Adie & Son STATION POINTER 0199 UGE010
Ahlborn, E. (W. Carson & Sons) THERMOMETER - GLASS MERCURY 2302 PRI176
Ahmad ash-Sharabatli ASTROLABE QUADRANT 4527 CBL004
Ahmad ash-Sharabatli ASTROLABE QUADRANT - DOUBLE 4533 CBL010
Ainsley, T.L. MARINE AZIMUTH INSTRUMENT 1116 PRI007
al-Amir Ridwan at-Tawil DIAL - HORIZONTAL 4532 CBL009
al-Hajj Hasan al-Mu'arrif ASTROLABE QUADRANT 4531 CBL008
Allen, M.H. & J.W. APOGRAPH 0570 Ex0570
Alment CIRCUMFERENTOR 3651 NMD116
Alment, J. BAROMETER - ANGLE 0498 Ex0498
Alment, J. BAROMETER - STICK 3742 MIS058
Alment, J. DIAL - HORIZONTAL PEDESTAL 0320 Ex0320
Alment, J. DIAL - HORIZONTAL PEDESTAL 3743 PRI116
Alment, J. SECTOR 0464 Ex0464
Alment, J. TELESCOPE - REFLECTING 0499 Ex0499
Alment, J. TRADE LABEL Ex0500
Andrews, T. AIR PUMP 1030 QBC002
Andrews, T. CRITICAL STATE APPARATUS 1029 QBC001
Andrews, T. DISCHARGE TUBE 1032 QBC012
Andrews, T. DISCHARGE TUBE 1035 QBC021
Andrews, T. THERMOMETER - GLASS MERCURY 2297 QBC033
Apps COIL - INDUCTION, RUHMKORFF 0394 RDS005
Apps COIL - INDUCTION, RUHMKORFF 0781 UDP048
Apps COIL - INDUCTION, RUHMKORFF 0835 UDP101
Apps COIL - INDUCTION, RUHMKORFF 0836 UDP102
Apps COIL - INDUCTION, RUHMKORFF 1310 TDP071
Apps COIL - INDUCTION, RUHMKORFF 1968 UCP195
Apps COIL - INDUCTION, RUHMKORFF 2712 TDP256
Apps COIL - INDUCTION, RUHMKORFF 2750 TDP294
Apps CONDENSER 1644 MAY131
Apps POLARISCOPE 0971 BIR012
Apps SPARK GAP 1067 MAY043
Archdall, W. BALANCE - EQUAL ARM 0631 Ex0631
Argent HYDROMETER 2053 BLA042
Arm, P.K. KALEIDOSCOPE 0496 Ex0496
Armstrong, T. & Brother BAROMETER - ANEROID, PORTABLE 3993 ARM067
Armstrong & Brother MICROSCOPE - COMPOUND 4284 RCS034
Arnold, E.J. & Son GLOBE - TERRESTRIAL 0302 Ex0302
Arnold, E.J. & Son GLOBE - TERRESTRIAL 0558 Ex0558
Arnold, J. CLOCK - REGULATOR 1821 DUN003
Arnold, J. & Son CLOCK - REGULATOR 1822 DUN004

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Arnold & Dent CLOCK - REGULATOR 2363 BIR049
 Ashcroft, F. COMPASS - MARINE, IN BINNACLE 3289 NMM029
 Aston AMMETER & VOLTMETER 2879 UCP295
 Aston & Mander DRAWING INSTRUMENTS - SET 4398 PRI226
 Aston & Mander DRAWING INSTRUMENTS - SET 1387 TDE069
 Aston & Mander SLIDE RULE - HANNYNGTON 1383 TDE066
 Ausfeld, H. LAMP - OIL 2356 BIR042
 Ausfeld, H. TELESCOPE - REFRACTING 0985 BIR026
 Austen & Son STANDARD VOLUMES - IMPERIAL 3527 SAL050
 Austin BALANCE - POSTAL 0321 Ex0321
 Automatic Telephone Co. HORN 3500 QBP226
 Avery BALANCE - FOLDING COIN 1695 MAY182
 Ayrton & Perry AMMETER 0229 QBP023
 Ayrton & Perry SELF INDUCTOMETER 1322 TDP022
 Ayrton & Perry VOLTMETER 0230 QBP024
 B., J. DIAL - HORIZONTAL PEDESTAL 2444 NMD093
 Baer, H. & Co. YARN TESTER 3847 SAL055
 Baillere, Tindall & Cox EAR MODEL 3907 QBP268
 Baird & Tatlock AIR PUMP - SYRINGE 2738 TDP282
 Baird & Tatlock AIR PUMP PLATE 2893 UGP301
 Baird & Tatlock BAROMETER - FITZROY 2631 PRI066
 Baird & Tatlock BOW 2189 UDP275
 Baird & Tatlock CHLADNI PLATE 0943 UDP211
 Baird & Tatlock COIL - INDUCTION, WEINHOLD 2215 UDP293
 Baird & Tatlock COIL - INDUCTION, WEINHOLD 2216 UDP294
 Baird & Tatlock ELECTRIC EGG 3160 QBP105
 Baird & Tatlock ELECTROMETER - QUADRANT, DOLEZALEK 2561 UGP261
 Baird & Tatlock EUDIOMETER - CAVENDISH 3764 NMC165
 Baird & Tatlock EUDIOMETER - CAVENDISH 3764 NMD160
 Baird & Tatlock GALVANOMETER - ASTATIC, NOBILI 2206 NMD213
 Baird & Tatlock GALVANOMETER - AYRTON MATHER 1223 TDP027
 Baird & Tatlock GALVANOMETER - TANGENT 3336 UCP336
 Baird & Tatlock GALVANOMETER - TANGENT, STEWART & GEE 0065 UCP077
 Baird & Tatlock (Dring & Fage) HYDROMETER - SIKES 0532 IDG012
 Baird & Tatlock LENS HOLDER 1453 UCP132
 Baird & Tatlock PRISM 0850 UDP116
 Baird & Tatlock RESISTANCE - STANDARD 3081 UDE107
 Baird & Tatlock RESISTANCE BOX 3060 UDE086
 Baird & Tatlock SONOMETER - HUBBARD MONOCHORD 3342 UCP342
 Baird & Tatlock SPHEROMETER 2318 QBP084
 Baird & Tatlock STAND - CONDENSER 4344 TDC035
 Baird & Tatlock STANDARD VOLUME - IMPERIAL 1994 SAL016
 Baird & Tatlock THERMOMETER - BECKMANN 3472 QBP198
 Baird & Tatlock TUNING FORK 2641 RDS138
 Baker MICROSCOPE - COMPOUND 0587 NMD299
 Baker MICROSCOPE - COMPOUND 4278 RCS028
 Baker MICROSCOPE - COMPOUND, BINOCULAR 0134 QBP001
 Baker MICROSCOPE - SIMPLE 1647 MAY134
 Baker PROTRACTOR - CIRCULAR 2401 BIR077
 Baker SPECTROSCOPE - MICRO 0495 PRI142
 Balhoomal ASTROLABE 0670 PRI126
 Bancks MICROSCOPE - COMPOUND 2471 PRI192
 Banks TELESCOPE - REFRACTING 4010 SAL067
 Bardin, W. & T.M. GLOBE - CELESTIAL 3989 ARM063
 Bardou et Fils TELESCOPE - REFRACTING 3266 NMM006
 Barker & Son COMPASS - PRISMATIC 2584 PRI218
 Barker, F. & Son DIVIDERS - PROPORTIONAL 4231 PRI250
 Barnes, E. THERMOMETER & BAROMETER 2590 MIS040
 Barraud CHRONOMETER - MARINE 0118 QBP009
 Barrett, W.F. SINGING FLAMES APPARATUS 0323 Ex0323
 Barrett, W.F. SINGING FLAMES APPARATUS 0324 Ex0324
 Barrett, W.F. SINGING FLAMES APPARATUS 0325 Ex0325
 Barrett, W.F. SINGING FLAMES APPARATUS 0326 Ex0326
 Barrett, W.F. SOUND CYLINDERS 0327 Ex0327
 Barrow, H. & Co. DIP CIRCLE 1164 TDP152
 Barry CIRCUMFERENTOR 0213 Ex0213
 Bate (Loftus) HYDROMETER - SIKES 2967 PRI076
 Bate (Loftus) (Joseph Long) SACCHAROMETER 0545 IDG018
 Bate (Oertling, L.) SACCHAROMETER 0547 IDG017
 Bate (Oertling, L.) SACCHAROMETER 4476 STL004
 Bate, J. DIAL - HORIZONTAL PEDESTAL 2622 PRI056
 Bate, J. & P. DIAL - UNIVERSAL EQUINOCTIAL RING 0262 Ex0262
 Bate, P. DIAL - HORIZONTAL PEDESTAL 0322 Ex0322
 Bate, R.B. STANDARD WEIGHTS - IMPERIAL 1990 SAL012
 Baum, J. & Co. DIAL - HORIZONTAL COMPASS 2368 NMD073
 Bausch & Lomb Co. MICROSCOPE - DISSECTING 0452 RDS025
 Bausch & Lomb Co. MICROSCOPE - DISSECTING 1807 MAY290
 Bausch & Lomb MICROSCOPE - SIMPLE 4279 RCS029
 Beard GAS PRESSURE REGULATOR 0482 RDS083
 Beard GAS PRESSURE REGULATOR 2556 BIR104
 Beard, R. (R.) SLIDE INSERTER 0457 RDS073
 Beck, R. & J. (Casella) ANEMOMETER - ROBINSON BECKLEY RECORDING 4520 MET019
 Beck, R. & J. GRATING - DIFFRACTION 1395 UCP143
 Beck, R. & J. MICROSCOPE - COMPOUND 0316 CWC017
 Beck, R. & J. MICROSCOPE - COMPOUND 2538 UGP244

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Beck, R. & J. MICROSCOPE - COMPOUND, BINOCULAR 1176 TDP141
 Beck, R. & J. PERISCOPE 1643 MAY130
 Beck, R. & J. RADIUM BUTTON HOLDER 0469 RDS103
 Beck, R. & J. SPECTROSCOPE - DIRECT VISION 4262 RCS012
 Beck, R. & J. SPECTROSCOPE - ULTRA VIOLET 0126 RDS113
 Beck, R. & J. SPINTHARISCOPE 2282 PRI168
 Becker AMMETER 0044 UCP006
 Becker MICROSCOPE - TRAVELLING 0018 UCP071
 Becker MIRROR - CONCAVE 2548 UGP254
 Becker, F.E. COLORIMETER 1015 PRI153
 Becker, F.E. & Co. AIR PUMP - SYRINGE 2901 UGP309
 Becker, F.E. & Co. BALANCE - EQUAL ARM 3841 BIR150
 Becker, F.E. & Co. BALANCE - PRECISION 1457 UCP209
 Becker, F.E. & Co. BALANCE - PRECISION 1536 UGP134
 Becker, F.E. & Co. BALANCE - PRECISION 2114 BLA102
 Becker, F.E. & Co. COIL - DU BOIS REYMOND 0073 UCP087
 Becker, F.E. & Co. COIL & MAGNETIC NEEDLE 3174 QBP119
 Becker, F.E. & Co. ELECTROSTATIC GENERATOR 3386 NMC017
 Becker, F.E. & Co. IMPACT APPARATUS(?) 1511 UGP089
 Becker, F.E. & Co. POLARIMETER 0779 MAY020
 Becker, F.E. & Co. (T.H. Mason) POLARIMETER 2135 UDP227
 Becker, F.E. & Co. (Pye, W.G. & Co.) RESISTANCE BOX 2790 UCP243
 Becker, F.E. & Co. THERMOPILE 3811 NMC212
 Becker, F.E. & Co. VOLTAMETER 1678 MAY165
 Becker, F.E. & Co. WEIGHTS - IMPERIAL 4070 BIR161
 Becker's Sons BALANCE - PRECISION 1533 UGP124
 Belfast Ropework Company CALLIPER - ROPEWORK 2960 NMD200
 Bellingham & Stanley SPECTROSCOPE - PHOTOGRAPHIC, LITTROW 2841 TDP302
 Bennet, T. DIAL - HORIZONTAL PEDESTAL 4244 NMD193
 Bennett ARTIFICIAL HORIZON 0113 UCP040
 Bennett BAROMETER - STICK 2484 SAL033
 Bennett DIAL - HORIZONTAL COMPASS 0049 Ex0049
 Bennett ELECTROMETER - HENLEY 0112 UCP021
 Bennett ELECTROMETER - TORSION, COULOMB 0110 UCP025
 Bennett OCTANT 0516 Ex0516
 Bennett OCTANT 0588 Ex0588
 Bennett QUINTANT 0050 Ex0050
 Bennett SEXTANT - BOX 0319 Ex0319
 Bennett SONOMETER 2758 UCP211
 Bennett SYMPIESOMETER 0114 UCP022
 Bennett TELESCOPE - REFRACTING 0641 Ex0641
 Bennett, J. MECHANICAL MODEL - PISTON ENGINE 3613 NMC109
 Bennett, J. MECHANICAL MODEL - PISTON ENGINE 3613 MIS076
 Bennett, J. SEXTANT 1083 TDE004
 Bennett, T. BAROMETER - MARINE 0034 Ex0034
 Bennett, T. BAROMETER - STICK 0125 Ex0125
 Bennett, T. CLINOMETER 0198 UGE009
 Bennett, T. COMPASS - SIGHTING 3832 NMC233
 Bennett, T. ELECTROSTATIC GENERATOR - CUTHBERTSON 0116 UCP008
 Bennett, T. HYDROMETER - SIKES 0415 NMD035
 Bennett, T. HYGROMETER - MASON 0105 UCP020
 Bennett, T. OCTANT 0126 Ex0126
 Bennett, T. TRADE LABEL 0048 Ex0048
 Bennett, T. TRADE LABEL 0254 UCP122
 Berge OCTANT 4091 UFM009
 Berge TELESCOPE - REFRACTING 2359 BIR045
 Bete, C. NAVIGATIONAL PLOTTER 3952 ARM026
 Bewley & Evans MEDICINE CHEST 0335 Ex0335
 Bezu, Hausser & Cie MICROSCOPE - COMPOUND 1012 PRI150
 Bianchi, G. BAROMETER - BANJO 0719 NMD016
 Bianchi, G. BAROMETER - BANJO 2621 PRI054
 Bianchi, G. BAROMETER - BANJO 4381 SAL087
 Bianchi, V. BAROMETER - BANJO 0016 Ex0016
 Biancho, G. BAROMETER - BANJO 1426 PRI035
 Binda BAROMETER - BANJO 1718 PRI025
 Binda BAROMETER - BANJO 2606 PRI040
 Binda BAROMETER - BANJO 3369 MIS012
 Binda, G. BAROMETER - BANJO 1999 PRI032
 Binda, G. BAROMETER - BANJO 2000 PRI033
 Binda, G. BAROMETER - BANJO 4014 SAL071
 Binda, J. BAROMETER - BANJO 2569 PRI204
 Bion, N. SECTOR 1405 NMD055
 Birnie, J. DIAL - UNIVERSAL EQUINOCTIAL RING 0333 Ex0333
 Blair, H.G. & Co. SEXTANT 1112 PRI003
 Blake, T.O. SACCHAROMETER 0548 IDG006
 Bland & Long LENS - PLANO CONVEX 2386 BIR062
 Bleuler SPYGLASS 3681 SAL051
 Block Anderson CALCULATOR 3240 QBE018
 Bloud, C. DIAL - DIPTYCH 3425 BIR127
 Blunt COMPASS 1616 MAY105
 Blunt, H. MOON SURFACE MODEL 3966 ARM040
 Blunt, T. DIP CIRCLE 1932 UCP159
 Blunt, T. OBJECT GLASS - DIVIDED MICROMETER 3969 ARM043
 Bock-Steger EYE MODEL 1977 UCP204
 Bock-Steger EYE MODEL 3793 NMC194

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Booth Brothers LEVEL - SPIRIT 3521 SAL044
Booth Brothers MECHANICAL MODEL - CLOCK ESCAPEMENT 4019 NMC237
Booth Brothers MECHANICAL MODEL - CLOCK ESCAPEMENT 4019 NMD182
Booth Brothers MICROTOME 0110 Ex0110
Booth, J. & Son CLOCK - REGULATOR 2834 MIS041
Booth, J. & Son CLOCK - REGULATOR 2846 TDP307
Booth, J. & Son CLOCK - TIME SYSTEM 2833 TDE072
Borland, F.J. LAMP - CARBON ARC 2521 UGP227
Bourdon, E. PRESSURE GAUGE 0064 UCP082
Bourdon & Richard BAROMETER - ANEROID 1880 UGP149
Bowden, J.H. THERMOMETER - GLASS MERCURY 4286 RCS036
Boyle, J. DIAL - HORIZONTAL PEDESTAL 3936 ULS033
Bracken, P. DIAL - HORIZONTAL PEDESTAL 3676 PRI105
Brady, P. DIAL - HORIZONTAL PEDESTAL 2460 PRI186
Braham DIAL - MINER 0636 NMD253
Brasseur, L. TELEGRAPH PRINTER 3378 NMC009
Breguet ELECTRICAL MACHINE - GRAMME 0079 UGP028
Breguet ELECTRICAL MACHINE - GRAMME 1197 TDP006
Breguet TELEGRAPH - ALPHABETICAL 3570 NMC066
Breguet TELEGRAPH - ALPHABETICAL 3614 NMC110
Breguet TELEGRAPH - ALPHABETICAL 3579 NMC075
Breguet TELEGRAPH - ALPHABETICAL 3615 NMC111
Breguet THERMOMETER - SPIRAL METALLIC 0121 QBP006
Breithaupt, F.W. & Sohn THEODOLITE - SIMPLE 1038 MAY012
Breton Frères GALVANOMETER - ASTATIC, NOBILI 3589 NMC085
Bridge (Elliott Brothers) DIFFRACTION APPARATUS 2701 TDP245
Brinsley, G. & R. COMPASS 1620 MAY068
British Engine Co. STEAM ENGINE INDICATOR 4098 UFM015
British Meteorological Office BAROGRAPH - DINE'S FLOAT 4521 MET020
Broadhurst, Clarkson & Co. TELESCOPE - REFRACTING 1847 DUN029
Brockbank & Atkins CHRONOMETER - MARINE 3267 NMM007
Brooks FLEXIBLE CURVE - BROOKS' 3657 PRI140
Brooks, J.B. & Co. COMPASS - PRISMATIC 2665 PRI073
Brown, J. TELESCOPE - REFRACTING 1506 UGP076
Brown, S.G. HORN 2888 UGP296
Brown Brothers STAND 2197 UDP283
Brown & Sharpe Co. MICROMETER SCREW GAUGE 2482 PRI203
Browning, J. PRISM HOUSING 1938 UCP165
Browning, J. SPECTROSCOPE - ASTRONOMICAL 0967 BIR007
Browning, J. SPECTROSCOPE - DIRECT VISION 0279 CWC011
Browning, J. SPECTROSCOPE - DIRECT VISION 0968 BIR008
Browning, J. SPECTROSCOPE - DIRECT VISION 1306 TDP169
Browning, J. SPECTROSCOPE - DIRECT VISION 2400 BIR076
Browning, J. SPECTROSCOPE - DIRECT VISION, GRACE 0138 UGP001
Browning, J. SPECTROSCOPE - DIRECT VISION, McCLEAN 3837 BIR146
Browning, J. SPECTROSCOPE - DIRECT VISION, McCLEAN 3838 BIR147
Browning, J. SPECTROSCOPE - MICRO 0141 UGP004
Browning, J. SPECTROSCOPE - MICRO 2298 PRI172
Browning, J. SPECTROSCOPE - MICRO 4269 RCS019
Browning, J. SPECTROSCOPE - TABLE 0123 QBP043
Browning, J. SPECTROSCOPE - TABLE 0142 UGP005
Browning, J. SPECTROSCOPE - TABLE 1327 TDP016
Browning, J. SPECTROSCOPE - TABLE 1330 TDP176
Browning, J. SPECTROSCOPE - TABLE 2760 UCP213
Browning, J. SPECTROSCOPE - TABLE 3829 NMC230
Browning, J. SPECTROSCOPE - TABLE 4341 TDC032
Browning, J. TELESCOPE - REFRACTING 0334 CWC014
Brunsviga CALCULATOR 3962 ARM036
BTH X-RAY TUBE - COOLIDGE 3606 NMC102
BTH X-RAY TUBE - COOLIDGE 3890 QBP251
Buchanan, A. (Dutton) CLOCK - REGULATOR 3703 ARM016
Buckley CIRCUMFERENTOR 0715 NMD014
Buckley LEVEL - TELESCOPIC 0329 Ex0329
Buckley LEVEL - TELESCOPIC 0334 Ex0334
Buckley LEVEL - TELESCOPIC 4193 DCM004
Buckley OCTANT 1131 NMD039
Buckley OCTANT 0328 Ex0328
Buckley PANTOGRAPH 0478 Ex0478
Buckley PROTRACTOR 0314 Ex0314
Buckley PROTRACTOR 0332 Ex0332
Buckley PROTRACTOR/PLOTTING SQUARE 0460 Ex0460
Buckley SEXTANT 0525 Ex0525
Buckley, J. BAROMETER - BANJO 0331 Ex0331
Buckley, J. BAROMETER - STICK 0723 NMD020
Buckley, J. BAROMETER - STICK 4486 PRI283
Buckley, J. COMPASS - MARINE 1161 TDP182
Buckley, J. LEVEL - TELESCOPIC 0969 BIR009
Buckley, J. (T. Bennett) OCTANT 0115 UCP023
Buckley, J. OCTANT 0330 Ex0330
Buckley, J. TRADE LABEL 0546 BIR010
Buckley & Co. HYDROMETER 0527 IDG031
Buckley & Co. SACCHAROMETER 0549 IDG047
Burton QUADRANT 3949 ARM023
Buss HYDROMETER - SIKES 0533 IDG021
Buss HYDROMETER - SIKES 0993 PRI144

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Buss HYDROMETER - SIKES 3726 PRI111
Buss HYDROMETER - SIKES 4028 SAL077
Buss HYDROMETER - SIKES 4110 UFM025
Buss, T.O. HYDROMETER - SIKES 3924 ULS021
Butler SHAFT SPEED INDICATOR 3926 ULS023
Butterfield DIAL - HORIZONTAL BUTTERFIELD 0725 NMD022
Butterfield DIAL - HORIZONTAL BUTTERFIELD 3423 BIR125
Butterfield DIAL - HORIZONTAL BUTTERFIELD 3424 BIR126
Butterfield GRAPHOMETER 0639 NMD250
Butterfield GRAPHOMETER 0923 NMD026
C., J. DIAL - HORIZONTAL PEDESTAL 4111 UFM026
Cahill BAROMETER - ANEROID 2083 BLA071
Cahill TELESCOPE - REFRACTING 0564 Ex0564
Cahill, P. MODEL - DOMESTIC WATER SYSTEM 4021 NMC239
Cahill, P. MODEL - DOMESTIC WATER SYSTEM 4021 PRI230
Cahill, P. MECHANICAL MODEL - LIFT PUMP 4022 NMC240
Cahill, P. MECHANICAL MODEL - LIFT PUMP 4022 NMD184
Cahill, P. MECHANICAL MODEL - WATER WHEEL 3748 NMC149
Cahill, P. MECHANICAL MODEL - WATER WHEEL 4020 NMC238
Cahill, P. MECHANICAL MODEL - WATER WHEEL 3748 NMD180
Cahill, P. MECHANICAL MODEL - WATER WHEEL 4020 NMD183
Callan, N. BATTERY - DANIELL 1772 MAY255
Callan, N. BATTERY - MAYNOOTH 1663 MAY150
Callan, N. BATTERY - MAYNOOTH 4056 MAY319
Callan, N. COIL - INDUCTION 0207 Ex0207
Callan, N. COIL - INDUCTION 1070 MAY046
Callan, N. COIL - INDUCTION 1658 MAY145
Callan, N. COIL - INDUCTION 1659 MAY146
Callan, N. COIL - INDUCTION 1660 MAY147
Callan, N. COIL - INDUCTION 1796 MAY279
Callan, N. CONDENSER 1792 MAY275
Callan, N. ELECTROMAGNET 1797 MAY280
Callan, N. ELECTROMAGNET 4142 MAY340
Callan, N. INTERRUPTOR 1723 MAY206
Callan, N. POINT AND PLATE VALVE 4143 MAY341
Callinan, M. DIAL - HORIZONTAL PEDESTAL 2463 PRI188
Cambridge Co. CAMERA - FALLING PLATE 2840 TDP301
Cambridge Co. DRUM RECORDER 0813 UDP079
Cambridge Co. DRUM RECORDER 1298 TDP056
Cambridge Co. DRUM RECORDER 1304 TDP058
Cambridge Co. ELECTRO DYNAMOMETER 0929 UDP194
Cambridge Co. ELECTROMAGNET FOR STRING GALVANOMETER 2842 TDP303
Cambridge Co. ELECTROMETER 1996 RDS133
Cambridge Co. ELECTROMETER - GOLD LEAF 0884 UDP150
Cambridge Co. ELECTROMETER - GOLD LEAF 1249 TDP121
Cambridge Co. ELECTROMETER - LINDEMANN 1421 SAL004
Cambridge Co. ELECTROMETER - QUADRANT, DOLEZALEK 0221 QBP017
Cambridge Co. ELECTROMETER - QUADRANT, DOLEZALEK 0932 UDP197
Cambridge Co. ELECTROMETER - QUADRANT, DOLEZALEK 1212 TDP015
Cambridge Co. ELECTROMETER - QUADRANT, DOLEZALEK 2782 UCP235
Cambridge Co. ELECTROMETER PLATES VOLTAGE ADJUSTER 2784 UCP237
Cambridge Co. FLUXMETER 3121 UDE146
Cambridge Co. FRICTION HEATING APPARATUS - CALLENDAR 0106 UCP056
Cambridge Co. FRICTION HEATING APPARATUS - CALLENDAR 0700 UDP028
Cambridge Co. FRICTION HEATING APPARATUS - CALLENDAR 1730 MAY213
Cambridge Co. FRICTION HEATING APPARATUS - CALLENDAR 2845 TDP306
Cambridge Co. GALVANOMETER - ASTATIC MIRROR 0791 UDP057
Cambridge Co. GALVANOMETER - ASTATIC MIRROR 0792 UDP058
Cambridge Co. GALVANOMETER - ASTATIC MIRROR 3478 QBP204
Cambridge Co. GALVANOMETER - AYRTON MATHER 0227 QBP021
Cambridge Co. GALVANOMETER - AYRTON MATHER 1221 TDP029
Cambridge Co. GALVANOMETER - AYRTON MATHER 2675 TDP219
Cambridge Co. GALVANOMETER - AYRTON MATHER 2848 UGP289
Cambridge Co. GALVANOMETER - BROCA 0228 QBP022
Cambridge Co. GALVANOMETER - BROCA 0935 UDP200
Cambridge Co. GALVANOMETER - BROCA 1219 TDP021
Cambridge Co. GALVANOMETER - BROCA 2566 UGP266
Cambridge Co. GALVANOMETER - D'ARSONVAL 1169 TDP149
Cambridge Co. GALVANOMETER - D'ARSONVAL 1952 UCP179
Cambridge Co. GALVANOMETER - DUDELL OSCILLOGRAPH 2708 TDP252
Cambridge Co. GALVANOMETER - UNIPIVOT NEEDLE 0917 UDP182
Cambridge Co. GALVANOMETER - VIBRATION 3083 UDE109
Cambridge Co. GALVANOMETER SCALE 1522 UGP108
Cambridge Co. HYDROMETER - RECORDING 0542 IDG028
Cambridge Co. INDUCTANCE 3111 UDE136
Cambridge Co. INDUCTANCE BOX 3072 UDE098
Cambridge Co. MELDOMETER - JOLY 2687 TDP231
Cambridge Co. NEPHOSCOPE - HILL'S MIRROR 4522 MET021
Cambridge Co. OPTICAL CELL 1250 TDP193
Cambridge Co. OSCILLOGRAPH - DUDELL 3087 UDE113
Cambridge Co. PEN - ELECTRICAL RECORDING 2320 QBP086
Cambridge Co. POLARISCOPE 0955 UDP223
Cambridge Co. POTENTIOMETER 0239 QBP033
Cambridge Co. RESISTANCE 3075 UDE101
Cambridge Co. RESISTANCE - STANDARD 0233 QBP027

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Cambridge Co. RESISTANCE - STANDARD 0234 QBP028
Cambridge Co. RESISTANCE - STANDARD(?) 3332 UCP332
Cambridge Co. RESISTANCE - VARIABLE 3076 UDE102
Cambridge Co. RESISTANCE BOX 3070 UDE096
Cambridge Co. RESISTANCE BOX 3071 UDE097
Cambridge Co. (H.M. Dean) STANDARD CELL - WESTON 3719 UGP371
Cambridge Co. VOLTMETER 3028 UDE054
Cambridge Co. VOLTMETER - UNIPIVOT DYNAMOMETER 3012 UDE038
Cambridge Co. WATTMETER 3113 UDE138
Cambridge & Paul EXTENSOMETER 3243 QBE021
Cambridge & Paul Co. HYDROMETER - RECORDING 0543 IDG033
Cambridge & Paul Co. MAGNETOMETER 3094 UDE120
Cambridge & Paul Co. TUNING FORK STAND WITH ELECTROMAGNET 4145 TDP311
Cappo, J. BAROMETER - BANJO 1424 SAL002
Cappo, J. HYDROMETER 0054 Ex0054
Carpenter BAROMETER - STICK 3854 MIS060
Carpenter MICROSCOPE - COMPOUND, JONES 1132 NMD040
Carpenter & Westley LANTERN - DOUBLE 4440 ULS061
Carpenter & Westley MICROSCOPE SLIDES 4285 RCS035
Carpentier, J. GALVANOMETER - D'ARSONVAL 0679 UDP007
Carré, E. ELECTROSTATIC GENERATOR - CARRÉ 2393 BIR069
Carre, E. ELECTROSTATIC GENERATOR - CARRÉ 3307 UCP307
Cary ALIDADE 2464 NMD212
Cary ALIDADE - TELESCOPIC 1443 MIS006
Cary BAROMETER - ANEROID 3667 PRI095
Cary GLOBE - TERRESTRIAL 1513 UGP091
Cary GONIOMETER - CRYSTAL, WOLLASTON 0363 RDS055
Cary MICROSCOPE - COMPOUND, GOULD 0585 NMD301
Cary MICROSCOPE - COMPOUND, GOULD 4458 PRI272
Cary PROTRACTOR - REFLECTING 1114 PRI005
Cary SCALE - ENGINEERS' 4461 PRI224
Cary TELESCOPE - REFRACTING 1422 SAL003
Cary, G. & J. GLOBE - TERRESTRIAL 0648 NMD242
Cary, J. & W. GLOBE - CELESTIAL 0355 MIS017
Cary, J. & W. GLOBE - CELESTIAL 1514 UGP092
Cary, J. & W. GLOBE - CELESTIAL 1623 MAY111
Cary, J. & W. GLOBE - CELESTIAL 1661 MAY148
Cary, J. & W. GLOBE - CELESTIAL 3994 ARM068
Cary, J. & W. GLOBE - TERRESTRIAL 1428 MIS016
Cary, J. & W. GLOBE - TERRESTRIAL 1662 MAY149
Cary, W. HYPSONOMETER 1000 QBC010
Casartelli, A. BAROMETER - BANJO 0017 Ex0017
Casartelli, J. & Son CLINOMETER 2579 TDE071
Casartelli, J. & Son LINEN PROVER 3931 ULS028
Casartelli, J. & Son THERMOMETER - ELBOW RIGHT ANGLE 0518 IDG077
Casella HYGROMETER - HAIR 0562 IDG039
Casella HYGROMETER - TWIRLING 1967 UCP194
Casella TELEGRAPH APPARATUS 3285 NMM025
Casella (Mason) THERMOMETER - MAXIMUM 2244 UDP322
Casella THERMOMETER - MAXIMUM 3957 ARM031
Casella THERMOMETER - MINIMUM 1609 MAY099
Casella (Mason, T.) THERMOMETER - MINIMUM 2245 UDP323
Casella WATER STERILISER(?) 2428 RDS137
Casella, L. ANEMOMETER - ROBINSON 1527 UGP114
Casella, L. ANEMOMETER - ROBINSON 2405 BIR081
Casella, L. BAROMETER - MARINE 1864 MIS031
Casella, L. HYGROMETER - DINES 3311 UCP311
Casella, L. HYGROMETER - DINES 0808 UDP074
Casella, L. HYGROMETER - DINES 0951 UDP118
Casella, L. HYGROMETER - DINES 3355 UCP355
Casella, L. RHEOSTAT 3052 UDE078
Casella, L. SPIROMETER 4295 RCS045
Casella, L. THEODOLITE - TRANSIT 0203 UGE014
Casella, L. THERMOMETER - GLASS MERCURY 3958 ARM032
Casella, L. THERMOMETER - MINING 3476 QBP202
Casella, L. THERMOMETER - SOLAR RADIATION 1254 TDP143
Cave CIRCUMFERENTOR 0116 Ex0116
Cave CIRCUMFERENTOR 2626 PRI060
Cave CIRCUMFERENTOR/SURVEYING CIRCLE 4029 PRI127
Cave, T. CIRCUMFERENTOR 0052 Ex0052
Cave, T. CIRCUMFERENTOR 0264 Ex0264
Cave, T. CIRCUMFERENTOR 0912 NMD023
Cave, T. CIRCUMFERENTOR 1115 NMD314
Cave, T. DIAL - HORIZONTAL COMPASS 0051 Ex0051
Cave, T. DIAL - HORIZONTAL PEDESTAL 0617 Ex0617
Central Electric Co. ELECTRIC MOTOR 3415 BIR117
Central Scientific Co. DISCHARGE TUBE 1025 QBC035
Cetti & Gatty BAROMETER - BANJO 0336 Ex0336
Chadburn Brothers BAROMETER - FORTIN 4507 MET006
Champion, C.H. & Co. CARBON ARC RODS 2752 TDP296
Chancellor, J. BAROMETER - FITZROY 4386 SAL088
Chancellor, J. MUSIC BOX 0618 Ex0618
Chancellor & Son BAROMETER 3858 SAL058
Chancellor & Son BAROMETER - FORTIN 0035 Ex0035
Chancellor & Son BAROMETER - STICK 3944 SAL061

