COMPUTER LABORATORY

ANNUAL REPORT

1986/87

CONTENTS

Section 1 Introduction.

The highlights of 1986/87 in the Computer Laboratory were:

- The major increase in the workload of the ICL Series 39 machine which now performs the bulk of the computational tasks.
- The initiation of a search for replacement machines for the ageing DECsystem-20 units.
- Continued growth in the use of microcomputers in all areas of activity.
- The establishment of a sales unit to administer the sale of microcomputers and related supplies within College.
- Planning for the forthcoming move of part of the Laboratory to the O'Reilly Institute.

Virtually every sector of operation experienced a continuing growth in demand which the Laboratory again attempted to meet with its existing staff resources. This continues to place a great strain on resources and has again forced a lowering of standards and a reduction of safety margins in many areas in an effort to cope with the expectations of users. For example, microcomputer support, nonexistant a few years ago, now takes over 26% of staff resources but the establishment has increased by under 7% (two positions) to cope with this. The problem is increased by the difficulty of recruiting and retaining experienced staff leading to an unbalanced structure and an unreasonable dependence on key individuals.

The situation has now reached a stage where the service is in a very precarious state and the risk of a major breakdown, either administrative or technical, is considerable.

The format of the Annual Report has been modified to better reflect the changing role of the Computer Laboratory. While mainframe computing continues at greater level than ever, the faster growing areas of microcomputing and data communications have now reached the stage where any account of the Laboratory's activity must include them.

Section 2 Use of Services

The principal services offered now are considered under the following categories:

Mainframe related services

Microcomputer related services.

Communications

The net running cost of the Laboratory has been apportioned to the first two of these and to the categories of user of each. Communications is seen as a third major service area and is the subject of a brief report but has not been been practicable to isolate it in the quantitative analysis. The basis of the costings is described in more detail in Appendix C.

The overall breakdown of Laboratory costs are shown in Figures 1 and 2.

Overall Cost of Services

User	Mainframe	Micro.	Total
Academic	566488	149834	716321
Library	50004	21018	71022
Administration	68498	79845	148344
Total	684990	250697	935687

Table 1

Overall Usage
Percent of Total Laboratory Cost

User	Mainframe	Micro.	Total
Academic	60.5%	16.0%	76.6%
Library	5.3%	2.2%	7.6%
Administration	7.3%	8.5%	15.9%
Total	73.2%	26.8%	

Table 2

2.1 Mainframe computing

All mainframe machines performed well during the year. The main area of growth was the ICL system which catered for the needs of a large number of undergraduates and for a major computational workload for research purposes. The latter would have not have been possible in College without this machine which adds a significant new dimension to the computing service. The transfer of many undergraduates to the ICL system together with an embargo on major new applications on the DECsystem-2060, relieved the serious congestion which was a feature of the latter machine for a number of years making it possible to provide a tolerable service for those users who's work requires the DEC facilities. The workload on the DECsystem-2020 remained heavy notwithstanding the transfer of much administrative work to microcomputers.

Cost of Mainframe Related Services

User	Machine Usage	General Support	Total
Academic	521950	44538	566488
Library	30866	19138	50004
Administration	28598	39900	68498
Total	581414	103576	684990

Table 3

Mainframe Use per Machine

Machine	User Category Library	Academic	Admin	TOTAL
DEC2020	22279	824	24339	47442
DEC2060	371	137134	3333	140838
VAX11/780	0	43063	0	43063
PDP11/34	6731	0	0	6731
ICL	1484	340929	926	343339
TOTAL	30866	521950	28598	581414

Table 4

Academic Mainframe Use

Faculty	DEC2020	DEC2060	VAX	ICL	TOTAL
Arts (Humanities)	0	1699	0	800	2499
Arts (Letters)	0	1171	0	9	1180
Econ. & Social Studies	193	6092	0	9227	15512
Eng. & System Sciences	39	53002	43063	136783	232887
Health Sciences	0	3512	0	1425	4937
Science	592	71658	0	192685	264935
	824	137134	43063	340929	521950

Table 5

Number of Academic User Registrations

Faculty	DECsystem-2060	ICL
Arts (Humanities)	50	13
Arts (Letters)	18	11
Econ. & Social Studies	159	315
Eng. & Systems Sciences	993	1487
Health Sciences	84	46
Science	361	215
TOTAL	1665	2087

Table 6

2.2 Microcomputer related Services

The use of microcomputer usage in College continued to grow rapidly and now accounts for a considerable amount of the Laboratory's activity. This growth has been helped by the Laboratory's central purchasing function which is described separately in Section 4 of this report.

In the Academic sector, the Arches microcomputer laboratory proved very successful and was very heavily used throughout the year. In addition, the limited microcomputer facilities in the main Laboratory were much in demand. A growing amount of the calls for assistance to the Academic User Services Group are now related to micro matters and this is reflected in the courses which the Group runs for users. It is estimated that some 21% of the Laboratory total resources allocated to the academic sector are now spent on microcomputer related matters.

In the Administrative area, the transfer of all the College payrolls from the DECsystem-2020 to IBM PCs took place during the year and plans were well advanced for the transfer of the remaining ledger processing to micros, making the Finance Office completely self-sufficient in terms of operational data processing.

In the Library, the micro based purchasing system continued to operate and a microcomputer based system formed the main feature of a project to convert records from the card catalogue into computer readable form.

Cost of Microcomputer Related Services

User	Machine Usage	General Support	Total
Academic	97276	52558	149834
Library	1951	19067	21018
Administration	23451	56395	79845
Total	122678	128019	250697

Table 7

2.3 Communications

With the increasing decentralisation of equipment, much of which is owned by other departments, the Laboratory is, in the case of some users, providing a communications facility rather than a computing service. It is believed that this will become a much more important function of the service in future and, in addition to providing connectivity for computational purposes, will become an important administrative vehicle as word processing and electronic mail usage develops.

At present, in addition to the Laboratory's central machines, computers in Mathematics, Statistics, Computer Science, and Microelectronics are accessible in varying degrees via the Laboratory's links.

The Computer Laboratory also provides the point of connection to HEANET and to EIRPAC and these external links are now used by many users for electronic mail, for the exchange of computer files, and as a means of access to outside computers.

Approximately 12% of the Laboratory's non-pay expenditure is currently spent directly on communications services or equipment.

Section 3 Future Developments

The DECsystem-20 machines will shortly reach the end of their economic life and are due for replacement. While replacement options were still under consideration at the year end, a decision was subsequently taken to acquire DEC VAX equipment and installation of this will commence during 1987/88. While the migration of users from the old to the new systems will be a complex matter and involve some disruption of service, the new equipment will ensure an ongoing service for users and identify a framework within which the service can develop in an orderly way.

Another major development will be the transfer of the Laboratory's Computer Services Group together with the mainframe equipment to the new O'Reilly Institute. This will provide urgently needed serviced accommodation for the main equipment to replace the existing computer room in Pearse Street which has deteriorated to an extent which places equipment at risk. In the medium term, however, it will provide no additional accommodation for user facilities and all terminal rooms will remain in their existing locations. The Academic User Services Group and the Information Systems