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Chancellor & Son COMPASS - MARINE 1984 MIS032
 Chapman, D.C. GRATING - DIFFRACTION 1145 TDP184
 Chesterman, J.C. LAND CHAIN 1361 TDE035
 Chesterman, J.C. LAND CHAIN 1790 MAY273
 Chevalier, A. OPTICAL STAND 1185 TDP009
 Chevallier CAMERA LUCIDA 1688 MAY175
 Childe, H. ROTATING COLOURED DISCS 4333 MAY346
 Christie & Wilson BAROGRAPH - ANEROID 4491 CIL004
 Clarke MICROSCOPE - COMPOUND, JONES 0582 NMD303
 Clarke SPARK GENERATOR 0899 UDP165
 Clarke, E. DIAL - HORIZONTAL COMPASS 0664 NMD226
 Clarke, E. DIAL - HORIZONTAL PEDESTAL 0291 Ex0291
 Clarke, E. DIAL - UNIVERSAL EQUINOCTIAL 0121 Ex0121
 Clarke, E. MICROSCOPE - COMPOUND, CULPEPER 1433 RCS001
 Clarke, E. TELESCOPE - REFRACTING 0220 Ex0220
 Clarke, E.M. BATTERY - MAYNOOTH 1664 MAY151
 Clarke, E.M. BURNER - OXY HYDROGEN 0407 RDS034
 Clarke, E.M. LANTERN - UNIAL 1779 MAY262
 Clarke, E.M. MECHANICAL MODEL - BEAM ENGINE 3149 UDE174
 Clarke, E.M. OPTICAL ELEMENT 1627 MAY115
 Clarke, E.M. TELESCOPE - REFRACTING 3397 PRI082
 Clarke, J. & I. BALANCE - EQUAL ARM 1551 STR010
 Clement, A. ELECTRIC MOTOR 4124 UFM039
 Coates, V. & Co. BEAM ENGINE 3152 UDE177
 Cochrane, H. BAROMETER - BANJO 2618 PRI052
 Cogit COLORIMETER 4310 TDC006
 Cohen, S.P. BAROMETER - STICK 2467 SAL028
 Cole SCALE 1406 NMD056
 Collardeau MEASURING CYLINDER - GAS 2289 QBC026
 Collins, C. MICROSCOPE - COMPOUND, BINOCULAR 2689 TDP233
 Collins, P. DIAL - HORIZONTAL PEDESTAL 2434 NMD084
 Collins, R. BAROMETER - STICK 4101 UFM018
 Condry, B. OCTANT 0609 NMD279
 Conte, J. PANTOGRAPH 2425 BIR100
 Conway, W. DIAL - HORIZONTAL PEDESTAL 2872 UCP288
 Cooke LEVEL - TELESCOPIC 2475 PRI196
 Cooke, T. & Sons CLINOMETER 1615 MAY104
 Cooke, T. & Sons THEODOLITE - TRANSIT 3227 QBE005
 Cooke, T. & Sons TRANSIT INSTRUMENT 3228 QBE006
 Coonan, S. DIAL - HORIZONTAL PEDESTAL 3739 PRI114
 Cossor, A.C. ROD - CHARGING 3159 QBP104
 Cox, H.W. & Co. COIL - INDUCTION, MEDICAL 2158 UDP247
 Cox, W.C. (J. Lilley & Son) SEXTANT 3283 NMM023
 Cox-Cavendish Co. COIL - INDUCTION, RUHMKORFF 3190 QBP135
 Crichton, J. MICROSCOPE - COMPOUND, DRUM 4260 RCS010
 Crichton Brothers SEXTANT 4096 UFM013
 Crisp, W.B. (Moore, F.M.) CHRONOMETER - MARINE 3705 ARM018
 Crocker-Wheeler ELECTRIC MOTOR 2419 BIR094
 Croker, E. DIAL - HORIZONTAL PEDESTAL 4432 PRI234
 Croll Rait & Co. GAS METER 1341 TDP023
 Crompton & Co. GALVANOMETER - MIRROR 3117 UDE142
 Crompton & Co. GALVANOMETER - MIRROR 3118 UDE143
 Crompton & Co. (Stanley) POTENTIOMETER 3114 UDE139
 Crompton & Pochin LAMP - CARBON ARC 3143 UDE168
 Crosby, D. BALANCE - EQUAL ARM 0053 Ex0053
 Crosby, D. BALANCE - EQUAL ARM 0088 Ex0088
 Crosby, D. BALANCE - EQUAL ARM 4442 ULS063
 Crosby Co. STEAM ENGINE INDICATOR 0566 IDG016
 Crosthwaite, J. CLOCK - REGULATOR 3704 ARM017
 Crouch, H. MICROSCOPE - COMPOUND 3326 UCP326
 Crouch, H. MICROSCOPE - COMPOUND, BINOCULAR 0025 UCP090
 Crouch, H. MICROSCOPE - COMPOUND, BINOCULAR 0591 NMD295
 Crouch, H. MICROSCOPE - COMPOUND, BINOCULAR 4277 RCS027
 Cruise, J. DIAL - HORIZONTAL PEDESTAL 0337 Ex0337
 Cuff, J. MICROSCOPE - COMPOUND, CUFF 0577 NMD307
 Cumine, J.A. CRITICAL STATE APPARATUS 0305 Ex0305
 Cummins, C. SEXTANT - BOX 2576 PRI211
 Curry & Paxton BAROMETER - ANEROID, PORTABLE 1592 MAY081
 Curtis BAROMETER - ANEROID, PORTABLE 2612 PRI046
 Curtis Brothers BINOCULARS 2342 SAL025
 Cussons, G. ATWOOD MACHINE 2094 BLA082
 Cussons, G. ATWOOD MACHINE 4155 TDP321
 Cussons & Co. LENS SYSTEM 2514 UGP220
 Cutts, Sutton & Sons SHIP'S LOG 4115 UFM030
 D., P.M. DAIL - HORIZONTAL PEDESTAL 2137 MIS037
 D., S. BALANCE - EQUAL ARM 4441 ULS062
 Dallmeyer, J.H. CAMERA - STEREO 2348 BIR034
 Dallmeyer, J.H. LENS - CONCAVE CONVEX 2380 BIR056
 Dallmeyer, J.H. LENS - CONVEX 3833 NMC234
 Dallmeyer, J.H. LENS SYSTEM 1546 STR005
 Dallmeyer, J.H. LENS SYSTEM 1547 STR006
 Dallmeyer, J.H. LENSES 2377 BIR053
 Dallmeyer, J.H. OPTICAL STAND 1726 MAY209
 Dallmeyer, J.H. TELESCOPE - REFRACTING 1782 MAY265
 Dallmeyer, J.H. TELESCOPE MOUNT 0241 QBP035

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Davidson, F. & Co. MICROSCOPE - COMPOUND 1393 PRI024
 Davidson, F. & Co. MICROSCOPE/CAMERA/TELESCOPE 4438 PRI236
 Davies, R. PELORUS 3271 NMM011
 Davis LEVEL - TELESCOPIC 1442 MIS004
 Davis, E. MICROSCOPE - COMPOUND 0973 BIR014
 Davis, J. TELESCOPE - REFLECTING 0599 NMD288
 Davis, J. & Son DIAL - MINER, HEDLEY 2477 PRI198
 Davis, J. & Son LEVEL - TELESCOPIC 2476 PRI197
 Davis, J. & Son THEODOLITE - SIMPLE 0750 UCP110
 Davis, W. CIRCUMFERENTOR 0271 Ex0271
 Davis, W. CIRCUMFERENTOR Ex0622
 Davy, J. DIAL - HORIZONTAL PEDESTAL 4007 SAL064
 Dawson, T. DIAL - HORIZONTAL PEDESTAL 1400 NMD050
 Dean, A.E. COIL - INDUCTION 3365 UCP365
 Dean, A.E. COIL - INDUCTION 3366 UCP366
 Deane, W. GUNNER'S CALLIPERS 0621 NMD267
 De Colmar, T. CALCULATOR 3236 QBE014
 De Grave, Short, & Fanner CHONDROMETER 2469 SAL030
 De Grave, Short & Co STANDARD VOLUMES - IMPERIAL 1992 SAL014
 Deleuil LAMP - CARBON ARC 1712 MAY199
 Deleuil TELEGRAPH - ALPHABETICAL 1600 MAY089
 Del Vecchio, J. BAROMETER 0266 Ex0266
 Dent CHRONOMETER - MARINE 1839 DUN021
 Dent, E.I. DIPLEIDOSCOPE 1368 TDE044
 Dent, E.J. DIPLEIDOSCOPE 0997 QBC007
 Dent, E. & Co. CLOCK - REGULATOR 1826 DUN008
 Dicas (Marratt & Ellis) HYDROMETER 1961 UCP187
 Dipple & Conway SPECTACLES 4232 NMD188
 Dixey, C.W. BAROMETER - STICK 4023 SAL075
 Dixon, H.H. WATER HAMMER 0421 RDS023
 Dixon & Hempenstall ALTIMETER 0339 Ex0339
 Dixon & Hempenstall BAROGRAPH - ANEROID 0339 CWC072
 Dixon & Hempenstall BAROGRAPH - ANEROID 4167 SAL084
 Dixon & Hempenstall BAROMETER 0340 Ex0340
 Dixon & Hempenstall BAROMETER - FORTIN 1213 TDP136
 Dixon & Hempenstall COIL - INDUCTION, RUHMKORFF 2676 TDP220
 Dixon & Hempenstall COMPASS 3403 NMD111
 Dixon & Hempenstall DRAWING INSTRUMENTS - SET 1376 TDE053
 Dixon & Hempenstall DRAWING INSTRUMENTS - SET 2581 PRI215
 Dixon & Hempenstall MECHANICAL MODEL - GIRDER BRIDGE 1357 TDE028
 Dixon & Hempenstall PANTOGRAPH 0505 IDG073
 Dixon & Hempenstall PLANIMETER - AMSLER 2580 PRI214
 Dixon & Hempenstall PLANIMETER - AMSLER 3242 QBE020
 Dixon & Hempenstall PROTRACTOR - CIRCULAR 2577 PRI212
 Dixon & Hempenstall SCALE - ENGINEERS' 4462 PRI274
 Dixon & Hempenstall SEXTANT 0287 TDE005
 Dixon & Hempenstall SURVEYING INSTRUMENT - POCKET 3231 QBE009
 Dixon & Hempenstall SURVEYING STAFF 1642 MAY129
 Dixon & Hempenstall SWITCH 2677 TDP221
 Dobbie, A. & Son SEXTANT 4494 CIL007
 Dobbie, McInnes STEAM ENGINE INDICATOR 2478 PRI199
 Dobbie, McInnes & Clyde STEAM ENGINE INDICATOR 2479 PRI200
 Dobsons & Curtis AMMETER 3786 NMC187
 Dobsons & Curtis AMMETER 3786 NMD181
 Dollond BAROGRAPH - ANEROID 1860 MIS027
 Dollond DYNAMETER 1836 DUN018
 Dollond ELECTROSTATIC GENERATOR - WIMSHURST 0059 UCP076
 Dollond MICROSCOPE - COMPOUND, GOULD 4259 RCS009
 Dollond MICROSCOPE - COMPOUND, JONES 0588 NMD298
 Dollond MICROSCOPE - COMPOUND, JONES 4281 RCS031
 Dollond MICROSCOPE - SOLAR 0589 NMD297
 Dollond OCTANT 4465 PRI277
 Dollond SEXTANT 3700 ARM013
 Dollond TELESCOPE - REFLECTING 0460 RDS038
 Dollond TELESCOPE - REFRACTING 0598 PRI055
 Dollond TELESCOPE - REFRACTING 2360 BIR046
 Dollond TELESCOPE - REFRACTING 3660 NMD195
 Dollond TELESCOPE - REFRACTING 3922 ULS019
 Dollond TELESCOPE - REFRACTING 3982 ARM056
 Dollond TELESCOPE - REFRACTING 3983 ARM057
 Dollond TELESCOPE - REFRACTING 4009 SAL066
 Dollond THEODOLITE - TRANSIT 4000 ARM074
 Dollond, P. LENS - PLANO CONVEX 4004 ARM078
 Donegan CLOCK/BAROMETER 0037 Ex0037
 Donovan, M. DIAL - HORIZONTAL 4249 MIS074
 Dorset, Duchess of DIAL - HORIZONTAL PEDESTAL 4444 MIS002
 Dover Charlton Kent DIP CIRCLE 4517 MET016
 Dover Charlton Kent MAGNETOMETER - KEW PATTERN 4518 MET017
 D.R.G.M. GALVANOMETER 0237 QBP031
 Dring & Fage CALLIPER - CROSS 0574 IDG063
 Dring & Fage CALLIPER - LONG 0575 IDG052
 Dring & Fage HYDROMETER 1438 NMD110
 Dring & Fage HYDROMETER 2017 BLA006
 Dring & Fage HYDROMETER - SIKES 0534 IDG010
 Dring & Fage HYDROMETER - SIKES 0535 IDG015

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Dring & Fage HYDROMETER - SIKES 3943 SAL060
 Dring & Fage HYDROMETER - SIKES 4477 STL005
 Dring & Fage SLIDE RULE 0383 RDS018
 Dring & Fage SLIDE RULE 0508 IDG019
 Dubilier Co. CONDENSER BOX 3194 QBP139
 Dublin Japan Works FIRE EXTINGUISHER 0513 IDG054
 Duboscq, J. BREWSTER BANDS APPARATUS 2331 QBP097
 Duboscq, J. CLAMP FOR COMPRESSING GLASS 3490 QBP216
 Duboscq, J. EYE-SIGHT TESTER(?) 3216 QBP161
 Duboscq, J. HELIOSTAT - SILBERMANN 0137 QBP002
 Duboscq, J. KALEIDOSCOPE 0245 QBP040
 Duboscq, J. LENS ON STAND 0687 UDP015
 Duboscq, J. MICROSCOPE - SOLAR 1486 UGP100
 Duboscq, J. OPTICAL BENCH 0322 CWC009
 Duboscq, J. PHOTOMETER - WHEATSTONE 3215 QBP160
 Duboscq, J. PHOSPHOROSCOPE - BECQUEREL 3220 QBP165
 Duboscq, J. POLARIMETER 0248 QBP044
 Duboscq, J. POLARISATION ANALYSER - GUÉRARD 0277 QBP072
 Duboscq, J. POLARISCOPE - DUBOSCQ 0246 QBP041
 Duboscq, J. POLARISCOPE - DUBOSCQ 324 CWC008
 Duboscq, J. POLARISCOPE - NORREMBERG 1751 MAY234
 Duboscq, J. POLARISCOPE - NORREMBERG 0247 QBP042
 Duboscq, J. PRISM - RIGHT-ANGLED 3491 QBP217
 Duboscq, J. PRISM ON STAND 0326 CWC075
 Duboscq, J. (Yeates & Son) PRISM ON STAND 0328 CWC077
 Duboscq, J. (Yeates & Son) PRISM ON STAND 0329 CWC078
 Duboscq, J. PRISM ON STAND 1187 TDP104
 Duboscq, J. PRISM ON STAND 3505 QBP231
 Duboscq, J. PRISM ON STAND 3506 QBP232
 Duboscq, J. PRISM - HOUSED 0688 UDP016
 Duboscq, J. PRISM - NICOL 2545 UGP251
 Duboscq, J. SACCHARIMETER 0149 UGP012
 Duboscq, J. SLIT 2547 UGP253
 Duboscq, J. SPECTROSCOPE - TABLE 0125 QBP037
 Duboscq & Pellin POLARISCOPE - NORREMBERG 0735 MAY010
 Duboscq, J. & Pellin OPTICAL BENCH 0454 RDS039
 Duboscq Soleil COMPRESSED GLASS CUBE 2546 UGP252
 Duboscq Soleil POLARISCOPE - DUBOSCQ 0147 UGP010
 Duboscq Soleil STEREO VIEWER - BREWSTER 0056 UCP092
 Duboscq Soleil STEREO VIEWER - BREWSTER 1690 MAY177
 Duboscq Soleil STEREO VIEWER - BREWSTER 3221 QBP166
 Duboscq, Th. & A. SACCHARIMETER 0734 MAY009
 Ducretet ELECTROMAGNETIC ROTATION APPARATUS 0922 UDP187
 Ducretet, E. AMPERE TABLE 0954 UDP046
 Ducretet, E. AMPERE TROUGH 0904 UDP170
 Ducretet, E. ELECTRIC MOTOR 2145 UDP234
 Ducretet, E. ELECTROSTATIC GENERATOR - HOLTZ 0689 UDP017
 Ducretet, E. FURNACE - CARBON ARC 0411 RDS062
 Ducretet, E. GALVANOMETER - D'ARSONVAL 1205 TDP046
 Ducretet, E. INTERRUPTOR 0004 UCP089
 Ducretet, E. LAMP - ELECTRIC 0953 UDP156
 Ducretet, E. & Cie COMMUTATOR - BERTIN 0766 UDP035
 Ducretet, E. & Cie COMMUTATOR - BERTIN 0767 UDP207
 Ducretet, E. & Cie ELECTRIC TROUGH 2154 UDP243
 Ducretet, E. & Cie ELECTROMAGNETIC INDUCTION APPARATUS 0694 UDP022
 Ducretet, E. & Cie FARADAY WHEEL 0768 UDP036
 Ducretet, E. & Cie GALVANOMETER - UPRIGHT 0765 UDP034
 Ducretet, E. & Cie MAGNETIC NEEDLE SUPPORT 2242 UDP320
 Ducretet, E. & Cie MELLONI APPARATUS 0680 UDP008
 Ducretet, E. & Cie OPTICAL STAND 2143 UDP232
 Ducretet, E. & Cie PULSE GLASS(?) 2247 UDP325
 Ducretet, E. & Cie THERMOMETER - LESLIE DIFFERENTIAL 0681 UDP009
 Ducretet, E. & Cie VERNIER MODEL 0690 UDP018
 Ducretet & Lejeune FURNACE - CARBON ARC 3065 UDE091
 Duffy, J. DIAL - HORIZONTAL PEDESTAL 2441 NMD090
 Dunn EIDOGRAPH 1102 TDE026
 Dunne, M. DIAL - HORIZONTAL PEDESTAL 3677 PRI106
 Earnshaw CLOCK - REGULATOR 3691 ARM004
 Earnshaw CLOCK - REGULATOR 3986 ARM060
 Eckhold OMNIMETER - ECKHOLD 3873 UDE190
 Edelmans, Dr W. GALVANOMETER 3126 UDE151
 Edison LAMP - ELECTRIC 0238 QBP032
 Edison PHONOGRAPH 0214 QBP010
 Edison, T.A. PHONOGRAPH 1641 MAY128
 Edison, T.A. PHONOGRAPH 3796 NMC197
 Edison & Swan Co. LAMP - ELECTRIC 3145 UDE170
 Ediswan AMMETER 3435 BIR137
 Ediswan LAMP - ELECTRIC 0315 CWC063
 Ediswan VOLTMETER 3434 BIR136
 Edmonds, W.G. & Co. HYDROMETER - SIKES 1414 NMD063
 Edmundson J. & Co AMMETER 3420 BIR122
 Edmundsons AMMETER 3044 UDE070
 Edmundsons AMMETER 3404 BIR106
 Edmundsons VOLTMETER 3016 UDE042
 Edney HYGROMETER - EDNEY PAPER 4082 QBP270

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Egan & Tatlow VOLTMETER 3567 Ex0599
Egan & Tatlow VOLTMETER 3567 NMC063
Electrical Engineering Co. VOLTMETER 0402 RDS119
Electrical Power Storage Co. VOLTMETER 0404 RDS118
Elliott Brothers AIR PUMP - SYRINGE 1347 TDP024
Elliott Brothers ARTIFICIAL HORIZON 0193 UGE004
Elliott Brothers BALANCE - ELECTRIC 3130 UDE155
Elliott Brothers BARLOW STELLAR WHEEL 0162 UGP041
Elliott Brothers BELL - ELECTRIC 0053 UGP025
Elliott Brothers BELL - ELECTRIC 0179 UGP059
Elliott Brothers BELL - ELECTRIC 1498 UGP069
Elliott Brothers BELL - ELECTRIC, "THE GAMUT" 0173 UGP052
Elliott Brothers BRIDGE - WHEATSTONE 3077 UDE103
Elliott Brothers BRIDGE - WHEATSTONE 3554 NMC050
Elliott Brothers COMMUNICATING VESSELS 0156 UGP035
Elliott Brothers COMMUTATOR 1897 UGP166
Elliott Brothers COMPASS - MARINE 0170 UGP049
Elliott Brothers COMPASS - PRISMATIC 1613 MAY102
Elliott Brothers COMPASS - PRISMATIC 2583 PRI217
Elliott Brothers CONDENSER - STANDARD 3037 UDE063
Elliott Brothers CONDENSER BOX 2270 UDP348
Elliott Brothers CONDENSER BOX 2788 UCP241
Elliott Brothers CONDENSER BOX 3036 UDE062
Elliott Brothers CONDUCTOR - CYLINDRICAL 2497 UGP203
Elliott Brothers CONDUCTOR - CYLINDRICAL 1502 UGP132
Elliott Brothers DIP CIRCLE 1900 UGP169
Elliott Brothers DISC SPINNER 1903 UGP172
Elliott Brothers DISCHARGE FRAME 0181 UGP061
Elliott Brothers DISCHARGE TUBE - AURORA 0080 UGP027
Elliott Brothers DISCHARGER - JOINTED 0180 UGP060
Elliott Brothers EARTH INDUCTOR - BARLOW GLOBE 0169 UGP048
Elliott Brothers EARTH INDUCTOR - DELEZENNE CIRCLE 3883 QBP244
Elliott Brothers ELECTRIC MOTOR 1907 UGP176
Elliott Brothers ELECTRIC PISTOL 1497 UGP078
Elliott Brothers ELECTROMETER - HARRIS DISCHARGE 0016 UGP021
Elliott Brothers ELECTROMETER - QUADRANT 2739 TDP283
Elliott Brothers ELECTROMETER - QUADRANT, THOMSON 0087 UCP044
Elliott Brothers ELECTROMETER - TORSION, COULOMB 0174 UGP053
Elliott Brothers ELECTROMETER - TORSION, COULOMB 0263 QBP058
Elliott Brothers ELECTROMETER - TORSION, COULOMB 0693 UDP021
Elliott Brothers ELECTROMETER - TORSION, COULOMB 1733 MAY216
Elliott Brothers ELECTROSTATIC GENERATOR - HARRIS 1496 UGP125
Elliott Brothers EXPANSION APPARATUS - FERGUSON 2795 UCP248
Elliott Brothers EXPANSION APPARATUS - 'S GRAVESANDE 2500 UGP206
Elliott Brothers GALVANOMETER - ASTATIC 0055 UCP052
Elliott Brothers GALVANOMETER - ASTATIC 3098 UDE124
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 0022 UCP034
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 0046 UGP026
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 0049 UCP051
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 1206 TDP004
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 1207 TDP005
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 1767 MAY250
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 2552 UGP257
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 3082 UDE108
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 3085 UDE111
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 3120 UDE145
Elliott Brothers GALVANOMETER - ASTATIC MIRROR 3622 NMC118
Elliott Brothers GALVANOMETER - ASTATIC, NOBILI 0015 UCP045
Elliott Brothers GALVANOMETER - ASTATIC, NOBILI 0063 UGP024
Elliott Brothers GALVANOMETER - ASTATIC, NOBILI 1220 TDP011
Elliott Brothers GALVANOMETER - ASTATIC, NOBILI 3219 QBP164
Elliott Brothers GALVANOMETER - D'ARSONVAL 3091 UDE117
Elliott Brothers GALVANOMETER - TANGENT 1512 UGP090
Elliott Brothers GALVANOMETER - TANGENT 1908 UGP177
Elliott Brothers GALVANOMETER - TANGENT, GAUGAIN 2152 UDP241
Elliott Brothers GONIOMETER - CRYSTAL 1043 MAY017
Elliott Brothers GONIOMETER - CRYSTAL, WOLLASTON 0172 UGP051
Elliott Brothers GONIOMETER - CRYSTAL, WOLLASTON 4039 UGG001
Elliott Brothers HALDAT APPARATUS 1510 UGP088
Elliott Brothers HYGROMETER - REGNAULT 0017 UCP038
Elliott Brothers LEYDEN JAR WITH WIRE GAUZE COATINGS 3716 UGP368
Elliott Brothers MAGNET & ROTATING CONDUCTOR 1895 UGP164
Elliott Brothers MAGNETOMETER - SUSPENSION 2864 UGP284
Elliott Brothers MECHANICAL INTEGRATOR - AMSLER 3247 QBE024
Elliott Brothers MELLONI APPARATUS 2942 UGP350
Elliott Brothers MELLONI APPARATUS 3361 UCP361
Elliott Brothers MICROSCOPE - COMPOUND 0979 BIR020
Elliott Brothers MICROSCOPE - TRAVELLING 0775 UDP042
Elliott Brothers OCTANT 1064 MAY040
Elliott Brothers OERSTED APPARATUS 2933 UGP341
Elliott Brothers OERSTED APPARATUS 3722 UGP374
Elliott Brothers PANTOGRAPH 3183 QBP128
Elliott Brothers PANTOGRAPH 3273 NMM013
Elliott Brothers PARALLEL RULE 1378 TDE058
Elliott Brothers PHOTOMETER - WHEATSTONE 0183 UGP063

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Elliott Brothers PLANIMETER - AMSLER 0212 UGE023
 Elliott Brothers PLANIMETER - AMSLER 2345 BIR031
 Elliott Brothers PLANIMETER - AMSLER 3865 UDE182
 Elliott Brothers POLARISCOPE - NORREMBERG 0150 UGP013
 Elliott Brothers PRISM ON STAND 0854 UDP120
 Elliott Brothers PROTRACTOR - RECTANGULAR 2959 NMD201
 Elliott Brothers RELAY 1259 TDP034
 Elliott Brothers RESISTANCE - STANDARD 0753 UCP113
 Elliott Brothers RESISTANCE - STANDARD 1342 TDP063
 Elliott Brothers RESISTANCE - STANDARD 4335 MAY348
 Elliott Brothers RHEOSTAT 0490 UCP147
 Elliott Brothers RHEOSTAT 1537 UGP129
 Elliott Brothers RHEOSTAT 3195 QBP140
 Elliott Brothers RHEOSTAT - WHEATSTONE 1299 TDP053
 Elliott Brothers SCALE - MARQUOIS 1559 STR018
 Elliott Brothers SCALE - MARQUOIS 4230 PRI249
 Elliott Brothers SEEBECK RECTANGLE 1892 UGP161
 Elliott Brothers SEXTANT 0974 BIR015
 Elliott Brothers SEXTANT - BOX 2603 NMD202
 Elliott Brothers SHAFT SPEED INDICATOR 2737 TDP281
 Elliott Brothers SHUNT 3032 UDE058
 Elliott Brothers SHUNT 3196 QBP141
 Elliott Brothers SPOUTING VESSEL 1473 UGP122
 Elliott Brothers STAND 1887 UGP156
 Elliott Brothers STAND WITH GLASS U-TUBES 2932 UGP340
 Elliott Brothers STEREO VIEWER - WHEATSTONE 2867 UGP287
 Elliott Brothers STEAM ENGINE INDICATOR 0568 IDG014
 Elliott Brothers STEREO VIEWER - BREWSTER 1487 UGP074
 Elliott Brothers SWITCH 0920 UDP185
 Elliott Brothers TELEGRAPH - MORSE 1886 UGP155
 Elliott Brothers TELESCOPE - READING 0335 CWC051
 Elliott Brothers TELESCOPE - READING 0749 UCP109
 Elliott Brothers TESTING SET 3101 UDE127
 Elliott Brothers THEODOLITE - TRANSIT 3226 QBE004
 Elliott Brothers THERMOMETER - LESLIE DIFFERENTIAL 1477 UGP133
 Elliott Brothers THERMOPILE 0028 UCP059
 Elliott Brothers THERMOPILE 1240 TDP096
 Elliott Brothers THERMOPILE 3721 UGP373
 Elliott Brothers THUNDER HOUSE 0188 UGP068
 Elliott Brothers VAPOUR PRESSURE APPARATUS 2524 UGP230
 Elliott Brothers WATTMETER 3102 UDE128
 Elliott Brothers WAVE DEMONSTRATION APPARATUS 0351 CWC041
 Elliott, W. SECTOR 2601 PRI036
 Elliott, W. THEODOLITE - PLAIN 1094 TDE037
 Elwell-Parker AMMETER 3406 BIR108
 EN DIAL - HORIZONTAL PEDESTAL 2459 NMD086
 Engelhardt, A. THERMO-HYDROMETER 3639 NMC135
 Ernecke, F. ELECTRIC DISCHARGE DEMONSTRATION 0794 UDP060
 Ernecke, F. REFLECTORS - PARABOLIC, HERTZ 0784 UDP051
 Ernecke, F. TESLA COIL APPARATUS 0939 UDP204
 Ertel & Sohn ALIDADE 3950 ARM024
 Eshelby, J. COMPASS 0203 Ex0203
 Essex, C. & Co. DIAL - HORIZONTAL COMPASS (MAGNETIC) 0663 NMD227
 Essex, C. & Co. DIAL - HORIZONTAL COMPASS (MAGNETIC) 1111 PRI002
 Evans, Lescher & Webb MATERIA MEDICA CABINET 3876 NEW006
 Everett Edgcumbe Co. VOLTMETER 3023 UDE049
 Evershed TESTING SET 3148 UDE173
 Evershed & Vignoles GENERATOR - PORTABLE 3147 UDE172
 Evershed & Vignoles RESISTANCE BOX 3055 UDE081
 Ewing MAGNETIC PERMEABILITY APPARATUS 3095 UDE121
 Fagioli, D. & Son BAROMETER - BANJO 2619 PRI053
 Fahey, E. DIAL - HORIZONTAL PEDESTAL 1123 PRI011
 Fahey, E. DIAL - HORIZONTAL PEDESTAL 1124 PRI012
 Fannin AMPUTATION SET 0503 Ex0503
 Fannin & Co. COIL - INDUCTION, MEDICAL 4293 RCS043
 Fannin & Co. ELECTRICAL MACHINE - CLARKE 4086 UFM004
 Fannin & Co. SCOTOMETER(?) 0092 Ex0092
 Fannin & Co. THERMOMETER - GLASS MERCURY 4287 RCS037
 Faraday, M. MAGNETIC DIAGRAMS 0217 QBP013
 Farrar, W. SLIDE RULE - MANNHEIM 1371 TDE047
 Farrell, J. DIAL - HORIZONTAL PEDESTAL 2370 NMD075
 Farrow & Jackson HYDROMETER - SIKES 2291 PRI171
 Fastré ainé THERMOMETER - GLASS MERCURY 2296 QBC031
 Fastré ainé THERMOMETER - GLASS SPIRIT 3469 QBP195
 Faure GRAPHITE FLASK 3422 BIR124
 Fawcett, J. DIAL - HORIZONTAL PEDESTAL 0702 NMD001
 Felt & Tarrant Co. CALCULATOR 3239 QBE017
 Feroni, A. BAROMETER 0267 Ex0267
 Field, R. & Co. EXPOSURE METER 4459 PRI273
 Fielding, C.F. PHONOGRAPH 2766 UCP219
 Fineran, P. DIAL - HORIZONTAL PEDESTAL 2440 NMD089
 Fitton, F. OCTANT 0055 Ex0055
 Fitton, W. OCTANT 0259 Ex0259
 FitzPatrick, T. DIAL - HORIZONTAL PEDESTAL 3937 ULS034
 Flavell, H. SPECTACLES 0341 Ex0341

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Fleming, I. DIAL - HORIZONTAL PEDESTAL 2442 NMD091
 Fletcher, T. BURNER - BUNSEN 0408 RDS089
 Fletcher, Russell & Co. BURNER 2303 PRI177
 Fletcher, Russell & Co. BURNER 2776 UCP229
 Fleuss AIR PUMP - FLEUSS 0474 RDS097
 Fleuss AIR PUMP - FLEUSS 1814 MAY297
 Fleuss AIR PUMP - FLEUSS 2057 BLA056
 Forbes, Dr THERMOMETER - GLASS MERCURY 1638 MAY125
 Foster, J. DIAL - HORIZONTAL PEDESTAL 0309 Ex0309
 Fowler & Co. CALCULATOR - TEXTILE 3849 SAL057
 Fox, J. & Co. HYDROMETER - SIKES 3942 SAL059
 Fraser, W. AIR PUMP - DOUBLE BARREL 2201 NMD215
 Fraunhofer TELESCOPE - REFRACTING 1846 DUN028
 Fric, J. & J. POLARIMETER 4466 PRI278
 Frith, P. LINEN PROVER 2573 PRI208
 Froment TELEGRAPH - ALPHABETICAL 2977 UDE003
 Fuess, R. GONIOMETER - CRYSTAL 1044 MAY018
 Fuess, R. GONIOMETER - CRYSTAL, WOLLASTON 4043 UGG005
 F.W. & J. CRUCIBLE 0356 RDS056
 Gallenkamp EXPANSION APPARATUS - BAR BREAKER 2797 UCP250
 Gallenkamp, A. & Co. CALORIMETER - FUEL, DARLING 2688 TDP232
 Gallenkamp, A. & Co. EXPANSION APPARATUS - DULONG/PETIT 2859 UGP279
 Gallenkamp, A. & Co. VAPOUR PRESSURE APPARATUS 2887 UGP294
 Gallenkamp, A. & Co. VAPOUR PRESSURE APPARATUS 2858 UGP278
 Galway, J. DIAL - HORIZONTAL PEDESTAL 2667 PRI075
 Gambey DIP CIRCLE 1319 TDP037
 Gambrell GALVANOMETER - D'ARSONVAL 2850 UGP270
 Gambrell Brothers COIL 1269 TDP125
 Gambrell Brothers COIL 2253 UDP331
 Gambrell Brothers EARTH INDUCTOR - DELEZENNE CIRCLE 2231 UDP309
 Gambrell Brothers GALVANOMETER 0389 RDS099
 Gambrell Brothers GALVANOMETER 1768 MAY251
 Gambrell Brothers (T. Mason) GALVANOMETER 2568 UGP268
 Gambrell Brothers GALVANOMETER - D'ARSONVAL 2211 UDP289
 Gambrell Brothers GALVANOMETER - D'ARSONVAL 2560 UGP260
 Gambrell Brothers GALVANOMETER - D'ARSONVAL 2880 UCP296
 Gambrell Brothers GALVANOMETER SCALE 3021 UDE047
 Gambrell Brothers (Mason) RESISTANCE BOX 2789 UCP242
 Gambrell Brothers RESISTANCE - STANDARD 3054 UDE080
 Gambrell Brothers & Co. GALVANOMETER - D'ARSONVAL 1224 TDP050
 Gambrell Brothers & Co. GALVANOMETER - D'ARSONVAL 1970 UCP197
 Gardner & Dowling BAROMETER - BANJO 0342 Ex0342
 Gardner & Neal MICROSCOPE - COMPOUND 0308 Ex0308
 Gardner & Neil OCTANT 0056 Ex0056
 Gardner & Co. CHRONOMETER 0343 Ex0343
 Gatchell, S. BALANCE - EQUAL ARM 0627 Ex0627
 Gatchell, S. BALANCE - COIN 0707 NMD006
 Gatchell, S. & Sons STANDARD VOLUMES - IMPERIAL 0345 Ex0345
 Gatchell & Sons BALANCE - EQUAL ARM 0672 NMD219
 Gatchell, S. & Sons BALANCE - EQUAL ARM 0632 Ex0632
 Gatty, D. BAROMETER - BANJO 2617 PRI051
 Gatty, J. BAROMETER - STICK 2637 SAL043
 Gatty, J. BAROMETER - STICK 0269 Ex0269
 GBN LANTERN - UNIAL 4434 NMD185
 GEC AMMETERS & VOLTMETERS 3436 BIR138
 GEC [General Electric Company] LAMP - ELECTRIC 3141 UDE166
 Geissler, H. THERMOMETER - GLASS MERCURY 0119 QBP008
 Gent & Co. GALVANOMETER - DEFLECTION 4519 MET018
 George, W. & J. DIP CIRCLE 3908 QBP269
 George, W. & J. DIP CIRCLE 4337 MAY350
 George, W. & J. & Becker SPECTROSCOPE - TABLE 1022 QBC032
 George, W. & J. TESLA COIL APPARATUS 1813 MAY296
 Gerard, W. BAROMETER - ANEROID 4107 UFM022
 Gerhardt, C. MASSON APPARATUS 0045 UCP003
 Gerletti, C. BAROMETER - BANJO 4016 SAL073
 Gernon, E. DIAL - HORIZONTAL PEDESTAL 3928 ULS025
 GFR COMPASS 1621 MAY109
 Giacomelli, G. BAROMETER - BANJO 4104 UFM021
 Gibbons, M. DIAL - HORIZONTAL PEDESTAL 2450 NMD099
 Gibson, W. & Co. CLOCK/COMPASS/THERMOMETER 3526 SAL049
 Gilbert BAROMETER - BANJO 0268 Ex0268
 Gilbert, W. BAROMETER - BANJO 4164 NMD137
 Gilkerson & Co. (LANE Globe) ORRERY 3699 ARM012
 Gilkerson & Co. TELESCOPE - PORTABLE ALTAZIMUTH 3988 ARM062
 Gilles, M. BAROMETER - ANEROID 1423 MIS018
 Giocomelli, G. BAROMETER - STICK 0128 Ex0128
 Glashütte CHRONOMETER - MARINE 2340 SAL023
 Godfrey INHALER 2292 PRI180
 Goerz, C.P. PERISCOPE 4078 MAY327
 Golaz, L. OPTICAL CELL 2969 TDP308
 Goodard, J. & J. TUNING FORK 2771 UCP224
 Gorham, J. COLOUR SPINNER 3494 QBP220
 Götze, F.O.R. THERMOMETER - GLASS MERCURY 2246 UDP324
 Gozzi, A. MICROSCOPE - COMPOUND 1425 MIS015
 GPO BELL - ELECTRIC 3777 NMC178

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GPO RELAY 1769 MAY252
GPO RHEOSTAT 1799 MAY282
GPO SIGNAL INDICATOR 4135 MAY339
GPO TELEGRAPH - MORSE 1757 MAY240
GPO TELEGRAPH - MORSE 3594 NMC090
GPO TELEGRAPH - MORSE 3595 NMC091
Grassi, S. BAROMETER - BANJO 4447 SAL085
Gray BAROMETER - STICK 0344 Ex0344
Gray, J. & Son ELECTRICAL MACHINE - CLARKE 4088 UFM006
Gregory & Wright COMPASS - MARINE 2332 QBP098
Gregory & Wright OCTANT 0488 RDS013
Greiner, J.G. HYGROMETER - MASON 1183 TDP002
Griffin AIR PUMP - FLEUSS 3301 UCP301
Griffin AIR PUMP - SYRINGE 0341 CWC003
Griffin BALANCE - MAGNETIC 3535 NMC031
Griffin BATTERY - SMEE(?) 2823 UCP276
Griffin BIOT APPARATUS 0285 CWC024
Griffin BRIDGE - WHEATSTONE 0885 UDP151
Griffin CATHETOMETER 0740 UCP100
Griffin COIL - INDUCTION, RUHMKORFF 1969 UCP196
Griffin COMMUTATOR - BERTIN 1680 MAY167
Griffin CONDENSER - STANDARD 3040 UDE066
Griffin (T. Mason) DIP NEEDLE 0289 CWC050
Griffin DIP NEEDLE 1747 MAY230
Griffin ELECTROMETER - QUADRANT 1716 MAY203
Griffin ELECTROMETER - QUADRANT 0085 UGP029
Griffin ELECTROMETER - QUADRANT 3569 NMC065
Griffin ELIHU THOMSON APPARATUS 0937 UDP202
Griffin EXPANSION APPARATUS - BAR BREAKER 3442 QBP168
Griffin EXPANSION APPARATUS - BAR BREAKER 3610 NMC106
Griffin EXPANSION APPARATUS - RHEAM 2861 UGP281
Griffin GALVANOMETER - ASTATIC MIRROR 0305 CWC028
Griffin GALVANOMETER - ASTATIC, NOBILI 2856 UGP276
Griffin GALVANOMETER - AYRTON MATHER 0934 UDP199
Griffin GALVANOMETER - AYRTON MATHER 3122 UDE147
Griffin GALVANOMETER - TANGENT 2567 UGP267
Griffin GALVANOMETER - TANGENT 2873 UCP289
Griffin GALVANOMETER - TANGENT 3328 UCP328
Griffin GALVANOMETER - TANGENT 3823 NMC224
Griffin GALVANOMETER - TANGENT, STEWART 1753 MAY236
Griffin GALVANOSCOPE - WEINHOLD 0050 UCP081
Griffin GONIOMETER - REFRACTION 1888 UGP157
Griffin HYDROMETER 2657 RDS155
Griffin HYGROMETER - MASON 1878 UGP147
Griffin MANOMETRIC FLAME APPARATUS 1921 UGP190
Griffin METAL TANK 3746 NMC147
Griffin MICROMETER SCREW MODEL 2090 BLA078
Griffin MICROSCOPE - TRAVELLING 2539 UGP245
Griffin MICROSCOPE - TRAVELLING 2803 UCP256
Griffin MICROSCOPE - TRAVELLING 2860 UGP280
Griffin ORGAN PIPE WITH MANOMETRIC CAPSULES 2130 UDP221
Griffin PHOTOMETER - JOLY 1524 UGP110
Griffin PHOTOMETER - JOLY 1801 MAY284
Griffin PNEUMATIC SHELF 3784 NMC185
Griffin PNEUMATIC SHELF 3784 NMD150
Griffin POT - STONEWARE 0371 RDS087
Griffin PUMP - FIRE ENGINE 3563 NMC059
Griffin RESISTANCE BOX 0893 UDP159
Griffin SLIDE RULE 2109 BLA097
Griffin SOAP BUBBLE DRUM - BOYS 1904 UGP173
Griffin SOAP BUBBLE DRUM - BOYS 3461 QBP187
Griffin SPECIFIC HEAT APPARATUS - REGNAULT 1745 MAY228
Griffin SPECTROSCOPE - TABLE 0146 UGP009
Griffin SPECTROSCOPE - TABLE 0278 CWC013
Griffin SPHEROMETER 2517 UGP223
Griffin THEODOLITE 2540 UGP246
Griffin THERMAL CONDUCTIVITY APPARATUS 2505 UGP211
Griffin THERMAL CONDUCTIVITY APPARATUS - SEARLE 2862 UGP282
Griffin THERMOMETER - MAXIMUM 1874 UGP143
Griffin THERMOMETER CALIBRATION HEATER 4130 MAY334
Griffin THERMOPILE 1270 TDP107
Griffin TUNING FORK 1285 TDP028
Griffin TUNING FORK ON RESONANCE BOX 1237 TDP077
Griffin VACUUM APPARATUS 1528 UGP115
Griffin WATER JACKET 2498 UGP204
Griffin, J.J. & Sons CHESHIRE DISC 0826 UDP092
Griffin, J.J. & Sons GALVANOMETER - TANGENT 3547 NMC043
Griffin, J.J. & Sons GALVANOMETER - TANGENT 3724 UGP376
Griffin, J.J. & Sons GAS HOLDER 3755 NMC156
Griffin, J.J. & Sons GAS HOLDER 3755 NMD163
Griffin, W. DIAL - HORIZONTAL PEDESTAL 2455 NMD103
Griffin & Son THERMOMETER - GLASS MERCURY 1873 UGP142
Griffin & Sons BAROMETER - FORTIN 0340 CWC071
Griffin & Sons COIL - INDUCTION, RUHMKORFF 2956 UGP364
Griffin & Sons (Percival) GALVANOMETER - ASTATIC, NOBILI 3568 NMC064

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Griffin & Sons (Percival) GALVANOMETER - ASTATIC, NOBILI 3568 NMD147
Griffin & Sons GALVANOMETER - AYRTON MATHER 3123 UDE148
Griffin & Sons THERMOPILE 2323 QBP089
Griffin & Tatlock LTD ELECTROMETER - GOLD LEAF 4077 MAY326
Griffin & Tatlock SEEBECK RECTANGLE 0846 UDP112
Grimme, Natalis & Co. CALCULATOR 1302 TDP209
Groves, W. GALVANOMETER - TANGENT, STEWART 2070 BLA051
Grubb, H. BASE LINE MEASURES 046 Ex0046
Grubb, H. CALLIPER - VERNIER 1144 TDP168
Grubb, H. CHRONOGRAPH 1465 UCP154
Grubb, H. CHRONOGRAPH 1823 DUN005
Grubb, H. CHRONOGRAPH 0237 Ex0237
Grubb, H. CHRONOGRAPH 0238 Ex0238
Grubb, H. CLOCK - REGULATOR 0152 Ex0152
Grubb, H. CLOCK - REGULATOR 0023 UCP048
Grubb, H. COELOSTAT 1824 DUN006
Grubb, H. COELOSTAT 0240 Ex0240
Grubb, H. COELOSTAT 0194 Ex0194
Grubb, H. CORONAGRAPH 0457 Ex0457
Grubb, H. DOME - ASTRONOMICAL 0246 Ex0246
Grubb, H. DOME - ASTRONOMICAL 0222 Ex0242
Grubb, H. DOME - ASTRONOMICAL 0248 Ex0248
Grubb, H. DOME - ASTRONOMICAL 0249 Ex0249
Grubb, H. DOME - ASTRONOMICAL 0250 Ex0250
Grubb, H. DOME - ASTRONOMICAL 0243 Ex0243
Grubb, H. DOME - ASTRONOMICAL 0245 Ex0245
Grubb, H. DOME - ASTRONOMICAL 0241 Ex0241
Grubb, H. DOME - ASTRONOMICAL 0244 Ex0244
Grubb, H. ELEVATING FLOOR 0426 Ex0426
Grubb, H. EYEPIECE - DAWES' SOLAR 0754 UCP114
Grubb, H. EYEPIECE - MICROMETER 1842 DUN024
Grubb, H. EYEPIECE - MICROMETER 0257 Ex0257
Grubb, H. EYEPIECE - MICROMETER 0111 UCP028
Grubb, H. EYEPIECE - MICROMETER 1462 UCP140
Grubb, H. EYEPIECE - MICROMETER 0458 Ex0458
Grubb, H. EYEPIECE - MICROMETER 3971 ARM045
Grubb, H. EYEPIECE - MICROMETER 3972 ARM046
Grubb, H. EYEPIECE - MICROMETER 0045 Ex0045
Grubb, H. HELIOMETER 0201 Ex0201
Grubb, H. HELIOMETER 0448 Ex0448
Grubb, H. HELIOMETER 0159 Ex0159
Grubb, H. HELIOSTAT 634 Ex0634
Grubb, H. HELIOSTAT 0196 Ex0196
Grubb, H. HELIOSTAT 0468 Ex0468
Grubb, H. LENS 0451 Ex0451
Grubb, H. LENS 0585 Ex0585
Grubb, H. LENS 0625 Ex0625
Grubb, H. LENS - CONCAVE CONVEX 2379 BIR055
Grubb, H. LENS SYSTEM 1545 STR004
Grubb, H. MERIDIAN CIRCLE 0741 UCP101
Grubb, H. MIRROR - SPECULUM METAL 0455 Ex0455
Grubb, H. OBSERVATORY FRAMEWORK 0251 Ex0251
Grubb, H. OBSERVATORY FRAMEWORK 0252 Ex0252
Grubb, H. OBSERVATORY FRAMEWORK 0253 Ex0253
Grubb, H. ROOF - OBSERVATORY 0247 Ex0247
Grubb, H. SEISMOGRAPH 1857 MAY303
Grubb, H. SIDEROSTAT 0239 Ex0239
Grubb, H. SPECTROGRAPH - SOLAR 0423 Ex0423
Grubb, H. SPECTROHELIOGRAPH 0193 Ex0193
Grubb, H. SPECTROSCOPE 0082 Ex0082
Grubb, H. (Spencer & Son) SPECTROSCOPE 0103 Ex0103
Grubb, H. SPECTROSCOPE 0574 Ex0574
Grubb, H. SPECTROSCOPE 0256 Ex0256
Grubb, H. SPECTROSCOPE 0148 Ex0148
Grubb, H. SPECTROSCOPE 0254 Ex0254
Grubb, H. SPECTROSCOPE 0255 Ex0255
Grubb, H. SPECTROSCOPE 0184 Ex0184
Grubb, H. SPECTROSCOPE 0175 Ex0175
Grubb, H. SPECTROSCOPE - TABLE 0129 RDS004
Grubb, H. SPECTROSCOPE - TABLE 0130 RDS104
Grubb, H. SPECTROSCOPE - TABLE 0117 UCP001
Grubb, H. SWITCH - SERVO-CONTROL 1446 UCP126
Grubb, H. TELESCOPE - REFLECTING 0140 Ex0140
Grubb, H. TELESCOPE - REFLECTING 0142 Ex0142
Grubb, H. TELESCOPE - REFLECTING 0347 Ex0347
Grubb, H. TELESCOPE - REFLECTING 0147 Ex0147
Grubb, H. TELESCOPE - REFLECTING 0427 Ex0427
Grubb, H. TELESCOPE - REFLECTING 0168 Ex0168
Grubb, H. TELESCOPE - REFLECTING 0164 Ex0164
Grubb, H. TELESCOPE - REFLECTING 0422 Ex0422
Grubb, H. TELESCOPE - REFLECTING & REFRACTING 0139 Ex0139
Grubb, H. TELESCOPE - REFLECTING & REFRACTING 0150 Ex0150
Grubb, H. TELESCOPE - REFLECTING & REFRACTING 0166 Ex0166
Grubb, H. TELESCOPE - REFLECTING & REFRACTING 0232 Ex0232
Grubb, H. TELESCOPE - REFLECTING & REFRACTING 0575 Ex0575

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Grubb, H.	TELESCOPE - REFRACTING	0435	Ex0435
Grubb, H.	TELESCOPE - REFRACTING	0141	Ex0141
Grubb, H.	TELESCOPE - REFRACTING	0183	Ex0183
Grubb, H.	TELESCOPE - REFRACTING	0348	Ex0348
Grubb, H.	TELESCOPE - REFRACTING	0202	Ex0202
Grubb, H.	TELESCOPE - REFRACTING	0433	Ex0433
Grubb, H.	TELESCOPE - REFRACTING	1444	UCP123
Grubb, H.	TELESCOPE - REFRACTING	0351	Ex0351
Grubb, H.	TELESCOPE - REFRACTING	0742	UCP102
Grubb, H.	TELESCOPE - REFRACTING	1464	UCP153
Grubb, H.	TELESCOPE - REFRACTING	0169	Ex0169
Grubb, H.	TELESCOPE - REFRACTING	0456	Ex0456
Grubb, H.	TELESCOPE - REFRACTING	0145	Ex0145
Grubb, H.	TELESCOPE - REFRACTING	0236	Ex0236
Grubb, H.	TELESCOPE - REFRACTING	0180	Ex0180
Grubb, H.	TELESCOPE - REFRACTING	0227	Ex0227
Grubb, H.	TELESCOPE - REFRACTING	0437	Ex0437
Grubb, H.	TELESCOPE - REFRACTING	0181	Ex0181
Grubb, H.	TELESCOPE - REFRACTING	0149	Ex0149
Grubb, H.	TELESCOPE - REFRACTING	0501	Ex0501
Grubb, H.	TELESCOPE - REFRACTING	0438	Ex0438
Grubb, H.	TELESCOPE - REFRACTING	0583	Ex0583
Grubb, H.	TELESCOPE - REFRACTING	0452	Ex0452
Grubb, H.	TELESCOPE - REFRACTING	0445	Ex0445
Grubb, H.	TELESCOPE - REFRACTING	3694	ARM007
Grubb, H.	TELESCOPE - REFRACTING	0071	Ex0071
Grubb, H.	TELESCOPE - REFRACTING	0200	Ex0200
Grubb, H.	TELESCOPE - REFRACTING	0224	Ex0224
Grubb, H.	TELESCOPE - REFRACTING	0231	Ex0231
Grubb, H.	TELESCOPE - REFRACTING	0223	Ex0223
Grubb, H.	TELESCOPE - REFRACTING	0449	Ex0449
Grubb, H.	TELESCOPE - REFRACTING	0189	Ex0189
Grubb, H.	TELESCOPE - REFRACTING	0447	Ex0447
Grubb, H.	TELESCOPE - REFRACTING	0439	Ex0439
Grubb, H.	TELESCOPE - REFRACTING	0151	Ex0151
Grubb, H.	TELESCOPE - REFRACTING	0442	Ex0442
Grubb, H.	TELESCOPE - REFRACTING	0199	Ex0199
Grubb, H.	TELESCOPE - REFRACTING	0430	Ex0430
Grubb, H.	TELESCOPE - REFRACTING	0459	Ex0459
Grubb, H.	TELESCOPE - REFRACTING	0226	Ex0226
Grubb, H.	TELESCOPE - REFRACTING	0157	Ex0157
Grubb, H.	TELESCOPE - REFRACTING	0155	Ex0155
Grubb, H.	TELESCOPE - REFRACTING	0440	Ex0440
Grubb, H.	TELESCOPE - REFRACTING	0153	Ex0153
Grubb, H.	TELESCOPE - REFRACTING	0154	Ex0154
Grubb, H.	TELESCOPE - REFRACTING	0158	Ex0158
Grubb, H.	TELESCOPE - REFRACTING	0156	Ex0156
Grubb, H.	TELESCOPE - REFRACTING	0190	Ex0190
Grubb, H.	TELESCOPE - REFRACTING	0230	Ex0230
Grubb, H.	TELESCOPE - REFRACTING	0469	Ex0469
Grubb, H.	TELESCOPE - REFRACTING	0160	Ex0160
Grubb, H.	TELESCOPE - REFRACTING	0161	Ex0161
Grubb, H.	TELESCOPE - REFRACTING	0162	Ex0162
Grubb, H.	TELESCOPE - REFRACTING	0163	Ex0163
Grubb, H.	TELESCOPE - REFRACTING	0177	Ex0177
Grubb, H.	TELESCOPE - REFRACTING	0467	Ex0467
Grubb, H.	TELESCOPE - REFRACTING	0165	Ex0165
Grubb, H.	TELESCOPE - REFRACTING	0167	Ex0167
Grubb, H.	TELESCOPE - REFRACTING	4139	PRI189
Grubb, H.	TELESCOPE - REFRACTING	0195	Ex0195
Grubb, H.	TELESCOPE - REFRACTING	0235	Ex0235
Grubb, H.	TELESCOPE - REFRACTING	0186	Ex0186
Grubb, H.	TELESCOPE - REFRACTING	0234	Ex0234
Grubb, H.	TELESCOPE - REFRACTING	0233	Ex0233
Grubb, H.	TELESCOPE - REFRACTING	0198	Ex0198
Grubb, H.	TELESCOPE - REFRACTING	0179	Ex0179
Grubb, H.	TELESCOPE - REFRACTING	0173	Ex0173
Grubb, H.	TELESCOPE - REFRACTING	0425	Ex0425
Grubb, H.	TELESCOPE - REFRACTING	0453	Ex0453
Grubb, H.	TELESCOPE - REFRACTING	0228	Ex0228
Grubb, H.	TELESCOPE - REFRACTING	0258	Ex0258
Grubb, H.	TELESCOPE - REFRACTING	0170	Ex0170
Grubb, H.	TELESCOPE - REFRACTING	0182	Ex0182
Grubb, H.	TELESCOPE - REFRACTING	0471	Ex0471
Grubb, H.	TELESCOPE - REFRACTING	0222	Ex0222
Grubb, H.	TELESCOPE - REFRACTING	0470	Ex0470
Grubb, H.	TELESCOPE - REFRACTING	0428	Ex0428
Grubb, H.	TELESCOPE - REFRACTING	0171	Ex0171
Grubb, H.	TELESCOPE - REFRACTING	0172	Ex0172
Grubb, H.	TELESCOPE - REFRACTING	0225	Ex0225
Grubb, H.	TELESCOPE - REFRACTING	0174	Ex0174
Grubb, H.	TELESCOPE - REFRACTING	0178	Ex0178
Grubb, H.	TELESCOPE - REFRACTING	0229	Ex0229
Grubb, H.	TELESCOPE - REFRACTING	0346	Ex0346
Grubb, H.	TELESCOPE - REFRACTING	0187	Ex0187

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 Grubb, H. TELESCOPE - REFRACTING 0454 Ex0454
 Grubb, H. TELESCOPE - REFRACTING 0185 Ex0185
 Grubb, H. TELESCOPE - REFRACTING 0429 Ex0429
 Grubb, H. TELESCOPE - REFRACTING 0431 Ex0431
 Grubb, H. TELESCOPE - REFRACTING 0443 Ex0443
 Grubb, H. TELESCOPE - REFRACTING 0450 Ex0450
 Grubb, H. TELESCOPE - REFRACTING 0444 Ex0444
 Grubb, H. TELESCOPE - REFRACTING 0436 Ex0436
 Grubb, H. TELESCOPE - REFRACTING 0441 Ex0441
 Grubb, H. TELESCOPE - REFRACTING 0582 Ex0582
 Grubb, H. TELESCOPE - REFRACTING 0197 Ex0197
 Grubb, H. TELESCOPE - REFRACTING 0446 Ex0446
 Grubb, H. TELESCOPE - REFRACTING 0176 Ex0176
 Grubb, H. TELESCOPE - REFRACTING 0424 Ex0424
 Grubb, H. TELESCOPE - REFRACTING 0192 Ex0192
 Grubb, H. TELESCOPE - REFRACTING 0432 Ex0432
 Grubb, H. TELESCOPE - REFRACTING 0434 Ex0434
 Grubb, H. TELESCOPE DRIVE 1825 DUN007
 Grubb, T. BALANCE - PRECISION 4305 TDC001
 Grubb, T. EYEPIECE - MICROMETER 0961 BIR025
 Grubb, T. LENS 0584 Ex0584
 Grubb, T. LENS - CONCAVE CONVEX 2378 BIR054
 Grubb, T. LENS SYSTEM 0318 Ex0318
 Grubb, T. LENS SYSTEM 0447 RDS029
 Grubb, T. LENS SYSTEM 1853 PRI026
 Grubb, T. LENS SYSTEM 3680 PRI109
 Grubb, T. MAGNETOMETERS 0310 Ex0310
 Grubb, T. MICROSCOPE - COMPOUND 0058 Ex0058
 Grubb, T. MICROSCOPE - COMPOUND 0472 Ex0472
 Grubb, T. MICROSCOPE - COMPOUND 0508 Ex0508
 Grubb, T. MICROSCOPE - COMPOUND 0561 Ex0561
 Grubb, T. TELESCOPE - REFLECTING 3693 ARM006
 Grubb, T. TELESCOPE - REFLECTING 0137 Ex0137
 Grubb, T. TELESCOPE - REFLECTING 0138 Ex0138
 Grubb, T. TELESCOPE - REFRACTING 0134 Ex0134
 Grubb, T. TELESCOPE - REFRACTING 0135 Ex0135
 Grubb, T. TELESCOPE - REFRACTING 0136 Ex0136
 Grubb, T. TELESCOPE - REFRACTING 2374 NMD078
 Grubb, T. TELESCOPE - REFRACTING 0350 Ex0350
 Grubb, T. TELESCOPE - REFRACTING 1820 DUN002
 Grubb, T. TELESCOPE DRIVE 3964 ARM038
 Grubb, T. THEODOLITE - PLAIN 0634 NMD255
 Grubb & Son SPECTROSCOPE - ASTRONOMICAL 0057 Ex0057
 Grubb & Son SPECTROSCOPE - ASTRONOMICAL 0553 Ex0553
 Grubb, Parsons & Co. TELESCOPE MIRROR 0569 Ex0569
 Gulbransen, P.F. CLOCK - REGULATOR 0515 Ex0515
 H, W. DIAL - ALTITUDE RING 0352 Ex0352
 Habermel, E. ASTROLABE 1397 NMD047
 Hackett, W.A. TELESCOPE - REFRACTING 0354 Ex0354
 Halden, J. & Co. ANEMOMETER - LOWNE 3664 PRI262
 Halden, J. & Co. ANEMOMETER - LOWNE 4427 PRI261
 Halden, J. & Co. CALCULATOR 0211 UGE022
 Hall Brothers THEODOLITE - SIMPLE 2491 SAL040
 Hammond TYPEWRITER 1748 MAY231
 Hammusihmidt GERBER TUBE 0361 RDS098
 Hancock DIAL - ALTITUDE RING 4499 ULS067
 Hancock DIAL - ALTITUDE RING 4498 ULS066
 Hand, Ephraim BALANCE - EQUAL ARM 4354 ULS041
 Handley & Shanks AMMETER 3625 NMC121
 Handley & Shanks AMMETER 3625 NMD174
 Handley & Shanks BATTERY - LECLANCHE 3780 Ex0609
 Hannon, J. DIAL - HORIZONTAL PEDESTAL 2430 NMD080
 Hare, G. PHOTOGRAPHIC CHANGING BOX 2391 BIR067
 Harling DRAWING INSTRUMENTS - SET 4395 PRI254
 Harling DRAWING INSTRUMENTS - SET 4396 PRI255
 Harling, W.H. BAROMETER - ANEROID, PORTABLE 1253 TDP135
 Harling, W.H. DRAWING INSTRUMENTS - SET 0379 RDS020
 Harling, W.H. SCALES - ENGINEERS' 1388 TDE042
 Harling, W.H. SCALES - ENGINEERS' 4495 CIL008
 Harris, P. STAND 2119 BLA107
 Harris, P. & Co. ATWOOD MACHINE 3348 UCP348
 Harris, P. & Co. BOILER - MARCET 3751 NMC152
 Harris, P. & Co. BOILING POINT APPARATUS 2506 UGP212
 Harris, P. & Co. ELECTROSTATIC GENERATOR - WIMSHURST 0940 UDP208
 Harris, P. & Co. EXPANSION APPARATUS - O'TOOLE 1746 MAY229
 Harris, P. & Co. EXPANSION APPARATUS - O'TOOLE 2084 BLA072
 Harris, P. & Co. GALVANOMETER - ASTATIC, NOBILI 0747 UCP107
 Harris, P. & Co. GALVANOMETER - ASTATIC, NOBILI 0748 UCP108
 Harris, P. & Co. GALVANOMETER - TANGENT 2208 NMD125
 Harris, P. & Co. MIRROR - ROTATING CUBIC 3627 NMC123
 Harris, P. & Co. PNEUMATIC SHELF - BEEHIVE 3783 NMC184
 Harris, P. & Co. PNEUMATIC SHELF - BEEHIVE 3783 NMD151
 Harris, P. & Co. POLARIMETER 0231 QBP025

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Harris, P. & Co. POLARIMETER 0370 RDS043
Harris, P. & Co. RESISTANCE BOX 2066 BLA048
Harris, P. & Co. RESISTANCE BOX 2092 BLA080
Harris, P. & Co. RHEOSTAT 0959 UDP218
Harris, P. & Co. SLIDE RULE 2108 BLA096
Harris, P. & Co. SPECIFIC HEAT APPARATUS - REGNAULT 2110 BLA098
Harris, P. & Co. SPECIFIC HEAT APPARATUS - REGNAULT 2495 UGP201
Harris, P. & Co. SPHEROMETER 2091 BLA079
Harris, P. & Co. THERMAL CONDUCTIVITY APPTS - INGENHOUZ 2258 UDP336
Harris, T. & Son DIAL - UNIVERSAL INCLINING 0941 NMD027
Harris, T. & Son MICROSCOPE - COMPOUND, GOULD 0581 NMD304
Harrison BALANCE - ROCKER COIN 4368 ULS055
Harrison DIAL - HORIZONTAL COMPASS 0306 Ex0306
Harrison DIAL - HORIZONTAL COMPASS 0493 Ex0493
Harrison, C. DIAL - HORIZONTAL COMPASS 0494 Ex0494
Harrison, C. DIAL - HORIZONTAL PEDESTAL 0316 Ex0316
Harrison, C. DIAL - HORIZONTAL PEDESTAL 0737 MIS001
Harriss TRADE LABEL 2634 PRI069
Hartley, W. SPECTRUM 2304 PRI178
Hartmann & Braun (Harris) AMMETER 2087 BLA075
Hartmann & Braun AMMETER 3050 UDE076
Hartmann & Braun AMMETER 3067 UDE093
Hartmann & Braun GALVANOMETER 2550 UGP256
Hartmann & Braun VOLTMETER 2086 BLA074
Hartmann & Braun VOLTMETER 3011 UDE037
Hartnack, E. MICROSCOPE - COMPOUND 1011 PRI149
Hartnack, E. MICROSCOPE - COMPOUND, DRUM 4261 RCS011
Harvey & Peak AMMETER 2736 TDP280
Harvey & Peak BELL - GLASS 3209 QBP154
Harvey & Peak BRIDGE - WHEATSTONE 2885 UGP293
Harvey & Peak COIL - INDUCTION 2494 UGP200
Harvey & Peak COIL - INDUCTION, RUHMKORFF 1534 UGP127
Harvey & Peak COMPASS - MARINE 2801 UCP254
Harvey & Peak ELECTROMAGNETIC ROTATION APPARATUS 0908 UDP173
Harvey & Peak ELECTROMETER - QUADRANT, DOLEZALEK 2854 UGP274
Harvey & Peak ELECTROSTATIC GENERATOR - CUTHBERTSON 0699 UDP027
Harvey & Peak ELECTROSTATIC GENERATOR - VOSS 0889 UDP155
Harvey & Peak ELECTROSTATIC GENERATOR - WIMSHURST 0264 QBP059
Harvey & Peak FARADAY WHEEL 0927 UDP192
Harvey & Peak FRESNEL RHOMB 1493 UGP105
Harvey & Peak GALVANOMETER - TANGENT 1317 TDP064
Harvey & Peak GALVANOMETER - TANGENT, GAUGAIN 2067 BLA049
Harvey & Peak LENSES 2937 UGP345
Harvey & Peak LEYDEN JAR BATTERY 0900 UDP166
Harvey & Peak MAGNET & ROTATING WHEEL 3168 QBP113
Harvey & Peak MAXWELL TOP 2326 QBP092
Harvey & Peak MIRROR - CONVEX 2174 UDP260
Harvey & Peak MIRROR - CONVEX 2544 UGP250
Harvey & Peak ORGAN - DEMONSTRATION 2764 UCP217
Harvey & Peak ORGAN PIPE - BLOCK 0798 UDP064
Harvey & Peak ORGAN PIPE - REED 2896 UGP304
Harvey & Peak SAVART DISC 1926 UGP195
Harvey & Peak SIREN - SEEBECK 1927 UGP196
Harvey & Peak (Yeates & Son) SIREN - CAGNIARD 0802 UDP068
Harvey & Peak SOUND TUBE - HOPKIN'S FORK 2196 UDP282
Harvey & Peak SPECIFIC HEAT APPARATUS - REGNAULT 1885 UGP154
Harvey & Peak SPECTROSCOPE - TABLE 0144 UGP007
Harvey & Peak STAND - INSULATING 0897 UDP163
Harvey & Peak STOOL - INSULATED 0903 UDP169
Harvey & Peak THERMAL RADIATION APPARATUS - RICHIE 2496 UGP202
Harvey & Peak THERMOMETER - KINNERSLEY 0026 UCP002
Harvey & Peak THERMOPILE 2330 QBP096
Harvey & Peak TUNING FORK - LISSAJOUS 1916 UGP185
Harvey & Peak VIBRATING ROD FOR LISSAJOUS FIGURES 0806 UDP072
Harvey & Peak VIBRATING ROD APPARATUS 3516 QBP242
Hawksley MANOMETER - FICK SPRING 0021 UCP063
Hayes Brothers SEXTANT 0353 Ex0353
Hayes, F.C. ELECTROSTATIC GENERATOR 2104 BLA092
Heath TELESCOPE - REFRACTING 2344 SAL027
Heath, T. SECTOR 0618 NMD270
Heath, T. THEODOLITE - PLAIN (ALTAZIMUTH) 0733 MAY008
Heath & Co. POSITION FINDER 3279 NMM019
Heath & Co. SEXTANT 1063 MAY039
Heath & Co. SEXTANT 2470 SAL031
Heath & Co. SEXTANT 3525 SAL048
Heinrici, L. ENGINE - HEAT 1175 TDP163
Hempenstall BAROMETER 0894 MIS003
Hennessy CALCULATOR 0355 Ex0355
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Hicks CHEMICAL GLASSWARE 1552 STR011
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Hicks HYDROMETER 2054 BLA043
 Hicks HYDROMETER - BATTERY TESTING 2818 UCP271
 Hicks, J. BAROMETER - FORTIN 2264 UDP342
 Hicks, J. BAROMETER - STICK 0833 UDP099
 Hicks, J. BAROMETER - STICK 4505 MET004
 Hicks, J. (Grubb Patent) CLINOMETER 1358 TDE032
 Hicks, J. CLINOMETER 1614 MAY103
 Hicks, J. CLINOMETER & PRISMATIC COMPASS 3268 NMM008
 Hicks, J. COMPASS - PRISMATIC 1612 MAY101
 Hicks, J. (Grubb Patent) GRAPHOMETER 1360 TDE033
 Hicks, J. (Grubb Patent) GRAPHOMETER 3232 QBE010
 Hicks, J. HYDROMETER 0070 UCP084
 Hicks, J. HYDROMETER 0528 IDG049
 Hicks, J. HYGROMETER - MASON 1960 UCP186
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 Hicks, J. (Grubb Patent) LEVEL - HAND 1359 TDE031
 Hicks, J. RAIN GAUGE - BECKLEY SELF-RECORDING 4515 MET014
 Hicks, J. THERMOGRAPH 0739 UCP099
 Hicks, J. THERMOMETER - MAXIMUM 1959 UCP185
 Hicks, J. THERMOMETER - SOLAR RADIATION 0809 UDP075
 Hicks, J. WIND INDICATOR 1562 STR021
 Hicks, J.J. BAROGRAPH - ANEROID 1978 UCP205
 Hicks, J.J. LEVEL - WATER 0627 NMD261
 Hicks, J.J. THERMOMETER - MINIMUM 0069 UCP098
 Hicks, T. OCTANT 0642 Ex0642
 Highley POLARISCOPE 1436 MAY056
 Hilger, A. GRATING - ECHELON 0724 UCP121
 Hilger, A. GRATING - ECHELON 2127 UDP179
 Hilger, A. LENS - BICONVEX 2181 UDP267
 Hilger, A. PRISM STAND 2151 UDP240
 Hilger, A. SPECTROSCOPE - DIRECT VISION 0133 RDS102
 Hilger, A. SPECTROSCOPE - DIRECT VISION 0773 UDP041
 Hilger, A. SPECTROSCOPE - DIRECT VISION 1951 UCP178
 Hilger, A. SPECTROSCOPE - DIRECT VISION 2812 UCP265
 Hilger, A. SPECTROSCOPE - PHOTOGRAPHIC 0124 QBP038
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 Hilger, A. SPECTROSCOPE - TABLE 0088 UCP039
 Hilger, A. SPECTROSCOPE - TABLE 0777 UDP044
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 Hilger, A. SPECTROSCOPE - TABLE 3198 QBP143
 Hiysns(?) PULLEY FRAME 0041 UGP032
 Hofmann, J.G. SPECTROSCOPE - DIRECT VISION 0097 UCP014
 Hofmann, J.G. SPECTROSCOPE - DIRECT VISION 0345 TDP170
 Hofmann, J.G. SPECTROSCOPE - DIRECT VISION 2321 QBP087
 Holm, P. LOG BOX 1138 NMD046
 Holmes Lights Co. COMPASS - MARINE 3270 NMM010
 Holtzapffel & Co. DRAWING INSTRUMENTS - SET 1231 TDP162
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 Holtzapffel & Co. SCALE 1318 TDP066
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 Hopgood, R.J. DIVIDERS - PROPORTIONAL 0620 NMD268
 Hornby, R. CHRONOMETER - MARINE 0616 NMD272
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 Houghton, S. & Son BALANCE - FOLDING COIN 1141 PRI018
 Houghton, S. & Son BALANCE - FOLDING COIN 2343 SAL026
 Houghton, T. BALANCE - FOLDING COIN 4222 PRI241
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 Hughes OXY-HYDROGEN CAPSTAN VALVE 3316 UCP316
 Hughes, H. & Son SEXTANT 0607 NMD281
 Hughes, H. & Son SEXTANT 4095 UFM012
 Hughes, H. & Son SEXTANT - ANGLE 3866 UDE183
 Hughes, H. & Son SEXTANT - DOUBLE 4493 CIL006
 Hughes, H. & Son TELESCOPE - REFRACTING 2490 SAL039
 Hughes, J. DIAL - HORIZONTAL PEDESTAL 2433 NMD083
 Hughes, J. THEODOLITE - TRANSIT 0763 MAY019
 Hughes, W.C. LAMP - OIL 4228 PRI247
 Hughes, W.C. LANTERN - TRIUNIAL 2375 BIR051
 Hunningscone TELEPHONE 2749 TDP293
 Hunt BAROMETER - BANJO 3303 UCP303
 Hunt BAROMETER - STICK 0018 Ex0018
 Hunt BAROMETER - STICK 2571 PRI206
 Hunt BAROMETER - STICK 4166 SAL083
 Hunt DIAL - HORIZONTAL PEDESTAL 3367 MIS049
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 Hunt, T. BAROMETER - BANJO 0020 Ex0020
 Hunt, T. BAROMETER - MARINE 0019 Ex0019
 Hunt, T. COMPASS - MARINE 0524 Ex0524
 Hunter, E. DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 0263 Ex0263
 Huntley Boorne & Stevens STENCIL PLATES - ENGINEERS 4426 PRI260
 Hutchinson HYDROMETER - TAR TESTER 4479 STL007
 Incanto BURNER - ACETYLENE 0409 RDS106
 India-Rubber Co. BATTERY - LECLANCHÉ 2421 BIR096
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J ASTROLABE QUADRANT 4529 CBL006
Jackson, H. BALANCE - EQUAL ARM Ex0628
Jacob & Halse SECTOR 2602 NMD204
Jamin LENS SYSTEM 1248 TDP061
JB TELESCOPE - REFRACTING 0474 Ex0474
Jewitt, W. & Co. SEXTANT 3275 NMM015
JM DIAL - HORIZONTAL PEDESTAL 2438 NMD088
Jobin, A. COLORIMETER 0496 IDG067
Jobin, A. POLARIMETER & SACCHARIMETER 0499 IDG008
Johnson & Phillips AMMETER 3045 UDE071
Johnson & Phillips AMMETER 3046 UDE072
Johnson & Phillips AMMETER 3049 UDE075
Johnson & Phillips AMMETER 4058 MAY321
Johnson & Phillips LAMP - CARBON ARC, BROCKIE 0012 UCP012
Johnson & Phillips LAMP - CARBON ARC, BROCKIE 0432 RDS081
Johnson & Phillips LAMP - CARBON ARC, BROCKIE 3193 QBP138
Johnson & Phillips VOLTMETER 2999 UDE025
Johnson & Phillips VOLTMETER 3014 UDE040
Johnson & Phillips VOLTMETER 3015 UDE041
Joly, J. CALORIMETER - JOLY STEAM 1203 TDP150
Jones BAROMETER - MARINE 0036 Ex0036
Jones BAROMETER - MARINE 0127 Ex0127
Jones POLEMSCOPE 1676 MAY163
Jones, T. DIVIDERS - PROPORTIONAL 2409 BIR085
Jones, T. EYEPiece - MICROMETER 4003 ARM077
Jones, T. LEVEL - Y 0732 MAY007
Jones, T. MAGNETOMETER - KEW PATTERN 1171 TDP158
Jones, T. (Grubb, T.) MURAL CIRCLE 3690 ARM003
Jones, T. PROTRACTOR - CIRCULAR 0625 NMD263
Jones, T. SEXTANT - BOX 2385 BIR061
Jones, T. TRANSIT INSTRUMENT 3689 ARM002
Jones, W. & S. COMPASS 4138 SAL080
Jones, W. & S. ELECTROMETER - CUTHBERTSON DISCHARGE 0014 UGP020
Jones, W. & S. ELECTROSTATIC GENERATOR - CUTHBERTSON 0032 UGP023
Jones, W. & S. EYE MODEL 1696 MAY183
Jones, W. & S. MICROSCOPE - SOLAR 2058 BLA057
Jones, W. & S. OPTICAL MODEL 0178 UGP058
Jones, W. & S. ORRERY 0646 PRI102
Jones, W. & S. ORRERY 1844 DUN026
Jones, W. & S. PANTOGRAPH 0200 UGE011
Jones, W. & S. PRISM ON STAND 1193 TDP195
Jones, W. & S. SLIDE RULE 0614 NMD274
Jones, W. & S. (Cuthbert, J.) TELESCOPE - REFLECTING 0601 NMD286
Jordan, J. PANMETRON 0261 Ex0261
Jordi, M. & Co. HYDROMETER - SIKES 0711 NMD010
Jordi, M. & Co. HYDROMETER - SIKES 2613 PRI047
Jordi, M. & Co. (Mason & Son) HYDROMETER - SIKES 4289 RCS039
Joslin, G. GLOBE - TERRESTRIAL 4141 SAL082
de la Joue, J. PAINTING 1430 MIS019
Junior Army & Navy Stores BAROGRAPH - ANEROID 3296 PRI080
K, D. DIAL - HORIZONTAL PEDESTAL 2429 NMD079
Kalee LAMP - CARBON ARC 0433 RDS120
Kane, J. DIAL - HORIZONTAL PEDESTAL 4497 ULS065
Kelvin, Bottomley & Baird AMMETER & VOLTMETER 4346 TDC037
Kelvin & White, J. AMMETER & VOLTMETER 2934 UGP342
Kelvin & White, J. MARINE AZIMUTH INSTRUMENT 2485 SAL034
Kelvin & White, J. MARINE AZIMUTH INSTRUMENT 3284 NMM024
Kempson & Kindon CALENDAR - PERPETUAL 1416 NMD065
Kerby, F. SIREN - CAGNIARD 1173 TDP156
Kershaw COIL - DU BOIS REYMOND 2551 TDP210
Kershaw, A. COIL - DU BOIS REYMOND 2555 TDP211
Kershaw, A. & Son GALVANOMETER - DETECTOR 3599 NMC095
Kidd OCTANT 3792 NMC193
King OCTANT 3223 QBE001
King, R. (Fannin & Co) ELECTRICAL MACHINE - CLARKE 2025 BLA014
King, W. DIAL - HORIZONTAL PEDESTAL 1432 DCM001
King, W. OCTANT 0115 Ex0115
King, W. OCTANT 0587 Ex0587
King, W. PROTRACTOR 0485 Ex0485
King, W. PROTRACTOR 0706 NMD005
King, Mendham & Co. CONDENSER 2271 UDP349
King, Mendham & Co. ELECTRO DYNAMOMETER 0081 UCP067
King, Mendham & Co. GALVANOMETER 1467 UCP156
Kinora KINORA 0788 PRI016
Kipp GALVANOMETER - AYRTON MATHER 0390 RDS094
Kipp LAMP - GALVANOMETER 0395 RDS095
Kipp & Zonen RECTIFIER(?) 2217 UDP295
Kirkwood GLOBES - CELESTIAL & TERRESTRIAL 0003 Ex0003
Klein OPTICAL ELEMENTS 2651 RDS148
Knapp, J. DIAL - EQUATORIAL 3686 NMD132
Knight CAMERA - STEREO 2347 BIR033
Knight GALVANOMETER - ASTATIC, NOBILI 0037 UCP047
Knight GALVANOMETER - ASTATIC, NOBILI 0084 UCP046

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Knight TELEGRAPH - ALPHABETICAL 0030 UCP005
Knight, A.W. COIL WINDING APPARATUS 1685 MAY172
Knight, G. & Co. ELECTROMETER - TORSION, COULOMB 0299 CWC027
Knight, R. & G. THERMOMETER - GLASS MERCURY 0981 BIR022
Knoblich, T. CHRONOGRAPH 3707 ARM020
Knott & Co. MICROSCOPE - COMPOUND 1125 PRI013
Koenig, R. KALEIDOPHONE - WHEATSTONE 0803 UDP069
Koenig, R. MANOMETRIC FLAME APPARATUS 2159 UDP248
Koenig, R. MANOMETRIC FLAME APPARATUS - ANALYSER 0684 UDP012
Koenig, R. MANOMETRIC FLAME APPARATUS - ANALYSER 2309 QBP075
Koenig, R. MANOMETRIC FLAME APPARATUS - BURNER 3454 QBP180
Koenig, R. MANOMETRIC FLAME APPARATUS - CAPSULE 0686 UDP014
Koenig, R. MANOMETRIC FLAME APPARATUS - CAPSULE 2179 UDP265
Koenig, R. MANOMETRIC FLAME APPARATUS - TROMBONE 0678 UDP006
Koenig, R. MANOMETRIC FLAME APPARATUS - TROMBONE 1646 MAY133
Koenig, R. ORGAN PIPE - BLOCK 2008 CWC073
Koenig, R. ORGAN PIPE - BLOCK 3901 QBP262
Koenig, R. ORGAN PIPE - REED 3905 QBP266
Koenig, R. ORGAN PIPE WITH MANOMETRIC CAPSULE 3904 QBP265
Koenig, R. ORGAN PIPE WITH MANOMETRIC CAPSULES 2009 CWC065
Koenig, R. ORGAN PIPE WITH MANOMETRIC CAPSULES 3903 QBP264
Koenig, R. ORGAN PIPE MOUTHPIECE 3902 QBP263
Koenig, R. RESONATOR - HELMHOLTZ 0266 QBP061
Koenig, R. RESONATOR - HELMHOLTZ 1739 MAY222
Koenig, R. RESONATOR - HELMHOLTZ 2769 UCP222
Koenig, R. RESONATOR - UNIVERSAL 1160 TDP153
Koenig, R. RESONATOR SOUNDING BOX 1265 TDP083
Koenig, R. SIREN - CAGNIARD 3218 QBP163
Koenig, R. SIREN - HELMHOLTZ DOUBLE 0265 QBP060
Koenig, R. SIREN - HELMHOLTZ DOUBLE 0683 UDP011
Koenig, R. SOUND PIPE 3894 QBP255
Koenig, R. SOUND CONE 3897 QBP258
Koenig, R. TUNING FORK 0682 UDP010
Koenig, R. TUNING FORK ON RESONANCE BOX 0685 UDP013
Koenig, R. TUNING FORK ON RESONANCE BOX 1264 TDP078
Koenig, R. TUNING FORK ON RESONANCE BOX 2006 CWC049
Koenig, R. TUNING FORK ON RESONANCE BOX 2226 UDP304
Koenig, R. TUNING FORK ON RESONANCE BOX 3210 QBP155
Koenig/Yeates TUNING FORK ON RESONANCE BOX 3580 NMC076
Koenig/Yeates TUNING FORK ON RESONANCE BOX 3581 NMC077
Koenig, R. WHISTLE 3896 QBP257
Koenig, R. WHISTLE - LOCOMOTIVE 3893 QBP254
Koenig, R. WIND CHEST 3214 QBP159
Kohl, M. ADJUSTABLE GAP WITH ELECTRIC CONTACTS 2849 UGP269
Kohl, M. BENDING ELASTICITY APPARATUS 2955 UGP363
Kohl, M. DIP CIRCLE 1901 UGP170
Kohl, M. DISCHARGE TUBE 0874 UDP140
Kohl, M. DISCHARGE TUBE - OSCILLOSCOPE 0876 UDP142
Kohl, M. EARTH INDUCTOR 2951 UGP359
Kohl, M. ELECTROMAGNET 2525 UGP231
Kohl, M. ELECTROMETER - QUADRANT, DOLEZALEK 2853 UGP273
Kohl, M. ELECTROMETER - TORSION, COULOMB 2865 UGP285
Kohl, M. ELIHU THOMSON APPARATUS 2520 UGP226
Kohl, M. LEYDEN JAR 4132 MAY336
Kohl, M. MAGNETIC NEEDLE 1891 UGP160
Kohl, M. MICROSCOPE - TRAVELLING 3727 UGP378
Kohl, M. ORGAN - DEMONSTRATION 3186 QBP131
Kohl, M. SIREN - CAGNIARD 0187 UGP067
Kohl, M. SPARK GAP 2254 UDP332
Kohl, M. SPECTROSCOPE - TABLE 0143 UGP006
Köhler, F. RESISTANCE BOX 2713 TDP257
KPM MERCURY TROUGH 3781 NMC182
Kulhman, W.H.F. (Mason, T.) BALANCE - PRECISION 4329 TDC025
Lacy, P. DIAL - HORIZONTAL PEDESTAL 4012 SAL069
Ladd, W. DISCHARGE TUBE 0295 CWC059
Ladd, W. DISCHARGE TUBE 0296 CWC060
Ladd, W. LAMP - CARBON ARC 1711 MAY198
Ladd, W. LENS ON STAND 0978 BIR019
Ladd, W. MERCURY DIFFUSING CUP 0184 UGP064
Ladd, W. MICROSCOPE - COMPOUND 3687 MIS055
Ladd, W. OPTICAL STAND 1241 TDP038
Ladd, W. PUMP - LIFT 2029 BLA018
Ladd, W. SPECTROSCOPE - DIRECT VISION 1020 PRI158
Ladd, W. VIBRATING ROD 0805 UDP071
Ladd, W. & Co. CRYSTAL - ICELAND SPAR 0853 UDP119
Ladd, W. & Co. ROCKING BAR - TREVELYAN 3453 QBP179
Ladd, W. & Co. TUNING FORK ON RESONANCE BOX 3717 UGP369
Ladd & Oertling BALANCE - PRECISION 0492 RDS046
Lambert, M., or Hughes, H. & Son POSITION FINDER 0570 IDG002
Lambert, M. POSITION FINDER 0360 Ex0360
Lambrecht, W. HYGROMETER - MASON, VENTILATED 3723 UGP375
Lancaster LAMP - OIL 4229 PRI248
Lancaster, J. CAMERA - FOLDING 2728 TDP272
Lane GLOBES - CELESTIAL & TERRESTRIAL 2365 NMD070
Lawson, W. LAMP - LIME LIGHT 0066 UCP065

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Lee BAROMETER - STICK 3946 SAL063
Lee TELESCOPE - REFRACTING 0363 Ex0363
Lee & Son BAROMETER - ANEROID, PORTABLE 0619 Ex0619
Lee & Son PROTRACTOR - CIRCULAR 3245 QBE022
Lee & Son SEXTANT - BOX 0315 Ex0315
Lee & Son TRADE LABEL 0365 Ex0365
Lee & Sons TELESCOPE - REFRACTING 0364 Ex0364
Leighton, S. & Son BAROGRAPH - ANEROID, SHORT & MASON 4389 SAL089
Leitz MICROSCOPE - COMPOUND 0317 CWC016
Leitz, E. CAMERA - PHOTOMICROGRAPHIC 0422 RDS064
Leitz, E. (Baker, C.) CAMERA - PHOTOMICROGRAPHIC 3346 UCP346
Leitz, E. COLORIMETER 4475 STL003
Leitz, E. INCUBATOR 4297 RCS047
Leitz, E. LAMP - CARBON ARC 2528 UGP234
Leitz, E. (Baker, C.) MICROSCOPE - COMPOUND 3852 UCP368
Leitz, E. (Becker, F.E.) MICROSCOPE - COMPOUND 4405 NBG007
Leitz, E. (Becker, F.E.) MICROSCOPE - COMPOUND 4406 NBG008
Leitz, E. (Becker, F.E.) MICROSCOPE - COMPOUND 4403 NBG006
Leitz, E. (Becker, F.E.) MICROSCOPE - COMPOUND 4408 NBG009
Leitz, E. (Becker, F.E.) MICROSCOPE - COMPOUND 4409 NBG010
Leitz, E. (Robinson, J. & Sons) MICROSCOPE - COMPOUND 4412 NBG013
Leitz, E. MICROSCOPE - COMPOUND 0449 RDS024
Leitz, E. MICROSCOPE - COMPOUND 0592 NMD294
Leitz, E. MICROSCOPE - COMPOUND 3846 SAL054
Leitz, E. MICROSCOPE - COMPOUND 4267 RCS017
Leitz, E. MICROSCOPE - COMPOUND 4282 RCS032
Leitz, E. MICROSCOPE - COMPOUND 4283 RCS033
Leitz, E. MICROSCOPE - COMPOUND 4266 RCS016
Leitz, E. MICROSCOPE - COMPOUND 4270 RCS020
Leitz, E. MICROSCOPE - COMPOUND 4271 RCS021
Leitz, F. MICROSCOPE - COMPOUND 4411 NBG012
Leitz, E. MICROSCOPE - COMPOUND 4410 NBG011
Leitz, E. MICROSCOPE - DISSECTING 4400 NBG003
Leitz, E. MICROSCOPE - DISSECTING 4401 NBG004
Leitz, E. MICROSCOPE - SIMPLE 1648 MAY135
Lerebours GONIOMETER - CRYSTAL 0362 RDS082
Lerebours & Secretan LENS - PLANO CONVEX 2387 BIR063
Lerebours & Secretan LENS - PLANO CONVEX 4075 BIR166
Lerebours & Secretan POLARISCOPE - SOLEIL 0092 UCP032
Lerebours & Secretan PRISM - ADJUSTABLE 0075 UCP004
Lerebours & Secretan PRISM - CONICAL 0096 UCP015
Lerebours & Secretan PRISM ON STAND 1488 UGP112
Lerebours & Secretan PRISM ON STAND 1945 UCP172
Lerebours & Secretan SPECTROSCOPE - PROJECTION 0148 UGP011
Levett, E. SEXTANT 3264 NMM004
Lewis, A.E. BAROGRAPH - ANEROID, SHORT & MASON 2488 SAL037
Lewis, J. CIRCUMFERENTOR 0727 MAY002
Lewis, J. CIRCUMFERENTOR 0112 Ex0112
Lewis, J. DIAL - HORIZONTAL PEDESTAL 0113 Ex0113
Lewis, J. DIAL - HORIZONTAL PEDESTAL 0502 Ex0502
Lewis, J. DIAL - HORIZONTAL PEDESTAL 4035 PRI136
Lewis, J. DIAL - HORIZONTAL COMPASS 0111 Ex0111
Lewis, W. MAGNET 0060 Ex0060
Leybold, E. ORGAN PIPE WITH MANOMETRIC CAPSULES 0796 UDP062
Leybold, E. PULSE GLASS(?) 2248 UDP326
Leybold, E. THERMO-ELECTROMAGNET 0831 UDP097
Leybold, E. THERMO-ELECTROMAGNET 1882 UGP151
Liesegang, E. LENS SYSTEM 2376 BIR052
Lilley, J. & Gillie MARINE AZIMUTH INSTRUMENT 3737 PRI112
Lilly, W.E. SLIDE RULE - SPIRAL 1386 TDE061
Lilly, W.E. (Dixon & Hempenstall) SLIDE RULE - SPIRAL 4414 PRI256
Linderman, Hk. BALANCE - EQUAL ARM 4358 ULS045
Lingke, A. & Co. THEODOLITE - TRANSIT 3868 UDE185
Lister, H.A. & Co. CENTRIFUGE - GERBER 0136 RDS079
Litherland Davies & Co. CHRONOMETER - MARINE 4502 MET001
Littlewood & Co. BAROMETER - FITZROY 1863 MIS030
Litton BATTERY - LECLANCHÉ 1251 TDP131
Lizars BAROMETER - STICK 0361 Ex0361
Lizars, J. LANTERN - UNIAL 0252 QBP048
Lizars, J. TELESCOPE - REFRACTING 0362 Ex0362
Loftus HYDROMETER - SIKES 1962 UCP188
Loftus HYDROMETER - SIKES 3927 ULS024
London Stereoscope Co. KALEIDOSCOPE 1693 MAY180
Long, J. BAROMETER - STICK 3855 MIS061
Long, J. CALLIPER - CROSS 0573 IDG074
Long, J. HYDROMETER 0529 IDG040
Long, J. HYDROMETER - SIKES 0536 IDG013
Long, J. HYDROMETER - SIKES 4109 UFM024
Long, J. ROD - GAUGING 4394 PRI253
Long, J. SACCHAROMETER 0550 IDG037
Long, J. SLIDE RULE - BREWER'S 4463 PRI275
Long, J. SLIDE RULE - BREWER'S 4464 PRI276
Long, J. THERMOMETER - GLASS MERCURY 0521 IDG061
Long, J. THERMOMETER - GLASS MERCURY 0522 IDG059
Long, J. THERMOMETER - MAXIMUM & MINIMUM 0520 IDG062

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Lort, J. BALANCE - ROCKER COIN 0461 Ex0461
 Lort, J. CALENDAR - PERPETUAL 0624 Ex0624
 Lovibond COLORIMETER 0502 IDG072
 Lovibond, J.W. COLORIMETER 0500 IDG035
 Lovibond, J.W. COLORIMETER 0501 IDG071
 Lucas MICROSCOPE - TRAVELLING 4051 MAY314
 Lucas PHONIC WHEEL 1749 MAY232
 Lucas PHONIC WHEEL 2768 UCP221
 Lutz, E. MICROSCOPE - SIMPLE 4226 PRI244
 Lutz, E. SPECTROSCOPE - DIRECT VISION 1018 PRI156
 Lynch BAROMETER - STICK 2604 PRI037
 Lynch CIRCUMFERENTOR 0216 Ex0216
 Lynch CIRCUMFERENTOR 0272 Ex0272
 Lynch CIRCUMFERENTOR 0274 Ex0274
 Lynch COMPASS - SURVEYING 4162 NMD135
 Lynch DIAL - HORIZONTAL COMPASS 0367 Ex0367
 Lynch DIAL - HORIZONTAL PEDESTAL 0311 Ex0311
 Lynch DIAL - HORIZONTAL PEDESTAL 0566 Ex0566
 Lynch DIAL - HORIZONTAL PEDESTAL 1120 NBD001
 Lynch DIAL - HORIZONTAL PEDESTAL 1543 STR002
 Lynch DIAL - HORIZONTAL PEDESTAL 2457 NMD104
 Lynch DIAL - HORIZONTAL PEDESTAL 2625 PRI059
 Lynch DIAL - UNIVERSAL INCLINING(?) 510 Ex510
 Lynch DIAL - UNIVERSAL INCLINING 2836 NMD106
 Lynch MICROSCOPE - COMPOUND 0090 Ex0090
 Lynch MICROSCOPE - COMPOUND, CULPEPER 0312 Ex0312
 Lynch MICROSCOPE - COMPOUND, CULPEPER 0368 Ex0368
 Lynch, J. CANNON SCRIBE OR GUNNER'S PERPENDICULAR 0465 Ex0465
 Lynch, J. CIRCUMFERENTOR 0273 Ex273
 Lynch DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 0554 Ex0554
 Lynch, J. DIAL - HORIZONTAL PEDESTAL 4485 PRI133
 Lynch, J. THEODOLITE 0288 Ex0288
 Lynch, J. TRADE LABEL Ex0466
 Lynch, J. & Son AIR PUMP - DOUBLE BARREL 0475 RDS003
 Lynch, J. & Son MICROSCOPE - COMPOUND, CULPEPER 0580 NMD312
 Lynch, J. & Son TRADE LABEL 2591 NMD313
 Lynch & Co. INHALER 1567 MIS023
 Lynch & Co. INHALER 2620 SAL001
 Lynch & Co. INHALER 2973 NEW003
 Lynch & Co. TELESCOPE - REFRACTING 0146 Ex0146
 Lynch & Son ARMILLARY SPHERE 0647 NMD243
 Lynch & Son CLINOMETER 0061 Ex0061
 Lynch & Son DIAL - HORIZONTAL PEDESTAL 0205 Ex0205
 Lynch & Son DIAL - HORIZONTAL PEDESTAL 0286 Ex0286
 Lynch & Son DIAL - HORIZONTAL PEDESTAL 2624 PRI058
 Lynch & Son DIAL - UNIVERSAL EQUINOCTIAL RING 0287 Ex0287
 Lynch & Son GLOBE - TERRESTRIAL 0204 Ex0204
 Lyons, M. DIAL - HORIZONTAL MOON 4190 DCM002
 McCann, C. DIAL - HORIZONTAL PEDESTAL 3740 PRI115
 McClean SPECTROSCOPE - DIRECT VISION, McCLEAN 2324 QBP090
 McClintock, F. ELECTRIC MOTOR 1652 MAY139
 McClintock, F. ELECTRIC MOTOR 1654 MAY141
 McClintock, R.L. DIAL 3671 PRI099
 McClintock, R.L. DIAL - PEDESTAL 3879 PRI122
 McClintock, R.L. DIAL - PEDESTAL 3881 PRI124
 McClintock, R.L. DIAL - PEDESTAL 3882 PRI125
 McClintock, R.L. DIAL - VERTICAL 3880 PRI123
 McClintock, R.L. EQUATION OF TIME 3878 PRI121
 McDonagh, J. BAROMETER - STICK 4025 NMD133
 McEvoy, G. BACKSTAFF 0062 Ex0062
 McEvoy, G. BACKSTAFF 0063 Ex0063
 McEvoy, G. BACKSTAFF 0119 Ex0119
 McHugh, T. DIAL - HORIZONTAL PEDESTAL 2462 NMD098
 McIntosh (Knight & Lowenburg) COIL - INDUCTION, MEDICAL 4294 RCS044
 MacKeague, P. DIAL - VERTICAL 3155 PRI079
 M'Kinnell & Buchanan STEAM ENGINE INDICATOR 0567 IDG009
 McMaster & Son CHRONOMETER - MARINE 1313 TDP199
 McMurray, J. DIAL - VERTICAL 3295 MIS048
 McNally, R. GLOBE - TERRESTRIAL 4390 SAL090
 McNeill, H. & Co. LEVEL - SPIRIT 3522 SAL045
 M, W. DIAL - HORIZONTAL PEDESTAL 2396 BIR072
 Mackey, P. (Sharp) CLOCK/BAROMETER/THERMOMETER 4430 RCS053
 Macroby, R.J.T. SAVART DISC 0267 QBP062
 Maelzel METRONOME 3806 NMC207
 Maelzel METRONOME 3840 BIR149
 Magauran, J. DIAL - HORIZONTAL PEDESTAL 2437 NMD087
 Maiben & Co SPHEROMETER 4431 MAY351
 Maiben, J.M. & Co. (Becker, H.L.) BALANCE - PRECISION 2653 RDS150
 Maiben, J.M. & Co. BAROMETER - FORTIN 4473 STL001
 Maiben, J.M. & Co. EXPANSION APPARATUS - BAR BREAKER 1815 MAY298
 Maiben, J.M. & Co. GALVANOMETER - TANGENT 2027 BLA016
 Maiben, J.M. & Co. GALVANOMETER SCALE 0306 CWC029
 Maiben, J.M. & Co. GALVANOMETER SCALE 3002 UDE028
 Maiben, J.M. & Co. HOUSING 2002 CWC019
 Maiben, J.M. & Co. LAMP - GALVANOMETER 3000 UDE026

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Maiben, J.M. & Co. RESISTANCE BOX 2003 CWC042
Maire, P. le SECTOR 1404 NMD054
Malacrida BAROMETER - BANJO 2492 SAL041
Malacrida, C. & Co. BAROMETER - BANJO 0021 Ex0021
Malacrida & Co. BAROMETER - BANJO 0133 Ex0133
Malby, T. & Son GLOBE - TERRESTRIAL 1529 UGP116
Malby & Son GLOBE - CELESTIAL 0062 UCP083
Malcom, I.W.G. DIAL - HORIZONTAL PEDESTAL 3939 ULS036
Malcolm, J. BAROGRAPH - ANEROID 0381 Ex0381
Manchester Oxygen Co. GAS PRESSURE REGULATOR 2557 BIR105
Mann, J. MICROSCOPE - SCREW BARREL 1135 NMD043
Marconi Co. CONDENSER - VARIABLE 2730 TDP274
Marconi Co. CONDENSER - VARIABLE 3038 UDE064
Marconi Co. WIRELESS EQUIPMENT 1596 MAY085
Margas DIAL - HORIZONTAL PEDESTAL 0096 Ex0096
Margas MICROSCOPE - SOLAR 0095 Ex0095
Margas, J. BAROMETER - STICK 1542 STR001
Margas, J. COMPASS 0382 Ex0382
Margas, J. COMPASS 0623 Ex0623
Margas, J. DIAL - HORIZONTAL PEDESTAL 2623 PRI057
Marnoni, A. PHILOSOPHICAL BUBBLES 0994 PRI145
Marnony, A. PHILOSOPHICAL BUBBLES 4221 PRI240
Marquois SCALE - MARQUOIS 1385 TDE068
Marshall LEVEL - SPIRIT 4140 SAL081
Martin, D. DIAL - HORIZONTAL PEDESTAL 2436 PRI182
Martin, T. DIAL - HORIZONTAL PEDESTAL 3650 MIS053
Mason APOGRAPH 0047 Ex0047
Mason BAROMETER - ANEROID 3313 UCP313
Mason BAROMETER - FITZROY 0118 Ex0118
Mason BAROMETER - FITZROY 0720 NMD017
Mason BAROMETER - STICK 0507 Ex0507
Mason BAROMETER - STICK 0721 NMD018
Mason BAROMETER - STICK 0722 NMD019
Mason BAROMETER - STICK 2575 PRI210
Mason BAROMETER - STICK 4448 SAL086
Mason CAMERA LUCIDA 1413 NMD062
Mason CIRCUMFERENTOR 0714 NMD013
Mason CIRCUMFERENTOR 0275 Ex0275
Mason CIRCUMFERENTOR 0276 Ex0276
Mason CIRCUMFERENTOR 0277 Ex0277
Mason COMPASS - MARINE 1037 MAY011
Mason DIAL - HORIZONTAL COMPASS 0374 Ex0374
Mason DIAL - HORIZONTAL COMPASS 0376 Ex0376
Mason DIAL - HORIZONTAL COMPASS 0377 Ex0377
Mason DIAL - HORIZONTAL PEDESTAL 0710 NMD009
Mason DIAL - HORIZONTAL PEDESTAL 1126 PRI014
Mason DIAL - HORIZONTAL PEDESTAL 3401 PRI086
Mason DIP NEEDLE 0521 Ex0521
Mason HYDROMETER - TWADDELL 1635 MAY122
Mason LEVEL - TELESCOPIC 2474 PRI195
Mason LORRAIN GLASS 3682 NMD130
Mason PROTRACTOR - CIRCULAR 4031 PRI129
Mason PROTRACTOR - RECTANGULAR 3654 PRI091
Mason (Palmer) SWITCH 2532 UGP238
Mason THEODOLITE - PLAIN 0373 Ex0373
Mason THERMOPILE 2804 UCP257
Mason, J. BAROMETER - STICK 0463 Ex0463
Mason, J.[?] DIAL - HORIZONTAL PEDESTAL 3674 PRI103
Mason, J. OCTANT 0290 Ex0290
Mason, J. & J. DIVIDERS - PROPORTIONAL 0313 Ex0313
Mason, S. BAROMETER - BANJO 633 Ex0633
Mason, S. BAROMETER - MARINE 0561 IDG001
Mason, S. CIRCUMFERENTOR 0064 Ex0064
Mason, S. CIRCUMFERENTOR 0638 Ex0638
Mason, S. CIRCUMFERENTOR 0729 MAY004
Mason, S. THEODOLITE - PLAIN 0378 Ex0378
Mason, S. THEODOLITE - PLAIN 3665 NMD129
Mason, S. & T. BAROMETER - STICK 0022 Ex0022
Mason, T. ALTIMETER 0372 Ex0372
Mason, T. BAROGRAPH - ANEROID 0369 Ex369
Mason, T. BAROMETER - FITZROY 3670 PRI098
Mason, T. DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 0661 NMD229
Mason, T. GALVANOMETER - D'ARSONVAL POINTER 2714 TDP258
Mason, T. (Cary) GLOBES - CELESTIAL & TERRESTRIAL 0477 Ex0477
Mason, T. HYDROMETER 1637 MAY124
Mason, T. HYDROMETER - SIKES 2629 PRI064
Mason, T. HYDROMETER - SIKES 4478 STL006
Mason, T. (Beck) LANTERN - UNIAL 0438 RDS067
Mason, T. LEVEL - TELESCOPIC 1366 TDE040
Mason, T. LEVEL - TELESCOPIC 0065 Ex0065
Mason, T. MANOMETER 2191 UDP277
Mason, T. MICROSCOPE - COMPOUND, CULPEPER 0366 Ex0366
Mason, T. PLANIMETER 0109 Ex0109
Mason, T. TELESCOPE - REFRACTING 0370 Ex0370
Mason, T. TELESCOPE - REFRACTING 0371 Ex0371

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Mason, T. TELESCOPE - REFRACTING 0491 Ex0491
Mason, T. THERMOMETER - MAXIMUM & MINIMUM 1606 MAY095
Mason, T. TRADE LABEL 1979 UCP206
Mason, T. TRADE LABEL 2156 UDP245
Mason, T.H. (J. Long?) THERMOMETER - GLASS MERCURY 0537 IDG051
Mason, T.H. THERMOMETER - GLASS MERCURY 0811 UDP077
Mason, T.H. & Sons THERMOMETER - GLASS MERCURY 0523 IDG030
Mason, T. & J. CIRCUMFERENTOR 1091 TDE012
Mason, T. & J. CIRCUMFERENTOR 0066 Ex0066
Mason & Co. BAROMETER - STICK 0357 MIS005
Mason & Co. LEVEL - TELESCOPIC 0278 Ex0278
Mason & Co. MICROSCOPE - COMPOUND 0375 Ex0375
Mason & Son HYGROMETER - MASON 1179 TDP140
Mason & Son OPTICAL STAND 1333 TDP019
Maude & Keys MICROSCOPE - COMPOUND 0556 Ex0556
Maw, S., Son & Thompson INHALER 0559 IDG069
Maxwell, C. THERMODYNAMIC SURFACE - MODEL 0215 QBP011
Meagher CAMERA - BELLOWS 2727 TDP271
Earl of Meath CLOCK - WATER DRIVEN "FREE" PENDULUM 4449 PRI237
Megarey, A. CIRCUMFERENTOR 2372 NMD077
Melling & Co. DIAL - UNIVERSAL INCLINING 0662 NMD228
Melloni THERMOPILE 1449 UCP129
Melville, R. DIAL - HORIZONTAL PEDESTAL 2337 SAL020
Melville, R. DIAL - HORIZONTAL PEDESTAL 3877 PRI120
Melville, R. DIAL - HORIZONTAL PEDESTAL 4034 PRI134
Melvin, R. DIAL - HORIZONTAL PEDESTAL 0002 Ex0002
Melvin, R. DIAL - HORIZONTAL PEDESTAL 4439 ULS060
Merne, J.G. KEY 4174 NMC244
Merne, J.G. KEY 4174 PRI232
Merne, J.G. WOULFE BOTTLE 4173 NMC243
Merne, J.G. WOULFE BOTTLE 4173 PRI231
Merton GRATING - DIFFRACTION 3486 QBP212
Merz SPECTROSCOPE 1485 UGP098
Middlemiss, W. CAMERA - BELLOWS 2725 TDP269
Middlemiss, W. PRINTING FRAME 0456 RDS057
Milesio, D. BAROMETER - BANJO 0023 Ex0023
Milesio, D. BAROMETER - BANJO 0307 Ex0307
Milessio, D. BAROMETER - BANJO 0024 Ex0024
Milessio, D. BAROMETER - BANJO 0716 NMD015
Milessio, D. BAROMETER - STICK 0025 Ex0025
Miller, L. COIL - INDUCTION 1535 UGP128
Miller & Woods BELL - ELECTRIC 2533 UGP239
Miller & Woods OSCILLATOR - HERTZ(?) 0048 UGP018
Molteno Ainé GRAPHOMETER 2012 BLA001
Möller, I.D. MICROSCOPE SLIDES 4468 PRI280
Monroe, R.W. ANEMOMETER - ROBINSON 3695 ARM008
Moore SECTOR 3844 SAL052
Moore, F. OCTANT 1062 MAY038
Moore, F.M. ANEMOMETER - LOWNE 0479 Ex0479
Moore, F.M. BAROMETER - ANEROID 1861 MIS028
Moore, F.M. BAROMETER - STICK 3945 SAL062
Moore, F.M. LEVEL - TELESCOPIC 3234 QBE012
Moore, F.M. MARINE AZIMUTH INSTRUMENT 4489 CIL002
Moore, F.M. OCTANT 0635 Ex0635
Moore, F.M. SCALE 1108 TDE018
Moore, F.M. SEXTANT 0317 Ex0317
Moore, F.M. SEXTANT 0380 Ex0380
Moore, F.M. SEXTANT 3282 NMM022
Moore, F.M. (D. Adams) TELESCOPE - REFRACTING 0489 Ex0489
Moore, F.M. (Dollond) TELESCOPE - REFRACTING 0379 Ex0379
Moore, F.M. TRADE LABEL 1314 TDP154
Moore, F.M. TRADE LABEL 3277 NMM017
Moschino, G. SPYGLASS 4246 NMD194
Muirhead STANDARD CELL - ZINC/MERCURY 3017 UDE043
Muirhead STANDARD CELL - ZINC/MERCURY 3718 UGP370
Muirhead & Co. STANDARD CELL - ZINC/MERCURY 0911 UDP176
Müller X-RAY TUBE 3889 QBP250
Müller, L.T. DIAL - UNIVERSAL EQUINOCTIAL 2366 NMD071
Müller, L.T. DIAL - UNIVERSAL EQUINOCTIAL 4137 SAL079
Müller-Uri, R. DISCHARGE TUBE 2287 QBC024
Muller-Uri DISCHARGE TUBE - CROOKES 3512 QBP238
Munro, R.W. ANEMOMETER - DINES' RECORDING 1566 MIS022
Munro, R. & W. BAROGRAPH - PHOTOGRAPHIC, TABULATING INSTRUMENT 4510 MET009
Munster Iron Co. STANDARD VOLUMES - IMPERIAL 3541 Ex0595
Munster Iron Co. STANDARD VOLUMES - IMPERIAL 3541 NMC037
Munster Iron Co. STANDARD VOLUME - PINT 3848 SAL056
Murphy J.J. & Co. CHEMICAL FLASKS - CONTAINERS FOR CHEMICALS 4181 NMC251
Murphy J.J. & Co. CHEMICAL FLASKS - CONTAINERS FOR CHEMICALS 4181 PRI233
Murphy, P. ELECTRIC MOTOR 1653 MAY140
Murray, McVinnie & Co. COMPASS - MARINE 3281 NMM021
Nachet MICROSCOPE - COMPOUND 1649 MAY136
Nachet MICROSCOPE - COMPOUND 4040 UGG002
Nalder Brothers GALVANOMETER SCALE 1523 UGP109
Nalder Brothers & Co. AMMETER 2876 UCP292
Nalder Brothers & Co. AMMETER 3042 UDE068

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Nalder Brothers & Co. BRIDGE - WHEATSTONE 3059 UDE085
 Nalder Brothers & Co. BRIDGE - WHEATSTONE 3725 UGP377
 Nalder Brothers & Co. CONDENSER - STANDARD 2935 UGP343
 Nalder Brothers & Co. GALVANOMETER - ASTATIC MIRROR 2857 UGP277
 Nalder Brothers & Co. GALVANOMETER - ASTATIC MIRROR 3096 UDE122
 Nalder Brothers & Co. GALVANOMETER - ASTATIC MIRROR 3119 UDE144
 Nalder Brothers & Co. GALVANOMETER - D'ARSONVAL 1233 TDP031
 Nalder Brothers & Co. GALVANOMETER - D'ARSONVAL 1983 MAY304
 Nalder Brothers & Co. GALVANOMETER - D'ARSONVAL 2157 UDP246
 Nalder Brothers & Co. GALVANOMETER - D'ARSONVAL 2553 UGP258
 Nalder Brothers & Co. GALVANOMETER - D'ARSONVAL 3029 UDE055
 Nalder Brothers & Co. GALVANOMETER - TANGENT, GAUGAIN 1752 MAY235
 Nalder Brothers & Co. GALVANOMETER LAMP HOUSING & SCALE 3763 NMC164
 Nalder Brothers & Co. INDUCTANCE - VARIABLE 3104 UDE130
 Nalder Brothers & Co. RESISTANCE - STANDARD 3056 UDE082
 Nalder Brothers & Co. RESISTANCE - STANDARD 3073 UDE099
 Nalder Brothers & Co. RESISTANCE - STANDARD 3074 UDE100
 Nalder Brothers & Co. SECOHMMETER 2680 TDP224
 Nalder Brothers & Co. SECOHMMETER 3146 UDE171
 Nalder Brothers & Co. SELF-INDUCTION STANDARD 2958 UGP366
 Nalder Brothers & Co. SHUNT - UNIVERSAL 3327 UCP327
 Nalder Brothers & Thompson AMMETER & VOLTMETER 0509 IDG066
 Nalder Brothers & Thompson VOLTMETER 2563 UGP263
 Naylor LAMP - MINER SAFETY 1558 STR017
 Neeves ELECTROMETER - HENLEY 0047 UGP022
 Negretti, H. & Co. THERMOMETER - LESLIE DIFFERENTIAL 1182 TDP003
 Negretti & Zambra BAROMETER - MARINE 4097 UFM014
 Negretti & Zambra BAROMETER - STICK 2015 BLA004
 Negretti & Zambra BAROMETER - STICK 2336 SAL019
 Negretti & Zambra BAROMETER - STICK 2529 UGP235
 Negretti & Zambra HYGROMETER - HAIR 0563 IDG038
 Negretti & Zambra HYGROMETER - MASON 1252 TDP142
 Negretti & Zambra LEVEL - Y 3225 QBE003
 Negretti & Zambra MEASURING CYLINDER 2418 BIR093
 Negretti & Zambra POLARISCOPE - NORREMBERG 0818 UDP084
 Negretti & Zambra PROTRACTOR 1410 NMD059
 Negretti & Zambra SCALE - ENGINEERS' 4460 PRI038
 Negretti & Zambra THERMOGRAPH 0514 IDG023
 Negretti & Zambra THERMOGRAPH 0515 IDG026
 Negretti & Zambra THERMOGRAPH 0982 BIR023
 Negretti & Zambra THERMOMETER - DEEP SEA 0414 RDS123
 Negretti & Zambra THERMOMETER - GLASS MERCURY 1178 TDP139
 Negretti & Zambra THERMOMETER - GLASS MERCURY 4513 MET012
 Negretti & Zambra THERMOMETER - MINING 3474 QBP200
 Negretti & Zambra THERMOMETER - MINING 3475 QBP201
 Negretti & Zambra THERMOMETER - SOLAR RADIATION 4516 MET015
 Negretti & Zambra WEATHER INDICATOR 1142 PRI019
 Neill BAROMETER - MARINE 0383 Ex0383
 Neill, J. & Co. BAROMETER - BANJO 3400 PRI085
 Neill, J. & Son BAROMETER 0481 Ex0481
 Neill, Robert BALANCE - FOLDING COIN 4365 ULS052
 Neill, R. CLOCK - REGULATOR 0240 QBP034
 Neill, R. & Sons TRADE LABEL 1396 NMD066
 Neill, S.D. ANEMOMETER 0504 Ex0504
 Neill, S.D. BAROGRAPH - ANEROID 2136 PRI034
 Neill, S.D. BAROMETER - ANEROID, PORTABLE 0387 Ex0387
 Neill, S.D. BAROMETER - ANEROID, PORTABLE 0645 Ex0645
 Neill, S.D. BAROMETER - ANEROID, PORTABLE 4032 PRI131
 Neill, S.D. COMPASS - MARINE, IN BINNACLE 0476 Ex0476
 Neill, S.D. HYDROMETER - SIKES 0505 Ex0505
 Neill, S.D. SEXTANT 0384 Ex0384
 Neill, S.D. SEXTANT 0385 Ex0385
 Neill, S.D. TELESCOPE - REFRACTING 0386 Ex0386
 Neill Brothers BAROMETER - MARINE 0033 Ex0033
 Neill Brothers BAROMETER - PORTABLE 0388 Ex0388
 Neill Brothers LINEN PROVER 2572 PRI207
 Neill Brothers OCTANT 0389 Ex0389
 Neill & Son OCTANT 636 Ex0636
 Neill & Sons BAROMETER - BANJO 1394 PRI023
 Neill & Sons BAROMETER - BANJO 0026 Ex0026
 Neills TELESCOPE - REFRACTING 0484 Ex0484
 Nelson BAROMETER - MARINE 0027 Ex0027
 Nelson, O. DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 1401 NMD051
 Nelson, W. DIAL - UNIVERSAL INCLINING 3850 PRI117
 Neville SWITCH - BATTERY 2717 TDP261
 Neville SWITCH - BATTERY 3411 BIR113
 Neville SWITCH - BATTERY 0398 RDS117
 Neville SWITCH - BATTERY 3407 BIR109
 Newman AIR PUMP - DOUBLE BARREL 1059 MAY035
 Newman APERTURE - ADJUSTABLE 4154 TDP320
 Newman ELECTROMETER - GOLD LEAF 3161 QBP106
 Newman LAMP - MINER SAFETY 0437 RDS028
 Newman, I. ELECTROSTATIC GENERATOR - NAIRNE 3391 NMC022
 Newman, I. VAPOUR PRESSURE APPARATUS 2723 TDP267
 Newman, I. WAVE DEMONSTRATION APPARATUS 0258 QBP053

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Newman, J. BALANCE - ROBERVAL 2974 NEW004
Newman, J. BAROMETER - PORTABLE 2696 TDP240
Newman, J. BAROMETER - STICK 3967 ARM041
Newman, J. (Lynch, J.) PYROMETER - DANIELL 4030 PRI128
Newman, J. THERMOMETER - GLASS MERCURY 3956 ARM030
Newman, J. WAVE DEMONSTRATION APPARATUS 2706 TDP250
Newman, J. WEIGHTS - IMPERIAL 1987 SAL009
Newman & Son AIR PUMP - DOUBLE BARREL 2686 TDP230
Newton PRISM - HOUSED 0822 UDP088
Newton PRISM - HOUSED 1210 TDP042
Newton SLIDES 2229 UDP307
Newton SLIDES 3206 QBP151
Newton, E.T. DIAL - MINER 0637 NMD252
Newton, W.E. & F. AIR PUMP - DOUBLE BARREL 3197 QBP142
Newton & Co. AIR PUMP - SYRINGE 4099 UFM016
Newton & Co. AMMETER & VOLTMETER 0067 UCP013
Newton & Co. CLINOMETER 0643 NMD246
Newton & Co. COIL - INDUCTION, RUHMKORFF 1008 QBC018
Newton & Co. GYROSCOPE 0812 UDP078
Newton & Co. GYROSCOPE 2319 QBP085
Newton & Co. GYROSCOPE 3445 QBP171
Newton & Co. LANTERN - BIUNIAL 1152 TDP048
Newton & Co. LANTERN - TRIUNIAL 0439 RDS002
Newton & Co. LANTERN - TRIUNIAL 2756 TDP300
Newton & Co. LANTERN - TRIUNIAL 4041 UGG003
Newton & Co. LANTERN - UNIAL 1200 TDP041
Newton & Co. LANTERN - UNIAL 1974 UCP201
Newton & Co. LANTERN - UNIAL 3519 MAY308
Newton & Co. LENS SYSTEM 0440 RDS124
Newton & Co. MICROSCOPE - COMPOUND 0986 BIR027
Newton & Co. MICROSCOPE - PROJECTING 0442 RDS126
Newton & Co. MICROSCOPE - PROJECTING 1151 TDP049
Newton & Co. MICROSCOPE - PROJECTING 4042 UGG004
Newton & Co. NEWTON RINGS APPARATUS 0275 QBP070
Newton & Co. POLARISCOPE - ELBOW 0253 QBP049
Newton & Co. PRISM - CYANIN 3489 QBP215
Newton & Co. RESISTANCE FRAME 2753 TDP297
Newton & Co. RHEOSTAT 1538 UGP130
Newton & Co. SCREEN 2182 UDP268
Newton & Co. SLIT 0441 RDS125
Newton & Co. SLIT 4106 MAY329
Newton & Co. STAND 2122 BLA110
Newton & Co. X-RAY TUBE 0314 UDP137
Newton & Son ORRERY 0645 NMD244
Newton Son & Berry GLOBE - CELESTIAL 3990 ARM064
Newton Son & Berry GLOBE - TERRESTRIAL 1834 DUN016
Newton & Wright COIL - INDUCTION, RUHMKORFF 0780 UDP047
Newton & Wright X-RAY TUBE 3605 NMC101
Newton & Wright X-RAY TUBE 3608 NMC104
Nicholl, S. BAROMETER - ANEROID, PORTABLE 0390 Ex0390
Nicolson, W.B. BALANCE - PRECISION 4125 UFM040
Nicolson, W.B. DIP CIRCLE 1274 TDP126
Nicolson, W.B. ELECTROSTATIC GENERATOR - WIMSHURST 3358 UCP358
Nicolson, W.B. EXPANSION APPARATUS - 'S GRAVESANDE 0772 UDP040
Nicolson, W.B. EXPANSION APPARATUS - 'S GRAVESANDE 2512 UGP218
Nicolson, W.B. HYGROMETER - MASON 4083 QBP271
Nicolson, W.B. SPECTROSCOPE - TABLE 4149 TDP315
Nicolson, W.B. STEAM HEATER 3875 NEW005
Nisdeal, D. DIAL - HORIZONTAL PEDESTAL 3932 ULS029
Norie, J.W. & Co. SEXTANT 0608 NMD280
Norman, H.E. TYPEWRITER 0558 IDG042
Nosedá, J. BAROMETER - BANJO 0289 Ex0289
O'Connell, D. DIAL - HORIZONTAL PEDESTAL 2445 NMD094
O'Connell, D. DIAL - HORIZONTAL PEDESTAL 3672 PRI100
O'Connell, D. DIAL - HORIZONTAL PEDESTAL 3673 PRI101
O'Connell, T. DIAL - HORIZONTAL PEDESTAL 3368 MIS050
Odelem, A. THEODOLITE - SIMPLE 0638 NMD251
Oertling BALANCE - PRECISION 0493 RDS078
Oertling BALANCE - PRECISION 2719 TDP263
Oertling (T. Mason) BALANCE - PRECISION 2870 UCP286
Oertling BALANCE - PRECISION 4316 TDC012
Oertling, L. BALANCE - PRECISION 4069 BIR160
Oertling, L. STANDARD METRE 0755 UCP115
Oertling, L. STANDARD VOLUMES - IMPERIAL 0758 UCP118
Oertling, L. STANDARD VOLUMES - METRIC 0757 UCP117
Oertling, L. STANDARD WEIGHTS - METRIC 0760 UCP120
Oertling, L. STANDARD YARD 0756 UCP116
Oldham LAMP 0556 IDG046
O Mahony, J.D. DIAL - HORIZONTAL PEDESTAL 1544 STR003
O'Toole, H. EXPANSION APPARATUS - O'TOOLE 2062 BLA044
Ottewill CAMERA - FOLDING 2349 BIR035
Ottway, W. & Co. COELOSTAT 1830 DUN012
Ottway, W. & Co. TELESCOPE - REFLECTING 2351 BIR037
Oxygen Co. LAMP - LIME LIGHT 2427 BIR103
Packer, T. SHAFT SPEED INDICATOR 0468 RDS027

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Pallant, I. LEVEL - TELESCOPIC 4011 SAL068
 Palmer, E. COIL - INDUCTION, MEDICAL 0011 UCP024
 Parker, G. DIAL - UNIVERSAL EQUINOCTIAL RING 0654 NMD236
 Parker, W. or S. BURNING GLASS 0410 RDS001
 Parsons, C.A. & Co MIRROR - CONCAVE 2361 BIR047
 Pastorelli & Rapkin THERMOGRAPH 0038 UCP096
 Paterson & Cooper AMMETER 3418 BIR120
 Paterson & Cooper OHMMETER 1157 TDP059
 Paterson & Cooper VOLTMETER 0511 IDG064
 Paterson & Cooper VOLTMETER 3020 UDE046
 Paul, R.W. BALANCE - MAGNETIC(?) 1456 UCP135
 Paul, R.W. BALANCE - MAGNETIC 1705 MAY192
 Paul, R.W. BRIDGE - SLIDE WIRE 3090 UDE116
 Paul, R.W. CONDENSER - STANDARD 3041 UDE067
 Paul, R.W. ELECTROMETER 3532 NMC028
 Paul, R.W. ELECTROMETER - WEIGHT 0002 UCP075
 Paul, R.W. GALVANOMETER - AYRTON MATHER 1222 TDP026
 Paul, R.W. GALVANOMETER - AYRTON MATHER 1754 MAY237
 Paul, R.W. GALVANOMETER - AYRTON MATHER 3115 UDE140
 Paul, R.W. GALVANOMETER - AYRTON MATHER 3124 UDE149
 Paul, R.W. GALVANOMETER - AYRTON MATHER 3170 QBP115
 Paul, R.W. GALVANOMETER - AYRTON MATHER 3116 UDE141
 Paul, R.W. GALVANOMETER - CAMPBELL VIBRATION 0936 UDP201
 Paul, R.W. GALVANOMETER - TANGENT 0061 UCP078
 Paul, R.W. LAMP - CARBON ARC 2522 UGP228
 Paul, R.W. OSCILLOGRAPH - IRWIN-PAUL 3086 UDE112
 Paul, R.W. (T. Mason) RESISTANCE - STANDARD 2188 UDP274
 Paul, R.W. RESISTANCE BOX 3058 UDE084
 Paul, R.W. RHEOSTAT 3089 UDE115
 Paul, R.W. SHUNT 3103 UDE129
 Paul, R.W. SHUNT - UNIVERSAL 0222 QBP003
 Paul, R.W. STANDARD CELL 3144 UDE169
 Paul, R.W. STANDARD CELL - ZINC/MERCURY 3018 UDE044
 Paul, R.W. VOLTMETER - ELECTROSTATIC 2855 UGP275
 Paul, R.W. VOLTMETER - UNIPIVOT 2170 UDP256
 Pawson & Brailsford ELECTRICAL MACHINE - CLARKE 1163 TDP174
 Pawson & Brailsford ELECTRICAL MACHINE - CLARKE 1392 NMD021
 Pawson & Brailsford ELECTRICAL MACHINE - CLARKE 4089 UFM007
 Pawson & Brailsford ELECTRICAL MACHINE - CLARKE 4291 RCS041
 Pawson & Brailsford (Mason) ELECTRICAL MACHINE - CLARKE 4292 RCS042
 Pellin, P. REFRACTOMETER - FERY 0677 UDP005
 Pellin, P. & F. COLORIMETER 0497 IDG007
 Pellin, Ph & F. COLORIMETER 2306 PRI179
 Percival, G. GALVANOMETER - TANGENT 3375 NMC006
 Percival, G. GALVANOMETER - TANGENT 3375 NMD308
 Percival, G. OPTICAL BENCH 3573 NMC069
 Percival, G. OPTICAL BENCH 3573 NMD148
 Philip, G. & Son ORRERY 3997 ARM071
 Phillips, J. DIAL - HORIZONTAL PEDESTAL 3938 ULS035
 Piccolo CENTRIFUGE 4072 BIR163
 Pickering, D. BALANCE - EQUAL ARM 0629 Ex0629
 Pickering, J. BALANCE - EQUAL ARM 0067 Ex0067
 Pickering, J. BALANCE - EQUAL ARM 1408 NMD057
 Pickering, J. TRADE LABEL 1407 NMD067
 Piggott & Boddy THEODOLITE - PLAIN 4504 MET003
 Pilkington & Gibbs DIAL - HELIOCHRONOMETER 3930 ULS027
 Pilkington & Gibbs DIAL - HELIOCHRONOMETER 4392 PRI252
 Pilkington & Gibbs (Pollock) DIAL - HELIOCHRONOMETER 4488 CIL001
 Pillischer MICROSCOPE - COMPOUND 2338 SAL021
 Pillischer MICROSCOPE - SIMPLE 0453 RDS127
 Pilon, H. DISCHARGE TUBE 3609 NMC105
 Pistor & Martins TRANSIT CIRCLE 1828 DUN010
 Pitkin, J. GALVANOMETER - D'ARSONVAL 0276 QBP071
 Pitkin, J. GALVANOMETER - D'ARSONVAL 0931 UDP196
 Pitkin, J. VOLTMETER - RECORDING 2863 UGP283
 Pitzoli, A. BAROMETER 0272 Ex0270
 Pixii SET SQUARE 2163 NMD216
 Pixii Père & Fils MICROSCOPE - SOLAR 0858 UDP124
 Pixii Père & Fils PRISM - ADJUSTABLE 0676 UDP004
 Plath, C. SEXTANT 3248 QBE025
 Plössl TELESCOPE MOUNT 1833 DUN015
 Plumbago Co. GRAPHITE CRUCIBLE 3836 BIR145
 Pollock & Co. BAROGRAPH - ANEROID 3859 PRI118
 Pollock & Co. COMPASS - MARINE 3291 NMM031
 Pollock & Co. COMPASS - PRISMATIC 0391 Ex0391
 Pollock & Co. TELESCOPE - REFRACTING 4490 CIL003
 Polti, J.L. BAROMETER - STICK 4102 UFM019
 Pooley, H. & Son STANDARD WEIGHTS - IMPERIAL 1993 SAL015
 Porri BAROMETER - BANJO 4013 SAL070
 Porri, F. BAROMETER - BANJO 0028 Ex0028
 Porri, F. BAROMETER - BANJO 0392 Ex0392
 Porri, F. BAROMETER - BANJO 2605 PRI039
 Porri, F. BAROMETER - BANJO 3528 PRI088
 Porter Brothers YARN TESTER 4113 UFM028
 Porter Brothers YARN TESTER 4114 UFM029

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Porzellan Manufactur MERCURY TROUGH 0481 RDS060
 Potter HELIOSTAT 0154 UGP033
 Potter THEODOLITE - PLAIN 3684 PRI110
 Potter, J. PROTRACTOR 3861 UDE178
 Pouzet BAROMETER - ANEROID, PORTABLE 3421 BIR123
 Powell, J. CALENDAR - PERPETUAL 1415 NMD064
 Powell & Lealand MICROSCOPE - COMPOUND 0583 NMD302
 Powell & Lealand MICROSCOPE - COMPOUND 4399 NBG002
 Prazmowski, A. MICROSCOPE - COMPOUND 0372 NMD029
 Prazmowski, A. MICROSCOPE - COMPOUND 1713 MAY200
 Premier Lamp Co. LAMP - MINER SAFETY 1683 MAY170
 Prescott, G. OPHTHALMOSCOPE 0621 Ex0621
 Prescott, G. & Co. FRICTION HEATING APPARATUS - TYNDALL 1597 MAY086
 Prince, A. BAROMETER - BANJO 2616 PRI050
 Prince, A. TELESCOPE - REFRACTING 0129 Ex0129
 Pritchard, A. MICROSCOPE - COMPOUND 4258 RCS008
 Proctor DIAL - ALTITUDE RING 4500 ULS068
 Pulsometer Co. AIR PUMP 1198 TDP032
 Pulsometer Co. AIR PUMP - DOUBLE BARREL 2755 TDP299
 Pye CLOCK - STOP 1884 UGP153
 Pye, W.G. CONDENSER - VARIABLE, AEPINUS 0232 QBP026
 Pye, W.G. MAGNETOMETER 2565 UGP265
 Pye, W.G. & Co. BRIDGE - KOHLRAUSCH 4134 MAY338
 Pye, W.G. & Co. BRIDGE - WHEATSTONE 0223 QBP005
 Pye, W.G. & Co. CALORIMETER - JOLY STEAM 2866 UGP286
 Pye, W.G. & Co. CALORIMETER - JOLY STEAM 3166 QBP111
 Pye, W.G. & Co. COIL - INDUCTION 2536 UGP242
 Pye, W.G. & Co. CONDENSER BOX 2273 UDP351
 Pye, W.G. & Co. ELECTROMETER - QUADRANT, DOLEZALEK 0933 UDP198
 Pye, W.G. & Co. [Mason] ELECTROMETER - QUADRANT, DOLEZALEK 2783 UCP236
 Pye, W.G. & Co. FRICTION HEATING APPARATUS - SEARLE 2948 UGP356
 Pye, W.G. & Co. FRICTION HEATING APPARATUS - SEARLE 3338 UCP338
 Pye, W.G. & Co. FRICTION HEATING APPARATUS - SEARLE 3501 QBP227
 Pye, W.G. & Co. GALVANOMETER 4055 MAY318
 Pye, W.G. & Co. GALVANOMETER - ASTATIC MIRROR 2562 UGP262
 Pye, W.G. & Co. GALVANOMETER - ASTATIC MIRROR 3099 UDE125
 Pye, W.G. & Co. GALVANOMETER - BALLISTIC MIRROR 0035 UCP050
 Pye, W.G. & Co. GALVANOMETER - DEAD BEAT MIRROR 0930 UDP195
 Pye, W.G. & Co. GALVANOMETER - TANGENT 3171 QBP116
 Pye, W.G. & Co. GALVANOMETER - TANGENT 3817 NMC218
 Pye, W.G. (T. Mason) GALVANOMETER - TANGENT 4163 NMD136
 Pye, W.G. & Co. GALVANOMETER - WILBERFORCE 1227 TDP065
 Pye, W.G. & Co. GONIOMETER - SEARLE 1315 TDP068
 Pye, W.G. & Co. INTERRUPTOR 1724 MAY207
 Pye, W.G. & Co. MIRROR - CONCAVE & CONVEX 1519 UGP101
 Pye, W.G. & Co. MIRROR - CONCAVE & CONVEX 2175 UDP261
 Pye, W.G. & Co. PENDULUM - KATER REVERSIBLE 3184 QBP129
 Pye, W.G. & Co. REFLECTION APPARATUS - SEARLE 4050 MAY313
 Pye, W.G. & Co. RESISTANCE - STANDARD 2265 UDP343
 Pye, W.G. & Co. RESISTANCE - STANDARD 3053 UDE079
 Pye, W.G. & Co. RESISTANCE BOX 2274 UDP352
 Pye, W.G. & Co. (T. Mason) RHEOSTAT 2266 UDP344
 Pye, W.G. & Co. SONOMETER 1309 TDP072
 Pye, W.G. & Co. SPECTROSCOPE - TABLE 4148 TDP314
 Pye, W.G. & Co. TUNING FORK STAND WITH ELECTROMAGNET 4126 MAY330
 Pye, W.G. & Co. TUNING FORK STAND WITH ELECTROMAGNET 4144 TDP310
 Pye, W.G. & Co. VISCOMETER 1344 TDP045
 Pye, W.G. & Co. VOLTAMETER 1679 MAY166
 Pyrex CHEMICAL RETORTS 4178 NMC248
 Pyrex CHEMICAL RETORTS 4178 NMD141
 Quevenne-Gerber THERMO-HYDROMETER 0419 RDS129
 Quin, A.H. ELECTRICAL MACHINE 3300 UCP300
 R. W. CIRCUMFERENTOR 0108 Ex0108
 Rabone, J. & Sons BRIDGE - WHEATSTONE 2950 UGP358
 Rahtjen, G. OCTANT 2593 NMD209
 R A L & Co BATTERY - LECLANCHÉ 1775 MAY258
 R A L & Co BATTERY - LECLANCHÉ 2420 BIR095
 Ramsay, J. COMPASS - MARINE 0567 Ex0567
 Ramsden, J. MERIDIAN CIRCLE 1440 DUN001
 (Ramsden, J.) TELESCOPE - REFRACTING 2968 PRI077
 Read SURGEON'S INSTRUMENTS 0393 Ex0393
 Read, T. & Co. DENTAL INSTRUMENTS 0512 Ex0512
 Recordon CLOCK - REGULATOR 3991 ARM065
 Reeves, W. HYDROMETER - SIKES 0530 IDG050
 Reeves, W. SACCHAROMETER 0551 IDG041
 Reeves, W. & Co. THERMOMETER - BREWER'S 0516 IDG025
 Reeves, W. & Co. (Long, Zeal) THERMOMETER - BRINE PIPE 0517 IDG034
 Reeves, W. THERMOMETER - GLASS MERCURY 0524 IDG024
 Reeves, W. & Co. THERMO-HYDROMETER 0554 IDG053
 Reichert, C. POLARIMETER 0249 QBP045
 Reichert, C. POLARIMETER 1150 TDP181
 Reid MORSE KEY 2404 BIR080
 Reily, J. DIAL - HORIZONTAL PEDESTAL 3941 ULS038
 Reimanns BALANCE - SPECIFIC GRAVITY 1964 UCP190
 Reinmann, P.[?] DIAL - DIPTYCH 0658 NMD232

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Reynolds SHIP'S LOG 3262 NMM002
Reynolds, J.E. THIOUREA CRYSTALS 4320 TDC016
Reynolds & Branson MAGNETOMETER - EWLES' DAMPING 1802 MAY285
Rhodes, M. BAROMETER - BANJO 4017 SAL074
Ribaldi, J. BAROMETER - BANJO 0131 Ex0131
Ribaldi, J. BAROMETER - STICK 0132 Ex0132
Ribaldi, J. BAROMETER - BANJO 0130 Ex0130
Ribaldi, L. BAROMETER - BANJO 0394 Ex0394
Richard, J. ANEMOMETER 1180 TDP123
Richard Frères BAROGRAPH - ANEROID 0040 UCP054
Richard Frères BAROGRAPH - ANEROID 1159 TDP167
Richard Frères BAROGRAPH - ANEROID 2373 MIS039
Richardson BALANCE - FOLDING COIN 4363 ULS050
Riddel, L. HYDROMETER 2312 QBP078
Rider BAROMETER - STICK 0395 Ex0395
Riley Brothers LANTERN - UNIAL 1982 RDS132
Riley Brothers LANTERN - UNIAL 4080 ULS039
Ritchie, J. & Son CLOCK - REGULATOR 2832 RDS161
Roberson, C. & Co. COLOUR BOX 4425 PRI259
Robert, H. DIAL - CYLINDER 0668 NMD222
Robinson BAROMETER - FITZROY 3669 PRI097
Robinson GONIOMETER - CRYSTAL, WOLLASTON 0995 QBC005
Robinson MICROSCOPE - COMPOUND, BINOCULAR 0397 Ex0397
Robinson OCTANT 2106 BLA094
Robinson SEXTANT - BOX 1085 TDE008
Robinson TELESCOPE - REFRACTING 0396 Ex0396
Robinson TELESCOPE - PORTABLE ALTAZIMUTH 0975 BIR016
Robinson THERMOMETER - MAXIMUM & MINIMUM 1398 NMD048
Robinson, J. BALANCE - EQUAL ARM 0491 RDS008
Robinson, J. CAMERA - WET PLATE 0292 Ex0292
Robinson, J. COIL - INDUCTION, MEDICAL 0151 UGP014
Robinson, J. COIL - INDUCTION, MEDICAL 0309 CWC033
Robinson, J. COIL - INDUCTION, MEDICAL 1061 MAY037
Robinson, J. MEDICAL PHOTOGRAPHS 0005 Ex0005
Robinson, J. MICROSCOPE - COMPOUND 0646 Ex0646
Robinson, J. OPTICAL MODEL 0004 Ex0004
Robinson, J. TRADE LABEL 1143 CWC081
Robinson, J. & Sons BAROMETER - FORTIN 0560 IDG003
Robinson, J. & Sons BALANCE - PRECISION 1531 UGP120
Robinson, J. & Sons BASE 2681 TDP225
Robinson, J. & Sons CAMERA - DETECTIVE 0001 Ex0001
Robinson, J. & Sons CAMERA - DETECTIVE 0488 Ex0488
Robinson, J. & Sons CAMERA - 'LUZO' 0487 Ex0487
Robinson, J. & Sons CAMERA - 'LUZO' 2383 BIR059
Robinson, J. & Sons CAMERA - 'LUZO' 0486 Ex0486
Robinson, J. & Sons ELECTRICAL MACHINE - CLARKE 4087 UFM005
Robinson, J. & Sons ELECTROSTATIC GENERATOR - CUTHBERTSON 0698 UDP026
Robinson, J. & Sons HYDROMETER 2049 BLA038
Robinson, J. & Sons LENS SYSTEM 0448 RDS065
Robinson, J. & Sons PEDOMETER 1585 MAY074
Robinson, J. & Sons SCALE - MARQUOIS 2013 BLA002
Robinson, J. & Sons SIREN - CAGNIARD 0696 UDP024
Robinson, J. & Sons SONOMETER 1308 TDP069
Robinson, J. & Sons SONOMETER 2059 BLA058
Robinson, J. & Sons SONOMETER 2269 UDP347
Robinson, J. & Sons TELEGRAPH PRINTER 2980 UDE006
Robinson, J. & Sons THERMOMETER - GLASS MERCURY 2043 BLA032
Robinson, J. & Sons THERMOMETER - LESLIE DIFFERENTIAL 2016 BLA005
Robinson & Son WATER HAMMER 2056 BLA055
Robinson & Sons AIR PUMP - DOUBLE BARREL 0914 NMD025
Robinson & Sons BURNER - BUNSEN 2741 TDP285
Robinson & Sons COIL - INDUCTION, RUHMKORFF 0509 Ex0509
Robinson & Sons SCALE - MARQUOIS 2014 BLA003
Robinson & Barrow DIP CIRCLE 1165 TDP151
Robson PARALLEL RULE 2578 PRI213
Roby, R. GRAIN SIZER(?) 0576 IDG075
Roche, P. DIAL - HORIZONTAL PEDESTAL 3649 MIS052
Rodgers & Co. OCTANT 3263 NMM003
Rollaston, W. RAIN GAUGE 1555 STR014
Romney Robinson, T. PENDULUM - SIPHON BAROMETER 4005 ARM079
Ronchetti, B. BAROMETER - STICK 2614 PRI048
Ronchetti, J. COMPASS 2466 NMD211
Ross BAROGRAPH - ANEROID 4008 SAL065
Ross LENS SYSTEM 2162 NMD217
Ross LENS SYSTEM 2381 BIR057
Ross MICROSCOPE - COMPOUND 0318 CWC015
Ross MICROSCOPE - SOLAR 0590 NMD296
Ross MICROSCOPE - COMPOUND, BINOCULAR 4256 RCS006
Ross MICROSCOPE - PROJECTING 1209 TDP043
Ross, A. CONDENSER WITH WHEEL OF APERTURES 4301 RCS051
Ross, A. EYEPIECE - MICROMETER 4268 RCS018
Ross, A. LENS - PLANO CONVEX 2382 BIR058
Ross, A. MICROSCOPE - COMPOUND 0450 RDS011
Ross, A. MICROSCOPE - COMPOUND 0972 BIR013
Ross, A. MICROSCOPE - COMPOUND 4250 MIS075

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Ross, A. MICROSCOPE - COMPOUND 4252 RCS002
Rosse, Earl of BED OF HOOPS FOR THREE FOOT REFLECTOR 0581 Ex0581
Rosse, Earl of EYEPIECE 0085 Ex0085
Rosse, Earl of EYEPIECE 0086 Ex0086
Rosse, Earl of GAUGES 0578 Ex0578
Rosse, Earl of GRINDING TOOL 0579 Ex0579
Rosse, Earl of MIRROR - SPECULUM METAL 0083 Ex0083
Rosse, Earl of MIRROR - SPECULUM METAL 0085 Ex0084
Rosse, Earl of MIRROR - SPECULUM METAL 0577 Ex0577
Rosse, Earl of MIRROR - SPECULUM METAL 3839 BIR148
Rosse, Earl of POLISHING TOOL 0580 Ex0580
Rosse, Earl of QUADRANT - ASTRONOMICAL 0970 BIR011
Rosse, Earl of TELESCOPE - REFLECTING 0041 Ex0041
Rosse, Earl of TELESCOPE - REFLECTING 0087 Ex0087
Rosse, Earl of TELESCOPE - REFLECTING 0349 Ex0349
Rosse, Earl of TELESCOPE - REFLECTING 0984 BIR001
Rosse, Earl of TELESCOPE - REFLECTING 0987 BIR028
Rosse, Earl of TELESCOPE - REFLECTING 0988 BIR029
Rossin SPHEROMETER 1350 TDP202
Rost, P. u. THERMOMETER - GLASS SPIRIT 0072 UCP097
Rouch, W.W. & Co. LENSES 2515 UGP221
Rowen, T. DIAL - HORIZONTAL PEDESTAL 2449 PRI183
Rowland GRATING - DIFFRACTION 0691 UDP019
Rowland GRATING - DIFFRACTION 2126 UDP178
Rowland, H.A. GRATING - DIFFRACTION 0135 QBP004
Rowland, H.A. GRATING - DIFFRACTION 1835 DUN017
Ruhmkorff COIL - INDUCTION, RUHMKORFF 1450 UCP130
Ruhmkorff GALVANOMETER - ASTATIC, NOBILI 0998 QBC008
Ruhmkorff GALVANOMETER - TANGENT 0225 QBP019
Ruhmkorff POLARISCOPE 3200 QBP145
S., J. LANTERN - UNIAL 4435 NMD178
S., P. WEIGHTS - NESTED 4357 ULS044
St John, R.B. BAROMETER - ANEROID 2138 MIS038
Salm THERMO-SACCHAROMETER 0555 IDG032
Sanderson Brothers ELECTRICAL MACHINE 3061 UDE087
Sargent, T. SLIDE RULE 0260 Ex0260
Sartorius, F. BALANCE - PRECISION 3785 NMC186
Sartorius, F. BALANCE - SPECIFIC GRAVITY 0417 RDS045
Saunders DIAL - HORIZONTAL COMPASS 0122 Ex0122
Saunders DIAL - HORIZONTAL PEDESTAL 0726 MAY001
Saunders DIAL - UNIVERSAL EQUINOCTIAL RING 0657 NMD233
Saunders, T. BAROMETER - BANJO 0029 Ex0029
Sauteur Frères LAMP - CARBON ARC 0841 UDP107
Savage & Son COMPASS - PRISMATIC 1622 MAY110
Sax, J. GALVANOMETER 2426 BIR102
Saxby, S.M., Wood, H. & Co. SPHEROGRAPH 3288 NMM028
Scarlett, E. MICROSCOPE - COMPOUND, CULPEPER 0374 NMD030
Schaffer & Budenberg PRESSURE GAUGE TESTER 0565 IDG011
Schall, K. ELECTROSTATIC GENERATOR - WIMSHURST 1073 MAY049
Schall & Son AMMETER 3798 NMC199
Schall & Son X-RAY TUBE 2808 UCP261
Schall & Son X-RAY TUBE 3888 QBP249
Schlesinge LAMP - DOBEREINER 0100 UCP033
Schmalcalder SURVEYING INSTRUMENT - UNIVERSAL 0635 NMD254
Schebier DIAL - HORIZONTAL 4525 CBL002
Schmidt, F. & Haensch POLARIMETER 1781 MAY264
Schmidt, F. & Haensch POLARIMETER 1936 UCP163
Schmidt, F. & Haensch POLARIMETER 4347 TDC038
Schmidt, F. & Haensch SPECTROSCOPE - DIRECT VISION 0132 RDS033
Schott & Genossen LAMP - GAS 3752 NMC153
Schrettegger, J. DIAL - UNIVERSAL EQUINOCTIAL 0650 NMD240
Schröder, J. MECHANICAL MODEL - RAILWAY SIGNAL LEVERS 3088 UDE114
Schuckert, S. AMMETER 3405 BIR107
Schuckert, S. VOLTMETER 3414 BIR116
Scott DIAL - HORIZONTAL PEDESTAL 3154 PRI078
Secretan COMMUTATOR 2824 UCP277
Secretan COMMUTATOR - RUHMKORFF 0083 UCP068
Secretan GONIOMETER - CRYSTAL 0009 UCP053
Secretan OPTICAL BENCH 0743 UCP103
Secretan PRISM - NICOL 2802 UCP255
Secretan SPECTROSCOPE - PROJECTION 0099 UCP016
Secretan THERMOMETER - GLASS SPIRIT 2295 QBC030
Secretan TUNING FORK ON RESONANCE BOX 1236 TDP079
Sehr GAS REGULATOR(?) 0010 UCP062
Seibert LENSES - MICROSCOPE 4424 PRI258
Senecal, E. DIAL - DIPTYCH 4136 SAL078
Septems SPECIFIC GRAVITY APPARATUS 2212 UDP290
Serrin LAMP - CARBON ARC 1338 TDP075
Seward CIRCUMFERENTOR 0218 Ex0218
Seward CIRCUMFERENTOR 2371 NMD076
Seward DIAL - UNIVERSAL EQUINOCTIAL RING 0655 NMD235
Seward DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 0399 Ex0399
Seward DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 0704 NMD003
Seward DIVIDERS - PROPORTIONAL 0206 Ex0206
Seward LINEN PROVER 0705 NMD004

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Sewill SEXTANT 2489 SAL038
Sewill, J. SEXTANT 3276 NMM016
Sharp, C. PENDULUM - COMPENSATED 3692 ARM005
Shearer, J. CLOCK - REGULATOR 2364 BIR050
Shelton, J. CLOCK - REGULATOR 3698 ARM011
Sherwood, H.H. COIL - INDUCTION, MEDICAL 3805 NMC206
Shew PENDULUM 1556 STR015
Short, J. TELESCOPE - REFLECTING 0594 NMD292
Short, J. TELESCOPE - REFLECTING 1856 PRI029
Short, T. TELESCOPE - REFLECTING 1391 PRI022
Short, T. TELESCOPE - REFLECTING 3697 ARM010
Short & Mason BAROMETER - ANEROID 3828 NMC229
Shuttleworth MICROSCOPE - SOLAR 3977 ARM051
Siemens Brothers GALVANOMETER - ASTATIC, NOBILI 3590 NMC086
Siemens Brothers & Co. COIL - INDUCTION, MEDICAL 2329 QBP095
Siemens Brothers & Co. ELECTRO DYNAMOMETER 0224 QBP018
Siemens Brothers & Co. ELECTRO DYNAMOMETER 1069 MAY045
Siemens Brothers & Co. ELECTRO DYNAMOMETER 2724 TDP268
Siemens Brothers & Co. ELECTRO DYNAMOMETER 3024 UDE050
Siemens Brothers & Co. ELECTRO DYNAMOMETER 3025 UDE051
Siemens Brothers & Co. ELECTRO DYNAMOMETER 3394 NMC025
Siemens Brothers & Co. LINESMAN'S DETECTOR 2587 PRI221
Siemens & Halske VOLTMETER 3013 UDE039
Siemens Halske & Co. ATLANTIC CABLE SAMPLES 1300 TDP039
Silex CHEMICAL TEST PLATES 4176 NMC246
Silex CHEMICAL TEST PLATES 4176 NMD143
Simman-Abady PHOTOMETER 1948 UCP175
Simon, R. FARINATION APPARATUS 0498 IDG045
Simonton, J. BAROMETER - STICK 0506 Ex0506
Simonton SAND GLASS & BUBBLE LEVEL 3278 NMM018
Simpson BALANCE - EQUAL ARM 1988 SAL010
Simpson Lawrence & Co. COMPASS - MARINE 4121 UFM036
Sinclair, J. COIL - DU BOIS REYMOND 1229 TDP138
Sisson, J. QUADRANT - ASTRONOMICAL 3696 ARM009
Sisson, J. SECTOR 0619 NMD269
Sisson, J. WAYWISER 2838 NMD108
Smith BAROMETER - ANEROID 4015 SAL072
Smith CLINOMETER - ABNEY LEVEL 3484 QBP210
Smith, I. DIAL - HORIZONTAL PEDESTAL 2461 PRI187
Smith, T. GALVANOMETER 0996 QBC006
Smith, W. & A. (Mason) APOGRAPH 0624 NMD264
Smith & Beck MICROSCOPE - COMPOUND 4276 RCS026
Smith & Beck TELESCOPE - READING 0042 UCP095
Smith, Beck & Beck MICROSCOPE - COMPOUND, BINOCULAR 0451 RDS047
Smith, Beck & Beck STEREO VIEWER 2346 BIR032
Smith, Beck & Beck STEREO VIEWER 3222 QBP167
Smith & Sons GLOBE - TERRESTRIAL 0649 NMD241
Smith & Sons GLOBE - CELESTIAL 0786 NMD218
Soleil OPTICAL ELEMENT 0323 CWC070
Soleil OPTICAL ELEMENTS 3205 QBP150
Solomon, J. LAMP - MAGNESIUM 0436 RDS061
Solomon, J. LAMP - MAGNESIUM 2100 BLA088
Solomons, M.E. BAROMETER - FITZROY 0511 Ex0511
Solomons, M.E. BAROMETER - FITZROY 2630 PRI065
Solomons, M.E. TELESCOPE - REFRACTING 0398 Ex0398
Spear BAROMETER - BANJO 2615 PRI049
Spear BAROMETER - STICK 4168 PRI191
Spear CIRCUMFERENTOR 0640 NMD249
Spear CIRCUMFERENTOR 0217 Ex0217
Spear CIRCUMFERENTOR 0280 Ex0280
Spear CIRCUMFERENTOR 0281 Ex0281
Spear CIRCUMFERENTOR 4191 DCM003
Spear CLINOMETER 0297 Ex0297
Spear DIAL - HORIZONTAL COMPASS 0294 Ex0294
Spear DIAL - HORIZONTAL COMPASS 0571 Ex0571
Spear DIAL - HORIZONTAL PEDESTAL 0709 NMD008
Spear DIAL - HORIZONTAL PEDESTAL 3402 PRI087
Spear DIAL - HORIZONTAL PEDESTAL 4165 NMD138
Spear DIAL - UNIVERSAL INCLINING 0070 Ex0070
Spear ELECTRICAL MACHINE - CLARKE 1669 MAY156
Spear GUNNER'S CALLIPERS 0073 Ex0073
Spear GUNNER'S CALLIPERS 0303 Ex0303
Spear GUNNER'S CALLIPERS 0518 Ex0518
Spear GUNNER'S CALLIPERS 0620 Ex0620
Spear GUNNER'S CALLIPERS 0644 Ex0644
Spear GUNNER'S CALLIPERS 1389 PRI020
Spear MICROSCOPE - COMPOUND, GOULD 0072 Ex0072
Spear MICROSCOPE - COMPOUND, GOULD 0091 Ex0091
Spear OPERA GLASSES 0069 Ex0069
Spear QUADRANT - ARTILLERY 3272 NMM012
Spear SCALE 1109 TDE021
Spear SECTOR 0068 Ex0068
Spear SECTOR 0712 NMD011
Spear SEXTANT 0482 Ex0482
Spear SEXTANT 0626 NMD262

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Spear THEODOLITE - PLAIN 0299 Ex0299
Spear THEODOLITE - PLAIN 1087 TDE002
Spear THEODOLITE - PLAIN 4033 PRI132
Spear THERMOMETER - GLASS MERCURY 2609 PRI043
Speare [sic] CIRCUMFERENTOR 0221 Ex0221
Spear, R. BAROMETER - STICK 0031 Ex0031
Spear, R. BAROMETER - STICK 0123 Ex0123
Spear, R. BAROMETER - STICK 0462 Ex0462
Spear, R. BAROMETER - STICK 1565 MIS021
Spear, R. BAROMETER - STICK 4156 MIS062
Spear, R. BAROMETER - STICK 4157 NMD134
Spear, R. CHONDROMETER 0708 NMD007
Spear, R. CIRCUMFERENTOR 0219 Ex0219
Spear, R. CIRCUMFERENTOR 0282 Ex0282
Spear, R. PROTRACTOR 0300 Ex0300
Spear, R. TELESCOPE - REFRACTING 1133 NMD041
Spear, R. TELESCOPE - REFRACTING 0301 Ex0301
Spear, R. TELESCOPE - REFRACTING 0497 Ex0497
Spear, R. THEODOLITE 0298 Ex0298
Spear, R. THERMOMETER SCALE 4105 MAY328
Spear, R. WAYWISER 1434 UFM001
Spear & Co. BAROMETER - BANJO 0030 Ex0030
Spear & Co. DRAWING INSTRUMENTS - SET 0296 Ex0296
Spear & Co. [isc] BAROMETER - STICK 0143 Ex0143
Spear & Clarke CIRCUMFERENTOR 0730 MAY005
Spears, R. DIAL - HORIZONTAL PEDESTAL 3399 PRI084
Spears & Co. BAROMETER - STICK 0144 Ex0144
Spears & Co. BAROMETER - STICK 1858 MIS025
Spears & Co. DIAL - HORIZONTAL COMPASS 0295 Ex0295
Spears & Co. PROTRACTOR - CIRCULAR 0617 NMD271
Spears & Co. SYMPIESOMETER 0293 Ex0293
Spelman, P. DIAL - HORIZONTAL PEDESTAL 2439 PRI181
Spencer CONDENSER - VARIABLE, AEPINUS 1204 TDP120
Spencer LEVEL - TELESCOPIC 0413 NMD033
Spencer MICROSCOPE - COMPOUND 0044 Ex0044
Spencer PEN 0380 RDS114
Spencer PLATE MEASURER 3948 ARM022
Spencer SCALE 1106 TDE019
Spencer TELESCOPE - REFRACTING 0490 Ex0490
Spencer, J. MICROSCOPE - COMPOUND 0008 Ex0008
Spencer, J. MICROSCOPE - COMPOUND, DRUM 3663 NMD128
Spencer, J. TRADE LABEL 2635 PRI070
Spencer, J. WEIGHTS - IMPERIAL 1056 MAY032
Spencer, J. & Son BALANCE - PRECISION 1057 MAY033
Spencer, J. & Son POLARIMETER 0369 RDS037
Spencer, J. & Son PROTRACTOR 0520 Ex0520
Spencer, J. & Son SPIRIT LEVEL APPARATUS 1103 TDE001
Spencer, J. & Son THERMOMETER - GLASS MERCURY 4288 RCS038
Spencer, J. & Son TRADE LABEL 1352 TDE059
Spencer, J. & Son TRADE LABEL 2473 PRI194
Spencer & Son BAROMETER - STICK 0032 Ex0032
Spencer & Son BAROMETER - STICK 2666 PRI074
Spencer & Son BAROMETER - STICK 0913 NMD024
Spencer & Son BAROMETER - STICK 1127 PRI015
Spencer & Son CATHETOMETER 0675 UDP003
Spencer & Son COUNTER 3068 UDE094
Spencer & Son DIP NEEDLE 0674 UDP002
Spencer & Son GONIOMETER - CRYSTAL, WOLLASTON 1047 MAY023
Spencer & Son HALDAT APPARATUS 1054 MAY030
Spencer & Son HELIOSTAT - STONEY 0074 Ex0074
Spencer & Son HELIOSTAT - STONEY 0075 Ex0075
Spencer & Son HELIOSTAT - STONEY 0106 Ex0106
Spencer & Son HELIOSTAT - STONEY 0124 Ex0124
Spencer & Son HELIOSTAT - STONEY 0572 Ex0572
Spencer & Son HELIOSTAT - STONEY 0673 UDP001
Spencer & Son HYGROMETER - MASON 1190 TDP114
Spencer & Son LEVEL - TELESCOPIC 0400 Ex0400
Spencer & Son LEVEL - TELESCOPIC 2472 PRI193
Spencer & Son LEVEL - TELESCOPIC 0402 Ex0402
Spencer & Son LEVEL - TELESCOPIC 0403 Ex0403
Spencer & Son LEVEL - Y 0629 NMD260
Spencer & Son LEVEL - Y 3224 QBE002
Spencer & Son MICROSCOPE - COMPOUND 1066 MAY042
Spencer & Son MICROSCOPE - COMPOUND 2837 NMD107
Spencer & Son ORGAN PIPE - BLOCK 2672 TDP216
Spencer & Son PANTOGRAPH 0401 Ex0401
Spencer & Son PARALLEL RULE 1369 TDE045
Spencer & Son POLARISCOPE - NORREMBERG 1049 MAY025
Spencer & Son RESISTANCE (?) 1076 MAY052
Spencer & Son SACCHARIMETER - JELLETT 0059 Ex0059
Spencer & Son SACCHARIMETER - JELLETT 0292 TDP165
Spencer & Son SACCHARIMETER - JELLETT 0513 Ex0513
Spencer & Son SCALE 1107 TDE017
Spencer & Son (Grubb) SPECTROSCOPE - TABLE 0104 Ex0104
Spencer & Son STOPPER 2153 UDP242

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Spencer & Son SURVEYING STAFF 1355 TDE025
Spencer & Son THEODOLITE - PLAIN 2483 SAL032
Spencer & Son THERMOMETER 0304 Ex0304
Spicer CIRCUMFERENTOR 0728 MAY003
Spicer CIRCUMFERENTOR 0007 Ex0007
Spicer CIRCUMFERENTOR 0214 Ex0214
Spicer CIRCUMFERENTOR 0215 Ex0215
Spicer CIRCUMFERENTOR 0517 Ex0517
Spicer, E. CIRCUMFERENTOR 0006 Ex0006
Spiller WHISTLE - GALTON 2518 UGP224
Spindler & Hoyer (Mason) ELECTROMETER 1997 RDS134
Sprenger, E. LEVEL - TELESCOPIC 4209 DCM005
Stanley ALIDADE - TELESCOPIC 0210 UGE021
Stanley ALIDADE - TELESCOPIC 1363 TDE029
Stanley AMMETER 3433 BIR135
Stanley AMMETER & VOLTMETER 1255 TDP102
Stanley CLINOMETER - ABNEY LEVEL 2585 PRI219
Stanley DIAL - MINER, HEDLEY 1092 TDE070
Stanley DRAWING CURVES 4496 CIL009
Stanley LEVEL - HAND 3230 QBE008
Stanley LEVEL - TELESCOPIC 1365 TDE038
Stanley LEVEL - TELESCOPIC 3862 UDE179
Stanley PLANIMETER - AMSLER 4391 PRI251
Stanley PLOTTING RULE 3417 BIR119
Stanley PROTRACTOR 1837 DUN019
Stanley SECTOR - ISOGRAPH 4420 PRI239
Stanley SLIDE RULE - FULLER CYLINDRICAL 0384 RDS017
Stanley SLIDE RULE - FULLER CYLINDRICAL 1098 TDE056
Stanley SLIDE RULE - FULLER CYLINDRICAL 1129 NMD037
Stanley SLIDE RULE - FULLER CYLINDRICAL 2962 NMD198
Stanley SLIDE RULE - FULLER CYLINDRICAL 3233 QBE011
Stanley THEODOLITE - PLAIN 3871 UDE188
Stanley THEODOLITE - TRANSIT 3869 UDE186
Stanley TRANSIT INSTRUMENT 3256 QBE033
Stanley VOLTMETER 3432 BIR134
Starrett Co. MICROMETER SCREW GAUGE 2481 PRI202
Stephen, A. BACKSTAFF 0643 Ex0643
Stephens, A. BACKSTAFF 0076 Ex0076
Stephens, A. BACKSTAFF 0077 Ex0077
Stevenson, P. HYDROMETER 1611 MAY100
Steward, J.H. GAS PRESSURE REGULATOR 3412 BIR114
Steward, J.H. LAMP - CARBON ARC 0431 RDS100
Steward, J.H. TELESCOPE - REFRACTING 2339 SAL022
Stiff, J. & Sons BATTERY CELL CYLINDERS 3363 UCP363
Stiles, W.M. WHIRLING TABLE 1471 UGP077
Still, W.M. & Co. CONDENSER 1561 STR020
St John, R.B. BAROMETER - ANEROID 2138 MIS038
Stoak, G. CIRCUMFERENTOR 0114 Ex0114
Stoakes, G. SCALE - GUNTER 0079 Ex0079
Stoakes, G. SURVEYING INSTRUMENT 3153 NMD109
Stoakes, G. DIAL - HORIZONTAL AND ANALEMATIC 0526 Ex0526
Stocks LAMP 1778 MAY261
Stokes DIAL - HORIZONTAL COMPASS 0080 Ex0080
Stokes, G. BACKSTAFF 0265 Ex0265
Stokes, G. DIAL - UNIVERSAL EQUINOCTIAL RING 0703 NMD002
Stokes, G. QUADRANT - HORARY 0078 Ex0078
Street, T. (Holst, H.E.) LEVEL - TELESCOPIC 3251 QBE028
Stuart, Professor GALVANOMETER - ASTATIC MIRROR 2852 UGP272
Sugg, W. BALANCE - KEATES 0745 UCP105
Sugg, W. GAS METER 0746 UCP106
Sugg, W. PHOTOMETER 1946 UCP173
Sullivan, H. SWITCH 0226 QBP020
Sullivan, H.W. GALVANOMETER 4061 MAY324
Sullivan, H.W. INDUCTANCE - VARIABLE 2709 TDP253
Sullivan, H.W. OSCILLATION TRANSFORMER 2731 TDP275
Sullivan, H.W. VALVE RECTIFIER 2733 TDP277
Sullivan, H.W. VALVE TESTER(?) 2734 TDP278
Sullivan, H.W. WAVEMETER 2732 TDP276
Sunbeam LAMP - ELECTRIC 1798 MAY281
Sunbeam LAMP - ELECTRIC 2407 BIR083
Sunbeam LAMP - ELECTRIC 3634 NMC130
Suter GAS PRESSURE REGULATOR 2501 UGP207
Suter, R. MICROSCOPE SLIDES 2300 PRI174
Sutherland Thompson & Co. WATER BATH 0376 RDS069
Swan STEREO VIEWER 4454 PRI268
Sweeny OCTANT 0105 Ex0105
Swift, J. & Son MICROSCOPE - COMPOUND 0557 IDG004
Swift, J. & Son MICROSCOPE - COMPOUND 3683 MIS054
Swift, J. & Son MICROSCOPE - COMPOUND 3909 ULS006
Swift, J. & Son MICROSCOPE - COMPOUND 4273 RCS023
Swift, J. & Son MICROSCOPE - COMPOUND 4413 NBG014
Tedeo BAROMETER - BANJO 2632 PRI067
Tedeo BAROMETER - BANJO 4027 MIS046
Telegraph Construction Co. ATLANTIC CABLE SAMPLES 3286 NMM026
Telegraph Works TESTING SET 0405 RDS050

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Telegraph Works TESTING SET 3093 UDE119
Thayer & Chandler AIR PUMP - SYRINGE 2415 BIR090
Thompson, A. DIAL - ANALEMMATIC 0659 NMD231
Thompson, James DIAL - HORIZONTAL PEDESTAL 3933 ULS030
Thompson, J. DIAL - VERTICAL 3940 ULS037
Thomson AMMETER 3626 NMC122
Thomson AMMETER 3626 NMD176
Thomson, J. THERMODYNAMIC SURFACE - MODEL 1031 QBC004
Thomson-Houston Co. WATTMETER 3133 UDE158
Thomson, Skinner & Hamilton HYDROMETER - TWADDELL 2301 PRI175
Thornton, A.G. LEVEL - TELESCOPIC 3250 QBE027
Thornton, A.G. LEVEL - TELESCOPIC 3252 QBE029
Thornton, A.G. LEVEL - SPIRIT 2480 PRI201
Thornton Pickard CAMERA - FOLDING 2707 TDP251
Thorp GRATING - DIFFRACTION 0692 UDP020
Thorp GRATING - DIFFRACTION 1953 UCP180
Thorp GRATING - DIFFRACTION 3485 QBP211
Thorp GRATING - DIFFRACTION 3827 NMC228
Thorp GRATING - DIFFRACTION, MOUNTED ON PRISM 3496 QBP222
Tickell BAROMETER - STICK 0042 Ex0042
Tinsley, H. & Co. RESISTANCE BOX 3109 UDE134
Tinsley, H. & Co. BRIDGE - WHEATSTONE 3051 UDE077
Tinsley, H. & Co. CONDENSER - STANDARD 3039 UDE065
Tinsley, H. & Co. CONDENSER - VARIABLE 0891 UDP157
Tinsley, H. & Co (T. Mason) CONDENSER BOX 2272 UDP350
Tinsley, H. & Co. GALVANOMETER - AYRTON MATHER 1225 TDP052
Tinsley, H. & Co. GALVANOMETER - AYRTON MATHER 2674 TDP218
Tinsley, H. & Co. GALVANOMETER - AYRTON MATHER 3030 UDE056
Tinsley, H. & Co. GALVANOMETER - DRYSDALE-TINSLEY 1232 TDP020
Tinsley, H. & Co. POTENTIOMETER 1346 TDP060
Tinsley, H. & Co. POTENTIOMETER - VERNIER 3069 UDE095
Tinsley, H. & Co. VOLT RATIO BOX 3112 UDE137
Tisley, S.C. & Co. OPTICAL ELEMENT 2171 UDP257
Tisley, S.C. & Co. WHISTLE - GALTON 2402 BIR078
Tisley & Spiller PENDULUM - TISLEY COMPOUND 1349 TDP047
TN DIAL - HORIZONTAL PEDESTAL 2446 NMD095
Townshend & Co. BELLS - SET OF 3587 NMC083
Townson & Mercer EXPANSION APPARATUS - PULLINGER 3788 NMC189
Townson & Mercer HYDROMETER 2055 BLA054
Tree, J. SCALE 4470 PRI282
Trevithick, R. (West, W.) MECHANICAL MODEL - STEAM ENGINE 4471 MIS077
Troughton BAROMETER - STICK 4103 UFM020
Troughton LEVEL - Y 0630 NMD259
Troughton OCTANT 4092 UFM010
Troughton PROTRACTOR - CIRCULAR 2599 NMD203
Troughton SEXTANT 0354 CWC036
Troughton SEXTANT 4094 UFM011
Troughton STANDARD LENGTH - IMPERIAL 1257 TDP161
Troughton TELESCOPE - EQUATORIAL 3688 ARM001
Troughton TRANSIT INSTRUMENT 0964 BIR004
Troughton & Simms BAROMETER - STICK 1859 MIS026
Troughton & Simms CIRCUMFERENTOR 3864 UDE181
Troughton & Simms COMPASS - PRISMATIC 0628 PRI130
Troughton & Simms DIP CIRCLE 0771 UDP039
Troughton & Simms EYEPIECE - MICROMETER 3970 ARM044
Troughton & Simms LEVEL - TELESCOPIC 0201 UGE012
Troughton & Simms LEVEL - TELESCOPIC 0569 IDG005
Troughton & Simms LEVEL - TELESCOPIC 2574 PRI209
Troughton & Simms LEVEL - TELESCOPIC 3235 QBE013
Troughton & Simms LEVEL - TELESCOPIC 3249 QBE026
Troughton & Simms LEVEL - TELESCOPIC 3253 QBE030
Troughton & Simms LEVEL - TELESCOPIC 3254 QBE031
Troughton & Simms LEVEL - TELESCOPIC 3255 QBE032
Troughton & Simms LEVEL - TELESCOPIC 4428 PRI263
Troughton & Simms LEVEL - Y 1079 TDE039
Troughton & Simms LEVEL - Y 2486 SAL035
Troughton & Simms PANTOGRAPH 0965 BIR005
Troughton & Simms PLATE MEASURER 1850 DUN032
Troughton & Simms PLATE MEASURER 1851 DUN033
Troughton & Simms PLATE MEASURER 2843 TDP304
Troughton & Simms PLATE MEASURER 3947 ARM021
Troughton & Simms PROTRACTOR 3246 QBE023
Troughton & Simms PROTRACTOR - CIRCULAR 0976 BIR017
Troughton & Simms PROTRACTOR - CIRCULAR 1099 TDE063
Troughton & Simms PROTRACTOR - CIRCULAR 3031 UDE057
Troughton & Simms REFLECTING CIRCLE 0606 NMD282
Troughton & Simms REFLECTING CIRCLE 1328 TDP012
Troughton & Simms SCALE 1353 TDE022
Troughton & Simms SEXTANT - BOX 1084 TDE007
Troughton & Simms SPECTROSCOPE - TABLE 2844 TDP305
Troughton & Simms STANDARD YARD 0494 RDS136
Troughton & Simms STANDARD YARD 1230 TDP160
Troughton & Simms TELESCOPE - REFRACTING 0242 QBP036
Troughton & Simms TELESCOPE - REFRACTING 1848 DUN030
Troughton & Simms THEODOLITE - EVEREST 0633 NMD256

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Troughton & Simms THEODOLITE - PLAIN 1093 TDE011
Troughton & Simms THEODOLITE - PLAIN 4457 PRI271
Troughton & Simms THEODOLITE - TRANSIT 1089 TDE016
Troughton & Simms THEODOLITE - TRANSIT 1090 TDE043
Troughton & Simms THEODOLITE - TRANSIT 3229 QBE007
Troughton & Simms THEODOLITE - TRANSIT 3257 QBE034
Troughton & Simms THEODOLITE - TRANSIT 3258 QBE035
Troughton & Simms THEODOLITE - TRANSIT 3259 QBE036
Troughton & Simms THEODOLITE - TRANSIT 3260 QBE037
Troughton & Simms THEODOLITE - TRANSIT 3870 UDE187
Troughton & Simms THEODOLITE - TRANSIT 3872 UDE189
Troughton & Simms THERMOMETER - GLASS MERCURY 3468 QBP194
Troughton & Simms TRANSIT INSTRUMENT 0962 BIR002
Troy, E. DIAL - HORIZONTAL PEDESTAL 2453 PRI184
Tryon, H. DRAWING INSTRUMENTS - SET 0622 NMD266
Tucher, T. DIAL - DIPTYCH 3426 BIR128
Tulley TELESCOPE - REFRACTING 1827 DUN009
Tulley & Sons TELESCOPE - REFRACTING 0603 NMD284
Twaddell, W. HYDROMETER - TWADDELL 2310 QBP076
Twickenham Co. INTERRUPTOR 2871 UCP287
Underwood & Underwood STEREO VIEWER 4455 PRI269
Vacher TABLES 1384 TDE067
Veeder Co. PHONIC WHEEL 1340 TDP205
Velasquez, M.A. SPECTROSCOPE - DIRECT VISION 1019 PRI157
Verdin, C. METRONOME 0074 UGP031
Victoria, Queen PATENT PAPERS OF NICHOLAS CALLAN 4059 MAY322
Voss, J.R. ELECTROSTATIC GENERATOR - VOSS 1503 UGP085
Voster, D. DIAL - HORIZONTAL PEDESTAL 1564 MIS020
Voster, D. DIAL - HORIZONTAL PEDESTAL 1866 PRI031
Voster, D. SLIDE RULE 0107 Ex0107
W, J. LANTERN - UNIAL 0443 RDS068
Walker CIRCUMFERENTOR 0208 Ex0208
Walker CIRCUMFERENTOR 0283 Ex0283
Walker CIRCUMFERENTOR 0492 Ex0492
Walker CIRCUMFERENTOR 2640 NMD112
Walker DRAWING INSTRUMENTS - SET 0210 Ex0210
Walker DRAWING INSTRUMENTS - SET 0586 Ex0586
Walker SHIP'S LOG REGISTER 2341 SAL024
Walker, T. SHIP'S LOG 2493 SAL042
Walker, T. SHIP'S LOG 3261 NMM001
Walker, W. DIAL - HORIZONTAL PEDESTAL 3678 PRI107
Walker & Son CIRCUMFERENTOR 0284 Ex0284
Walker & Son CIRCUMFERENTOR 0285 Ex0285
Walker & Son CIRCUMFERENTOR 0483 Ex0483
Walker & Son CIRCUMFERENTOR 0639 Ex0639
Walker & Son CIRCUMFERENTOR 0713 NMD012
Walker & Son CIRCUMFERENTOR 0731 MAY006
Walker & Son CIRCUMFERENTOR 1399 NMD049
Walker & Son CIRCUMFERENTOR 2465 NMD115
Walker & Son CIRCUMFERENTOR 2638 NMD114
Walker & Son CIRCUMFERENTOR 2639 NMD113
Walker & Son DIAL - HORIZONTAL COMPASS 0081 Ex0081
Wallace THEODOLITE - PLAIN 0191 UGE002
Wallace, R. BAROMETER - ANEROID 3675 PRI104
Wallace, R. BAROMETER - STICK 1051 MAY027
Walsall AMMETER 3419 BIR121
Walsh, J. DIAL - HORIZONTAL PEDESTAL 2443 NMD092
Walsh, R. CLOCK/BAROMETER/THERMOMETER 3524 SAL047
Walton, E.T.S. FRICTION DEMONSTRATION APPARATUS 4234 NMD190
Walton, E.T.S. INVERTED PENDULUM APPARATUS 4235 NMD191
Walton, E.T.S. WIRELESS 4233 NMD189
Wands MICROSCOPE - COMPOUND 0319 CWC045
Wardale, J. & Co. COMPASS 1619 MAY108
Warren, J. BALANCE - EQUAL ARM 0630 Ex0630
Warren, J. BALANCE - EQUAL ARM 4224 PRI242
Warrington et.al. BURNER - GAS 4128 MAY332
Warwick Trading Co. LAMP - CARBON ARC 3356 UCP356
Watkins EXPOSURE METER 2390 BIR066
Watkins EXPOSURE METER 2389 BIR065
Watkins, J. & W. PANTOGRAPH 0623 NMD265
Watkins & Hill AIR PUMP - DOUBLE BARREL 3302 UCP302
Watkins & Hill BALANCE - PRECISION 2869 UCP285
Watkins & Hill BALANCE - SPRING 2308 QBP074
Watkins & Hill BASE 3331 UCP331
Watkins & Hill CLINOMETER 0644 NMD245
Watkins & Hill DISCHARGE TUBE - GEISSLER 0086 UCP072
Watkins & Hill ELECTROMETER - TORSION, COULOMB 0300 CWC031
Watkins & Hill GALVANOMETER - ASTATIC, NOBILI 1208 TDP013
Watkins & Hill IMPACT APPARATUS 3734 UGP385
Watkins & Hill LEVEL - Y 0197 UGE008
Watkins & Hill MANOMETER 2826 UCP279
Watkins & Hill MECHANICAL MODEL - BEAM ENGINE 3729 UGP380
Watkins & Hill MECHANICAL MODEL - BOILER 3733 UGP384
Watkins & Hill MECHANICAL MODEL - PUMP 3298 UCP298
Watkins & Hill MECHANICAL MODEL - PUMP 3299 UCP299

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Watkins & Hill MECHANICAL MODEL - PISTON ENGINE 3730 UGP381
Watkins & Hill MECHANICAL MODEL - STEAM LOCOMOTIVE 3731 UGP382
Watkins & Hill MECHANICAL MODEL - WATER WHEEL 3732 UGP383
Watkins & Hill PENDULUM - CYCLOIDAL CHEEKS 2307 QBP073
Watkins & Hill POLARISCOPE 0331 CWC010
Watkins & Hill POLARISCOPE 1934 UCP161
Watkins & Hill ROLLERS 3204 QBP149
Watkins & Hill SCREW PRESS 1949 UCP176
Watkins & Hill STEREO VIEWER 1469 UCP157
Watkins & Hill TELEGRAPH APPARATUS 2979 UDE005
Watkins & Hill WAVE DEMONSTRATION APPARATUS 2793 UCP246
Watson, J. TELESCOPE - REFLECTING 0597 NMD289
Watson & Son BAROMETER - STICK 3619 NMC115
Watson & Sons BAROMETER - ANEROID, PORTABLE 2611 PRI045
Watson & Sons LAMP - MICROSCOPE 3910 ULS007
Watson & Sons MICROSCOPE - COMPOUND 2600 NMD205
Watson, W. & Sons MICROSCOPE - COMPOUND 4272 RCS022
Watson & Sons MICROSCOPE - COMPOUND, BINOCULAR 4026 MIS045
Watson & Sons TELESCOPE - REFRACTING 1553 STR012
Watson & Sons TELESCOPE - REFRACTING 3440 BIR142
Watson, W. & Sons CAMERA - BELLOWS 2384 BIR060
Watson, W. & Sons CAMERA - BOX 2726 TDP270
Watson, W. & Sons CINEMATOGRAPH PROJECTOR 0485 RDS053
Watson, W. & Sons COIL - INDUCTION, RUHMKORFF 3834 NMC235
Watson, W. & Sons EYEPIECE - MICROMETER 1334 TDP017
Watson, W. & Sons HELIOSTAT - STONEY 0428 RDS016
Watson, W. & Sons (T. Mason) LANTERN - UNIAL 2889 UGP297
Watson, W. & Sons LENS SYSTEM 2388 BIR064
Watson, W. & Sons MICROSCOPE SLIDES 2354 BIR040
Watson, W. & Sons MICROSCOPE - COMPOUND 4044 UGG006
Watson, W. & Sons MICROSCOPE - COMPOUND, MUSEUM 2367 NMD072
Watson, W. & Sons MICROSCOPE - COMPOUND, MUSEUM 4079 ULS001
Watson, W. & Sons POLARISCOPE - ELBOW 1307 TDP051
Watson, W. & Sons SPINTHARISCOPE 1550 STR009
Watson, W. & Sons TELESCOPE - REFRACTING 1505 UGP075
Watts, E.R. & Son OPTICAL SQUARE(?) 2588 PRI222
Watts, J. BAROGRAPH - ANEROID 0626 Ex0626
Watts, J. TELESCOPE - REFRACTING 3874 PRI119
Webb, J. DIAL - UNIVERSAL INCLINING 0667 NMD223
Wedgwood BATTERY - GROVE 1793 MAY276
Wedgwood MORTAR & PESTLE 0367 RDS111
Weiss & Son EAR TRUMPET 1736 MAY219
Welch OPTICAL DISC - HARTL 0695 UDP023
Welch OPTICAL DISC - HARTL 1973 UCP200
Wells, A.C. & Co. LAMP 1708 MAY195
Wenborn, R. BALANCE - EQUAL ARM 2394 BIR070
West MICROSCOPE - COMPOUND, GOULD 2972 NEW002
West SEXTANT - BOX 1113 PRI004
West London Co. GALVANOMETER - ASTATIC 2554 UGP259
Westinghouse Co. WATTMETER 2684 TDP228
Westminster Engineering Co. AMMETER 3043 UDE069
Westminster Engineering Co. VOLTMETER 3027 UDE053
Weston Co. AMMETER 1226 TDP007
Weston Co. AMMETER 2259 UDP337
Weston Co. AMMETER 3790 NMC191
Weston Co. GALVANOMETER 2705 TDP249
Weston Co. VOLTMETER 0918 UDP183
Weston Co. VOLTMETER 2260 UDP338
Weston Co. VOLTMETER 2683 TDP227
Weston Co. VOLTMETER 3022 UDE048
Weston Co. VOLTMETER 3789 NMC190
Wharton, T. BURNER 2284 PRI170
Wheatstone, G. (Yeates & Son) WAVE DEMONSTRATION APPARATUS 3825 NMC226
Whitbread, G. ARTIFICIAL HORIZON 4116 UFM031
Whitbread, G. SEXTANT 1838 DUN020
White, H. DIAL - HORIZONTAL PEDESTAL 2456 PRI185
White, J. AMPERE GAUGE 0769 UDP037
White, J. AMPERE GAUGE 2531 UGP237
White, J. AMPERE GAUGE 3393 NMC024
White, J. AMPERE GAUGE 3393 NMD311
White, J. AMMETER - MAGNETO STATIC 0001 UGP001
White, J. AMMETER - MAGNETO STATIC 3010 UDE036
White, J. AMMETER - MAGNETO STATIC 3033 UDE059
White, J. BALANCE - ELECTRIC 1336 TDP018
White, J. BALANCE - ELECTRIC 3008 UDE034
White, J. CIRCUMFERENTOR 0641 NMD248
White, J. CIRCUMFERENTOR 0642 NMD247
White, J. ELECTROMETER 3191 QBP136
White, J. ELECTROMETER - GOLD LEAF 0770 UDP038
White, J. ELECTROMETER - QUADRANT, KELVIN 0024 UCP074
White, J. GALVANOMETER - CURRENT 0219 QBP015
White, J. GALVANOMETER - CURRENT 0925 UDP190
White, J. GALVANOMETER - CURRENT 3079 UDE105
White, J. GALVANOMETER - POTENTIAL 0218 QBP014
White, J. GALVANOMETER - POTENTIAL 0924 UDP189

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White, J. GALVANOMETER - POTENTIAL 3078 UDE104
 White, J. HYDROMETER - TWADDELL 0540 IDG043
 White, J. MAGNETOMETER 3080 UDE106
 White, J. RESISTANCE - VARIABLE 3057 UDE083
 White, J. RESISTANCE BOX 1337 TDP208
 White, J. SOUNDING TUBES 3287 NMM027
 White, J. TESTING SET 3092 UDE118
 White, J. VOLTMETER - ELECTROSTATIC 1148 TDP035
 White, J. VOLTMETER - ELECTROSTATIC 1981 UCP208
 White, J. VOLTMETER - MULTICELLULAR 0175 UGP054
 White, J. VOLTMETER - MULTICELLULAR 3009 UDE035
 White, J. VOLTMETER - MULTICELLULAR 3019 UDE045
 White, J. VOLTMETER - MULTICELLULAR 3063 UDE089
 White, J. VOLTMETER - MULTICELLULAR 3064 UDE090
 Whitehurst, J. LENGTH MEASURING DEVICE 3961 ARM035
 Whyte, J. FORCEPS - OBSTETRIC 0514 Ex0514
 Whyte, Thomson & Co. COMPASS - MARINE, IN BINNACLE 3290 NMM030
 Wilkinson BALANCE - FOLDING COIN 1694 MAY181
 Wilkinson, A. BALANCE - FOLDING COIN 4364 ULS051
 Wilkinson, A. BALANCE - FOLDING COIN 4366 ULS053
 Williams, L.E. QUADRANT - HORARY, GUNTER 4218 PRI238
 Williams, W. & Sons BALANCE - EQUAL ARM 3845 SAL053
 Williams & Woods HYGROMETER - MASON 2042 BLA031
 Williams' Perran Co. MECHANICAL MODEL - BEAM ENGINE 3150 UDE175
 Williamson BAROMETER 3529 PRI089
 Williamson Co. CAMERA - CINEMATOGRAPHIC 1158 TDP175
 Wilson, W. MICROSCOPE - TRAVELLING 0259 QBP054
 Wilson & Gillie SEXTANT 3265 NMM005
 Wilson, Warden & Co. BAROGRAPH - ANEROID 4503 MET002
 Wilton, W. DIP CIRCLE 2328 QBP094
 Winkel SPECTROSCOPE - DIRECT VISION 2813 UCP266
 Winkel-Zeiss SPECTROSCOPE - DIRECT VISION 1021 PRI159
 With TELESCOPE - REFLECTING 1829 DUN011
 Wolfram Diagnostik X-RAY TUBE 3607 NMC103
 Wood, G. CALCULATOR 3237 QBE015
 Woodhouse & Rawson Co. LAMP - PENTANE 2642 RDS140
 Woodhouse & Rawson Co. LAMP - PENTANE 3142 UDE167
 Woodside, J. BACKSTAFF 0117 Ex0117
 Wray Coussell CINEMATOGRAPH MECHANISM 2660 RDS158
 Wynn, W. & C. DIVIDERS - WINGED 4467 PRI279
 Yeates BAROMETER - ANEROID, PORTABLE 2610 PRI044
 Yeates BAROMETER - BANJO 1862 MIS029
 Yeates BAROMETER - BANJO 0014 Ex0014
 Yeates BAROMETER - STICK 0012 Ex0012
 Yeates BAROMETER - STICK 0013 Ex0013
 Yeates BATTERY - DRY PILE, ZAMBONI 1168 TDP147
 Yeates (Mottershead & Co.) COIL - INDUCTION, MEDICAL 0473 Ex0473
 Yeates DIAL - HORIZONTAL PEDESTAL 4038 PRI138
 Yeates DIAL - MINER 0409 Ex0409
 Yeates ELECTROMETER - HENLEY 1818 MAY301
 Yeates GNOMON 0338 Ex0338
 Yeates GONIOMETER - CRYSTAL, WOLLASTON 1048 MAY024
 Yeates HYDROMETER 1604 MAY093
 Yeates OCTANT 1045 MAY021
 Yeates OCTANT 1130 NMD038
 Yeates PROTRACTOR 0279 Ex0279
 Yeates PROTRACTOR - CIRCULAR 0194 UGE005
 Yeates PROTRACTOR - CIRCULAR 1101 TDE023
 Yeates SCALE 1110 TDE020
 Yeates SEXTANT - BOX 0555 Ex0555
 Yeates THEODOLITE 0211 Ex0211
 Yeates WEIGHTS 1530 UGP119
 Yeates, A. COMPASS - PRISMATIC 0480 Ex0480
 Yeates, G. BAROMETER - ANEROID 0563 Ex0563
 Yeates, G. BAROMETER - STICK 4445 MIS009
 Yeates, H. COIL - INDUCTION 0405 Ex0405
 Yeates, H. COIL - INDUCTION 1589 MAY078
 Yeates, H. LENS - BULL'S EYE 0557 Ex0557
 Yeates, H. MICROSCOPE - COMPOUND 0120 Ex0120
 Yeates, H. THEODOLITE - PLAIN 1379 TDE060
 Yeates, K. THERMOMETER - GLASS MERCURY 4170 PRI225
 Yeates, S. BAROMETER - STICK 0010 Ex0010
 Yeates, S. BAROMETER - STICK 1437 PRI017
 Yeates, S. DIAL - HORIZONTAL PEDESTAL 0011 Ex0011
 Yeates, S. DIAL - UNIVERSAL MECHANICAL EQUINOCTIAL 0038 Ex0038
 Yeates, S. INSTRUMENT COMPENDIUM 0559 Ex0559
 Yeates, S. INSTRUMENT COMPENDIUM 1719 SAL006
 Yeates, S. MICROSCOPE - SOLAR 0009 Ex0009
 Yeates, S.M. TELEPHONE 0097 Ex0097
 Yeates, W. MICROSCOPE - COMPOUND 0098 Ex0098
 Yeates & Son AIR PUMP PLATE 0093 Ex0093
 Yeates & Son AIR PUMP PLATE 1326 TDP206
 Yeates & Son AIR PUMP PLATE 1734 MAY217
 Yeates & Son AIR PUMP PLATE 2892 UGP300
 Yeates & Son AMPERE APPARATUS 0054 UGP017

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Yeates & Son AMPERE APPARATUS 1280 TDP190
Yeates & Son AMPERE APPARATUS 1756 MAY239
Yeates & Son AMPERE APPARATUS 1944 UCP171
Yeates & Son AMPERE APPARATUS 2033 BLA022
Yeates & Son AMPERE APPARATUS 2234 UDP312
Yeates & Son ANEMOMETER - BIRAM 0471 RDS007
Yeates & Son ANEMOMETER 0419 Ex0419
Yeates & Son ARAGO DISC APPARATUS 0057 UGP016
Yeates & Son ARAGO DISC APPARATUS 0261 QBP056
Yeates & Son ARAGO DISC APPARATUS 1729 MAY212
Yeates & Son ARAGO DISC APPARATUS 1942 UCP169
Yeates & Son BALANCE - ELECTRIC 3131 UDE156
Yeates & Son BAROGRAPH 0473 RDS009
Yeates & Son BAROGRAPH - ANEROID 0421 Ex0421
Yeates & Son BAROGRAPH - ANEROID 1867 RDS130
Yeates & Son BAROGRAPH - ANEROID 1986 MIS034
Yeates & Son BAROMETER - ANEROID 0040 Ex0040
Yeates & Son BAROMETER - ANEROID 3297 PRI081
Yeates & Son BAROGRAPH - ANEROID, SHORT & MASON 3738 PRI113
Yeates & Son BAROMETER - BANJO 0015 Ex0015
Yeates & Son BAROMETER - BANJO 1418 MIS007
Yeates & Son BAROMETER - FORTIN 0472 RDS031
Yeates & Son BAROMETER - FORTIN 1786 MAY269
Yeates & Son BAROMETER - FORTIN 2263 UDP341
Yeates & Son BAROMETER - STICK 1417 MIS008
Yeates & Son BAROMETER - STICK 1985 MIS033
Yeates & Son BAROMETER - STICK 2362 BIR048
Yeates & Son BAROMETER - STICK 2607 PRI041
Yeates & Son BASE 3199 QBP144
Yeates & Son BATTERY - BICHROMATE 1794 MAY277
Yeates & Son BATTERY - BICHROMATE 2671 TDP215
Yeates & Son BATTERY - DRY PILE, ZAMBONI 0090 UCP037
Yeates & Son BATTERY - DRY PILE, ZAMBONI 0262 QBP057
Yeates & Son BATTERY - DRY PILE, ZAMBONI 1587 MAY076
Yeates & Son BATTERY - LECLANCHÉ 2279 PRI165
Yeates & Son BATTERY - LECLANCHÉ 2422 BIR101
Yeates & Son BATTERY - ZINC/CARBON 1771 MAY254
Yeates & Son BELL 1735 MAY218
Yeates & Son BELL - ELECTRIC 0284 CWC067
Yeates & Son BELL - ELECTRIC 1684 MAY171
Yeates & Son BELL - ELECTRIC, "THE GAMUT" 1581 MAY070
Yeates & Son BOILER - MARCET 3624 Ex0608
Yeates & Son BOILER - MARCET 3624 NMC120
Yeates & Son BRIDGE 0785 UDP052
Yeates & Son CATHETOMETER 1810 MAY293
Yeates & Son CATHETOMETER 4049 MAY312
Yeates & Son CHEMICALS - SET 2691 TDP235
Yeates & Son CHLADNI PLATE 1922 UGP191
Yeates & Son CHLADNI PLATE 3213 QBP158
Yeates & Son CLINOMETER 0039 Ex0039
Yeates & Son CLOCK - REGULATOR 0256 QBP050
Yeates & Son CLOCK - REGULATOR 0257 QBP051
Yeates & Son CLOCK/BAROGRAPH/THERMOMETER 0475 Ex0475
Yeates & Son CLOCK/BAROGRAPH/THERMOMETER 0519 Ex0519
Yeates & Son CLOCK/BAROGRAPH/THERMOMETER 4446 TDP322
Yeates & Son COIL 2322 QBP088
Yeates & Son COIL 0271 QBP066
Yeates & Son COIL 1507 UGP097
Yeates & Son COIL 1515 UGP093
Yeates & Son COIL 1574 MAY063
Yeates & Son COIL 1629 MAY116
Yeates & Son COIL 2097 BLA085
Yeates & Son COIL 2669 TDP213
Yeates & Son COIL 2774 UCP227
Yeates & Son COIL - INDUCTION 1590 MAY079
Yeates & Son COIL - INDUCTION 1803 MAY286
Yeates & Son COIL - INDUCTION, RUHMKORFF 0103 UCP035
Yeates & Son COIL - INDUCTION, RUHMKORFF 0307 CWC020
Yeates & Son COIL - INDUCTION, RUHMKORFF 0793 UDP059
Yeates & Son COIL - INDUCTION, RUHMKORFF 1593 MAY082
Yeates & Son COIL - INDUCTION, RUHMKORFF 1811 MAY294
Yeates & Son COLOUR SPINNER 2715 TDP259
Yeates & Son COMPASS 0209 Ex0209
Yeates & Son COMPASS - BEAM 1374 TDE051
Yeates & Son COMPASS - VARIATION 1053 MAY029
Yeates & Son CONDENSER - VARIABLE, AEPINUS 1582 MAY071
Yeates & Son CONDENSER - VARIABLE, AEPINUS 1943 UCP170
Yeates & Son CONDENSER - VARIABLE, AEPINUS 3310 UCP310
Yeates & Son CONDUCTOR - SPHERICAL 2192 UDP278
Yeates & Son CRITICAL STATE APPARATUS 2673 TDP217
Yeates & Son CRYSTAL - ICELAND SPAR 0819 UDP085
Yeates & Son DIAL - HORIZONTAL PEDESTAL 0212 Ex0212
Yeates & Son DIAL - HORIZONTAL PEDESTAL 1118 PRI006
Yeates & Son DIAL - HORIZONTAL PEDESTAL 3668 PRI096
Yeates & Son DIAL - HORIZONTAL PEDESTAL 4036 PRI139

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Yeates & Son DIAL - HORIZONTAL PEDESTAL 1119 PRI009
Yeates & Son DIAL - HORIZONTAL PEDESTAL 2164 PRI010
Yeates & Son DIAL - UNIVERSAL EQUINOCTIAL 0495 Ex0495
Yeates & Son DIP CIRCLE 3813 Ex0611
Yeates & Son DIP CIRCLE 2023 BLA012
Yeates & Son DIP CIRCLE 3813 NMC214
Yeates & Son DISC SPINNER 3815 Ex0612
Yeates & Son DISC SPINNER 3816 Ex0613
Yeates & Son DISC SPINNER 1217 TDP134
Yeates & Son DISC SPINNER 1670 MAY157
Yeates & Son (Baird & Tatlock) DISC SPINNER 3815 NMC216
Yeates & Son DISC SPINNER 3816 NMC217
Yeates & Son DISC SPINNER 4153 TDP319
Yeates & Son DISCHARGE TUBE 0283 CWC025
Yeates & Son DISCHARGE TUBE 0834 UDP100
Yeates & Son DIVIDED CIRCLE 2146 UDP235
Yeates & Son DIVIDING ENGINE 1065 MAY041
Yeates & Son EARTH INDUCTOR - DELEZENNE CIRCLE 1504 UGP072
Yeates & Son EARTH INDUCTOR - DELEZENNE CIRCLE 2230 UDP308
Yeates & Son ELECTRIC EGG 0297 CWC038
Yeates & Son ELECTRIC EGG 1700 MAY187
Yeates & Son ELECTRIC EGG 2072 BLA052
Yeates & Son ELECTRIC MOTOR 0168 UGP047
Yeates & Son ELECTRIC MOTOR 1657 MAY144
Yeates & Son ELECTRIC MOTOR 1673 MAY160
Yeates & Son ELECTRIC MOTOR 1805 MAY288
Yeates & Son ELECTRIC MOTOR 3003 UDE029
Yeates & Son ELECTRICAL MACHINE - CLARKE 0029 UCP058
Yeates & Son ELECTROMAGNET 1722 MAY205
Yeates & Son ELECTROMAGNET 2670 TDP214
Yeates & Son ELECTROMAGNETIC APPARATUS 3035 UDE061
Yeates & Son ELECTROMAGNETIC BALANCE 1072 MAY048
Yeates & Son ELECTROMAGNETIC ROTATION APPARATUS 0415 Ex0415
Yeates & Son ELECTROMAGNETIC ROTATION APPARATUS 1630 MAY117
Yeates & Son ELECTROMAGNETIC ROTATION APPARATUS 2199 UDP285
Yeates & Son ELECTROMAGNETIC ROTATION APPARATUS 2558 MAY305
Yeates & Son ELECTRO-MEDICAL APPARATUS 0108 UCP029
Yeates & Son ELECTROMETER - TORSION, COULOMB 3373 Ex0590
Yeates & Son ELECTROMETER - TORSION, COULOMB 3373 NMC004
Yeates & Son ELECTROMETER - GOLD LEAF 3181 QBP126
Yeates & Son ELECTROPHORUS 1243 TDP119
Yeates & Son ELECTROSTATIC GENERATOR - CARRÉ 0701 UDP029
Yeates & Son ELECTROSTATIC GENERATOR - CARRÉ 1633 MAY120
Yeates & Son ELECTROSTATIC GENERATOR - CARRÉ 2742 TDP286
Yeates & Son ELECTROSTATIC GENERATOR - CUTHBERTSON 3345 UCP345
Yeates & Son ELECTROSTATIC GENERATOR - WIMSHURST 0158 UGP037
Yeates & Son ELECTROSTATIC GENERATOR - WIMSHURST 0778 UDP045
Yeates & Son ELECTROSTATIC GENERATOR - WIMSHURST 1583 MAY072
Yeates & Son ELECTROSTATIC GENERATOR - WIMSHURST 2124 UDP054
Yeates & Son ELLIPTOGRAPH 1100 TDE048
Yeates & Son ERECTOR 0102 UCP031
Yeates & Son ERECTOR 0425 RDS032
Yeates & Son ERECTOR 1324 TDP067
Yeates & Son ERECTOR 1671 MAY158
Yeates & Son EUDIOMETER - CAVENDISH 0359 RDS010
Yeates & Son EXPANSION APPARATUS 0417 Ex0417
Yeates & Son EXPANSION APPARATUS 1284 TDP044
Yeates & Son EXPANSION APPARATUS 2180 UDP266
Yeates & Son EXPANSION APPARATUS - BAR BREAKER 3618 Ex0606
Yeates & Son EXPANSION APPARATUS - BAR BREAKER 0814 UDP080
Yeates & Son EXPANSION APPARATUS - BAR BREAKER 1077 MAY053
Yeates & Son EXPANSION APPARATUS - BAR BREAKER 3618 NMC114
Yeates & Son EXPANSION APPARATUS - BAR BREAKER 4054 MAY317
Yeates & Son EXPANSION APPARATUS - 'S GRAVESANDE 2796 UCP249
Yeates & Son EXPANSION APPARATUS - TWO METALS 0101 Ex0101
Yeates & Son EXPANSION APPARATUS - TWO METALS 0416 Ex0416
Yeates & Son EXPANSION APPARATUS - TWO METALS 0832 UDP098
Yeates & Son EXPANSION APPARATUS - TWO METALS 1078 MAY054
Yeates & Son EYE MODEL 2316 QBP082
Yeates & Son EYEPIECE - MICROMETER 2218 UDP296
Yeates & Son FARADAY NEEDLE 0216 QBP012
Yeates & Son FARADAY NEEDLE 1238 TDP187
Yeates & Son FARADAY NEEDLE 1956 UCP191
Yeates & Son FARADAY NEEDLE 2065 BLA047
Yeates & Son FARADAY NEEDLE 2693 TDP237
Yeates & Son FARADAY NEEDLE 4131 MAY335
Yeates & Son FIRE SYRINGE 1154 TDP148
Yeates & Son FLASH POINT TESTER 0360 RDS036
Yeates & Son GALVANOMETER 0391 RDS109
Yeates & Son GALVANOMETER 1591 MAY080
Yeates & Son GALVANOMETER - ASTATIC MIRROR 0783 UDP050
Yeates & Son GALVANOMETER - ASTATIC MIRROR 1715 MAY202
Yeates & Son GALVANOMETER - ASTATIC MIRROR 3026 UDE052
Yeates & Son GALVANOMETER - ASTATIC MIRROR 3097 UDE123
Yeates & Son GALVANOMETER - ASTATIC, NOBILI 0302 CWC032

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Yeates & Son GALVANOMETER - ASTATIC, NOBILI 0392 RDS075
Yeates & Son GALVANOMETER - ASTATIC, NOBILI 2028 BLA017
Yeates & Son GALVANOMETER - ASTATIC, NOBILI 3066 UDE092
Yeates & Son GALVANOMETER - MIRROR 2549 UGP255
Yeates & Son GALVANOMETER - TANGENT 1580 MAY069
Yeates & Son GALVANOMETER - TANGENT 1586 MAY075
Yeates & Son GALVANOMETER - TANGENT, GAUGAIN 0782 UDP049
Yeates & Son GALVANOMETER - UPRIGHT 3564 Ex0598
Yeates & Son GALVANOMETER - UPRIGHT 0182 UGP062
Yeates & Son GALVANOMETER - UPRIGHT 0916 UDP181
Yeates & Son GALVANOMETER - UPRIGHT 1588 MAY077
Yeates & Son GALVANOMETER - UPRIGHT 1937 UCP164
Yeates & Son GALVANOMETER - UPRIGHT 2735 TDP279
Yeates & Son GALVANOMETER - UPRIGHT 3564 NMC060
Yeates & Son GALVANOMETER - UPRIGHT 4151 TDP317
Yeates & Son GEOMETRICAL MODELS 1380 TDE062
Yeates & Son GONIOMETER - CRYSTAL 1041 MAY015
Yeates & Son GONIOMETER - CRYSTAL, WOLLASTON 0824 UDP090
Yeates & Son GONIOMETER - CRYSTAL, WOLLASTON 1046 MAY022
Yeates & Son GONIOMETER - CRYSTAL, WOLLASTON 2315 QBP081
Yeates & Son GONIOMETER - REFRACTION 0332 CWC007
Yeates & Son GRATING - DIFFRACTION 0776 UDP043
Yeates & Son GYROSCOPE 0815 UDP081
Yeates & Son HARDNESS TESTER 1675 MAY162
Yeates & Son HELIOSTAT - STONEY 0043 Ex0043
Yeates & Son HELIOSTAT - STONEY 0155 UGP034
Yeates & Son HELIOSTAT - STONEY 0429 RDS006
Yeates & Son HELIOSTAT - STONEY 1058 MAY034
Yeates & Son HELIOSTAT - STONEY 1435 MAY055
Yeates & Son HYDROMETER 1292 TDP197
Yeates & Son HYDROMETER 1636 MAY123
Yeates & Son HYDROMETER 2311 QBP077
Yeates & Son HYDROMETER 2720 TDP264
Yeates & Son HYDROMETER - BATTERY TESTING 3523 SAL046
Yeates & Son HYDROMETER - SIKES 1634 MAY121
Yeates & Son HYDROMETER - TWADDELL 0416 RDS085
Yeates & Son HYGROMETER - DINES 1666 MAY153
Yeates & Son HYGROMETER - DINES 2699 TDP243
Yeates & Son HYGROMETER - MASON 1608 MAY097
Yeates & Son HYGROMETER - MASON 2398 BIR074
Yeates & Son HYGROMETER - REGNAULT 0807 UDP073
Yeates & Son LAMP - MICROSCOPE 0744 UCP104
Yeates & Son LANTERN - BIUNIAL 1780 MAY263
Yeates & Son LENS - CONCAVE CONVEX 0825 UDP091
Yeates & Son LENS - CONCAVE CONVEX 2647 RDS144
Yeates & Son LENS ON STAND 0071 UCP088
Yeates & Son LENS ON STAND 0445 RDS040
Yeates & Son LENS ON STAND 1188 TDP178
Yeates & Son LENSES 0828 UDP094
Yeates & Son LEVEL - TELESCOPIC 637 Ex0637
Yeates & Son LEVEL - SPIRIT 0640 Ex0640
Yeates & Son LEVEL - TELESCOPIC 0404 Ex0404
Yeates & Son LEVEL - TELESCOPIC 0486 NMD034
Yeates & Son MAGDEBURG HEMISPHERES 1971 UCP198
Yeates & Son MAGNET - ROTATING 0274 QBP069
Yeates & Son MAGNET - ROTATING 1575 MAY064
Yeates & Son MAGNET - ROTATING 2694 TDP238
Yeates & Son MANOMETRIC FLAME APPARATUS - CAPSULE 1075 MAY051
Yeates & Son MECHANICAL MODEL - ANGLED COG-WHEELS 2990 UDE016
Yeates & Son MECHANICAL MODEL - ARC MOTION 2995 UDE021
Yeates & Son MECHANICAL MODEL - CAM & BEAM 2983 UDE009
Yeates & Son MECHANICAL MODEL - COG WHEELS 2996 UDE022
Yeates & Son MECHANICAL MODEL - CROSS CAM 2991 UDE017
Yeates & Son MECHANICAL MODEL - DRILL 2985 UDE011
Yeates & Son MECHANICAL MODEL - GIRDER BRIDGE 1356 TDE027
Yeates & Son MECHANICAL MODEL - LINEAR COGS 2984 UDE010
Yeates & Son MECHANICAL MODEL - PISTON 2982 UDE008
Yeates & Son MECHANICAL MODEL - PISTON 2988 UDE014
Yeates & Son MECHANICAL MODEL - PISTON 2992 UDE018
Yeates & Son MECHANICAL MODEL - PUNCH 2981 UDE007
Yeates & Son MECHANICAL MODEL - REVOLVING CROSS 2987 UDE013
Yeates & Son MECHANICAL MODEL - REVOLVING CYLINDER 2986 UDE012
Yeates & Son MECHANICAL MODEL - REVOLVING CYLINDERS 3005 UDE031
Yeates & Son MECHANICAL MODEL - ROTATION DIRECTION 3007 UDE033
Yeates & Son MECHANICAL MODEL - SPIRAL & COG-WHEEL 2989 UDE015
Yeates & Son MECHANICAL MODEL - THREE WAY MOTION 2993 UDE019
Yeates & Son MECHANICAL MODEL - TURBINE 1640 MAY127
Yeates & Son MECHANICAL MODEL - VERTICAL MOTION 2994 UDE020
Yeates & Son MECHANICAL MODEL - VERTICAL ROD DRIVE 3004 UDE030
Yeates & Son MELDOMETER - JOLY 2975 UDE001
Yeates & Son MELDOMETER 0589 Ex0589
Yeates & Son METAL SPIRALS 3325 UCP325
Yeates & Son MICROMETER - WIRE 0166 UGP045
Yeates & Son MICROPHONE 0789 UDP055
Yeates & Son MICROSCOPE - COMPOUND 0573 Ex0573

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Yeates & Son MICROSCOPE - DISSECTING 0089 Ex0089
Yeates & Son MICROSCOPE - PROJECTING 0407 Ex0407
Yeates & Son MICROSCOPE - PROJECTING 2649 RDS146
Yeates & Son MICROSCOPE - TRAVELLING 0167 UGP046
Yeates & Son MICROSCOPE SLIDE 0562 Ex0562
Yeates & Son MIRROR - ROCKING 3550 Ex0596
Yeates & Son MIRROR - ROCKING 3550 NMC046
Yeates & Son MIRROR - ROTATING CUBIC 0350 CWC039
Yeates & Son MIRROR - ROTATING CUBIC 1195 TDP040
Yeates & Son MIRROR - ROTATING CUBIC 1917 UGP186
Yeates & Son MIRROR - ROTATING CUBIC 1935 UCP162
Yeates & Son MIRROR - ROTATING CUBIC 2021 BLA010
Yeates & Son NEWTON RINGS APPARATUS[?] 3561 Ex0597
Yeates & Son NEWTON RINGS APPARATUS 0827 UDP093
Yeates & Son NEWTON RINGS APPARATUS[?] 3561 NMC057
Yeates & Son OPTICAL ELEMENT 2219 UDP297
Yeates & Son OPTICAL STAND 3533 Ex0594
Yeates & Son OPTICAL ELEMENTS 3497 QBP223
Yeates & Son OPTICAL STAND 3533 NMC029
Yeates & Son ORGAN BELLOWS 2761 UCP214
Yeates & Son ORGAN PIPE - BLOCK 3900 QBP261
Yeates & Son ORGAN PIPE - REED 3585 Ex0604
Yeates & Son ORGAN PIPE - REED 2895 UGP303
Yeates & Son ORGAN PIPE - REED 3306 UCP306
Yeates & Son ORGAN PIPE - REED 3585 NMC081
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 3583 Ex0615
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 0797 UDP063
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 1261 TDP099
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 1816 MAY299
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 1931 UGP136
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 2007 CWC079
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 2786 UCP239
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 3583 NMC079
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULE 3583 NMD149
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULES 3584 Ex0603
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULES 2129 UDP209
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULES 3305 UCP305
Yeates & Son ORGAN PIPE WITH MANOMETRIC CAPSULES 3584 NMC080
Yeates & Son PHOSPHOROSCOPE 0823 UDP089
Yeates & Son PHOSPHOROSCOPE 1624 MAY112
Yeates & Son PHOSPHOROSCOPE 1625 MAY113
Yeates & Son PHOTOMETER - JOLY 0817 UDP083
Yeates & Son PHOTOMETER - JOLY 1521 UGP103
Yeates & Son PHOTOMETER - JOLY 1697 MAY184
Yeates & Son PLANIMETER 0576 Ex0576
Yeates & Son PLANIMETER - AMSLER 4437 PRI235
Yeates & Son POLARISCOPE 0821 UDP087
Yeates & Son POLARISCOPE 1516 UGP094
Yeates & Son POLARISCOPE - ELBOW 0455 RDS107
Yeates & Son POLARISCOPE - NORREMBERG 1933 UCP160
Yeates & Son PRISM - FRESNEL 1189 TDP177
Yeates & Son PRISM - HOLLOW 0373 RDS042
Yeates & Son PRISM - HOLLOW 0829 UDP095
Yeates & Son PRISM - HOLLOW 0830 UDP096
Yeates & Son PRISM - HOLLOW 1755 MAY238
Yeates & Son PRISM - HOUSED 1246 TDP118
Yeates & Son PRISM - JELLET 0185 UGP065
Yeates & Son PRISM - MULLER 3498 QBP224
Yeates & Son PRISM ON STAND 3808 Ex0610
Yeates & Son PRISM ON STAND 0327 CWC076
Yeates & Son PRISM ON STAND 1186 TDP180
Yeates & Son PRISM ON STAND 3808 NMC209
Yeates & Son PROJECTION APPARATUS 0411 Ex0411
Yeates & Son RAIN GAUGE 0094 Ex0094
Yeates & Son RAIN GAUGE 0420 Ex0420
Yeates & Son RAIN GAUGE 1579 NMD068
Yeates & Son RELAY 0107 UCP026
Yeates & Son RELAY 1763 MAY246
Yeates & Son RESISTANCE - STANDARD 0787 UDP053
Yeates & Son RESISTANCE BOX 2004 CWC046
Yeates & Son RHEOSTAT 0120 QBP007
Yeates & Son SAVART DISC MACHINE 3387 NMC018
Yeates & Son SAVART DISC MACHINE 3387 NMD309
Yeates & Son SEEBECK RECTANGLE 2198 UDP284
Yeates & Son SEEBECK RECTANGLE 3182 QBP127
Yeates & Son SEXTANT - BOX 1086 TDE009
Yeates & Son SINGING FLAMES APPARATUS 0410 Ex0410
Yeates & Son SINGING FLAMES APPARATUS 3390 Ex0593
Yeates & Son SINGING FLAMES APPARATUS 0268 QBP063
Yeates & Son SINGING FLAMES APPARATUS 0795 UDP061
Yeates & Son SINGING FLAMES APPARATUS 1196 TDP128
Yeates & Son SINGING FLAMES APPARATUS 1476 UGP056
Yeates & Son SINGING FLAMES APPARATUS 1714 MAY201
Yeates & Son SINGING FLAMES APPARATUS 2773 UCP226
Yeates & Son SINGING FLAMES APPARATUS 3390 NMC021

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Yeates & Son SIREN - CAGNIARD 1571 MAY060
Yeates & Son SIREN - CAGNIARD 1809 MAY292
Yeates & Son SIREN - CAGNIARD 1911 UGP180
Yeates & Son SIREN - CAGNIARD 3312 UCP312
Yeates & Son SIREN - CAGNIARD 3376 NMC007
Yeates & Son SIREN - CAGNIARD 3376 Ex0591
Yeates & Son SIREN - ELECTRICAL 1672 MAY159
Yeates & Son SIREN - HELMHOLTZ DOUBLE 1170 TDP159
Yeates & Son SIREN - HELMHOLTZ DOUBLE 1572 MAY061
Yeates & Son SIREN - HELMHOLTZ DOUBLE 2759 UCP212
Yeates & Son SIREN - SEEBECK 1060 MAY036
Yeates & Son SLIDE - GRANITE FILM 0820 UDP086
Yeates & Son SONOMETER 1913 UGP182
Yeates & Son SOUND CYLINDERS 0762 UDP031
Yeates & Son SOUND CYLINDERS 1279 TDP132
Yeates & Son SOUND CYLINDERS 1569 MAY058
Yeates & Son SOUND TUBE 3586 Ex0605
Yeates & Son SOUND TUBE 3586 NMC082
Yeates & Son SPECIFIC GRAVITY APPARATUS 0418 RDS092
Yeates & Son SPECIFIC HEAT APPARATUS - REGNAULT 3317 UCP317
Yeates & Son SPECTROSCOPE 0412 Ex0412
Yeates & Son SPECTROSCOPE 0414 Ex0414
Yeates & Son SPECTROSCOPE - DIRECT VISION 0131 RDS049
Yeates & Son SPECTROSCOPE - DIRECT VISION 0140 UGP003
Yeates & Son SPECTROSCOPE - DIRECT VISION 0281 CWC052
Yeates & Son SPECTROSCOPE - DIRECT VISION 0966 BIR006
Yeates & Son SPECTROSCOPE - DIRECT VISION 1042 MAY016
Yeates & Son SPECTROSCOPE - DIRECT VISION 1147 TDP172
Yeates & Son SPECTROSCOPE - PROJECTION 0413 Ex0413
Yeates & Son SPECTROSCOPE - PROJECTION 0094 UCP018
Yeates & Son SPECTROSCOPE - PROJECTION 0095 UCP019
Yeates & Son SPECTROSCOPE - PROJECTION 0127 RDS041
Yeates & Son SPECTROSCOPE - PROJECTION 0128 RDS090
Yeates & Son SPECTROSCOPE - TABLE 1040 MAY014
Yeates & Son SPECTROSCOPE - TABLE 1420 SAL005
Yeates & Son SPECTROSCOPE - TABLE 4480 STL008
Yeates & Son SPECTROSCOPE - TABLE 2487 SAL036
Yeates & Son SPECTROSCOPE - ULTRA VIOLET 0102 Ex0102
Yeates & Son SPHEROMETER 2317 QBP083
Yeates & Son SPHEROMETER 4160 MAY344
Yeates & Son SPINNER 1495 MAY057
Yeates & Son STAND - INSULATING 0956 UDP224
Yeates & Son STAND WITH SCREW CLAMP 3318 UCP318
Yeates & Son STANDARD LENGTH - IMPERIAL 1439 MIS013
Yeates & Son SURVEYING RULE 0560 Ex0560
Yeates & Son SURVEYING RULE 1370 TDE046
Yeates & Son SWITCH 1071 MAY047
Yeates & Son SWITCH 1631 MAY118
Yeates & Son SWITCH - ELECTROMAGNETIC EXPLODER 0109 UCP027
Yeates & Son SWITCH - ELECTROMAGNETIC EXPLODER 1181 TDP112
Yeates & Son (Breguet) SWITCH - ELECTROMAGNETIC EXPLODER 2978 UDE004
Yeates & Son TELEGRAPH - ALPHABETICAL 0098 UCP055
Yeates & Son TELEGRAPH - ALPHABETICAL 2019 BLA008
Yeates & Son (Breguet) TELEGRAPH - ALPHABETICAL 2018 BLA007
Yeates & Son TELEGRAPH - MORSE 0058 UGP015
Yeates & Son TELEGRAPH - MORSE 0790 UDP056
Yeates & Son TELEGRAPH - MORSE 1174 TDP036
Yeates & Son TELEGRAPH - MORSE 1758 MAY241
Yeates & Son TELEGRAPH - MORSE 1760 MAY243
Yeates & Son TELEGRAPH - MORSE 2020 BLA009
Yeates & Son TELEGRAPH - MORSE 2976 UDE002
Yeates & Son (Breguet) TELEGRAPH - MORSE 0104 UCP030
Yeates & Son TELESCOPE - REFRACTING 4048 MAY311
Yeates & Son TELESCOPE MOUNT 0418 Ex0418
Yeates & Son TELESCOPE MOUNT 0333 CWC057
Yeates & Son THEODOLITE - TRANSIT 0406 Ex0406
Yeates & Son THEODOLITE - TRANSIT 0408 Ex0408
Yeates & Son THERMAL CONDUCTIVITY APPARATUS 0816 UDP082
Yeates & Son THERMAL CONDUCTIVITY APPTS - DESPRETZ 1576 MAY065
Yeates & Son THERMOMETER WITH ELECTRICAL CONTACTS 1602 MAY091
Yeates & Son THERMOMETER - DIAL 1055 MAY031
Yeates & Son THERMOMETER - GLASS MERCURY 0525 IDG029
Yeates & Son THERMOMETER - GLASS MERCURY 3518 MAY307
Yeates & Son THERMOMETER - GLASS SPIRIT 1603 MAY092
Yeates & Son THERMOMETER - GLASS SPIRIT 4047 MAY310
Yeates & Son THERMOMETER - LESLIE DIFFERENTIAL 1605 MAY094
Yeates & Son THERMOMETER - LESLIE DIFFERENTIAL 3323 UCP323
Yeates & Son THERMOMETER - MAXIMUM 1601 MAY090
Yeates & Son THERMOMETER - MAXIMUM 2397 BIR073
Yeates & Son THERMOMETER - MAXIMUM & MINIMUM 1139 RDS128
Yeates & Son THERMOMETER - METALLIC, APPOLIT 3388 NMC019
Yeates & Son THERMOMETER - METALLIC, APPOLIT 3388 NMD310
Yeates & Son THERMOMETER - SOLAR RADIATION 0810 UDP076
Yeates & Son THERMOPILE 0100 Ex0100
Yeates & Son THERMOPILE 3571 Ex0600

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Yeates & Son THERMOPILE 1650 MAY137
Yeates & Son THERMOPILE 2096 BLA084
Yeates & Son THERMOPILE 3571 NMC067
Yeates & Son TIME BALL 0489 RDS012
Yeates & Son TITRATION APPARATUS 0099 Ex0099
Yeates & Son TRADE LABEL 1731 MAY214
Yeates & Son TUNING FORK & SLIDING FRAME 1283 TDP082
Yeates & Son TUNING FORK - LISSAJOUS 1743 MAY226
Yeates & Son TUNING FORK - LISSAJOUS 1744 MAY227
Yeates & Son TUNING FORK - LISSAJOUS 2763 UCP216
Yeates & Son TUNING FORK - ELECTROMAGNETIC 3621 Ex0607
Yeates & Son TUNING FORK - ELECTROMAGNETIC 0157 UGP036
Yeates & Son TUNING FORK - ELECTROMAGNETIC 2682 TDP226
Yeates & Son TUNING FORK - ELECTROMAGNETIC 3211 QBP156
Yeates & Son TUNING FORK - ELECTROMAGNETIC 3621 NMC117
Yeates & Son TUNING FORK & SLIDING FRAME 3212 QBP157
Yeates & Son TUNING FORK & SLIDING FRAME 1939 UCP166
Yeates & Son TUNING FORK ON RESONANCE BOX 3580 Ex0601
Yeates & Son TUNING FORK ON RESONANCE BOX 3581 Ex0602
Yeates & Son TUNING FORK ON RESONANCE BOX 0487 RDS026
Yeates & Son TUNING FORK ON RESONANCE BOX 0799 UDP065
Yeates & Son TUNING FORK ON RESONANCE BOX 0800 UDP066
Yeates & Son TUNING FORK ON RESONANCE BOX 1459 UCP137
Yeates & Son TUNING FORK ON RESONANCE BOX 1817 MAY300
Yeates & Son TUNING FORK ON RESONANCE BOX 2005 CWC062
Yeates & Son UNKNOWN 2648 RDS145
Yeates & Son VAPOUR PRESSURE APPARATUS 1472 UGP126
Yeates & Son VAPOUR PRESSURE APPARATUS 1573 MAY062
Yeates & Son VAPOUR PRESSURE APPARATUS 2668 TDP212
Yeates & Son VIBRATING ROD FOR LISSAJOUS FIGURES 3389 Ex0592
Yeates & Son VIBRATING ROD FOR LISSAJOUS FIGURES 0804 UDP070
Yeates & Son VIBRATING ROD FOR LISSAJOUS FIGURES 1812 MAY295
Yeates & Son VIBRATING ROD FOR LISSAJOUS FIGURES 3389 NMC020
Yeates & Son VIBRATING ROD FOR LISSAJOUS FIGURES 3715 UGP367
Yeates & Son WAVE DEMONSTRATION APPARATUS 3825 Ex0614
Yeates & Son WAVE DEMONSTRATION APPARATUS 1214 TDP130
Yeates & Son WEATHER STATION 1068 MAY044
Yeates & Son WEIGHTS 1354 TDE024
Yeates & Son WEIGHTS - METRIC 4315 TDC011
Yeates & Son WIND CHEST 1570 MAY059
Yeates & Son WIND CHEST 1930 UGP199
Yeates & Son WIND CHEST 2767 UCP220
Yeates & Son WIND CHEST 3304 UCP304
Yeates & Son WIND CHEST 3582 NMC078
Yeates & Son WIND CHEST 3582 NMD187
Yeates & Son WIND SPEED INDICATOR(?) 0568 Ex0568
Young COIL - INDUCTION, MEDICAL 2527 UGP233
Young, S. FRACTIONAL DISTILLATION COLUMNS 4331 TDC027
Zeiss, C. DIFFRACTION APPARATUS 2299 PRI173
Zeiss, C. LEVEL - TELESCOPIC 4217 DCM006
Zeiss, C. (Baker, C.) MICROSCOPE - DISSECTING 4402 NBG005
Zeiss, C. (Mason, T.H.) MICROSCOPE - COMPOUND, WITH MICRO-SPECTROSCOPE 4482 STL010
Zeiss, C. OPTICAL SQUARE 1367 TDE041
Zeiss, C. OPTICAL COMPARATOR 3520 MAY309
Zeiss, C. SPECTROSCOPE - MICRO 4483 STL011
Zimmermann, E. CHRONOSCOPE - HIPPO 0919 UDP184

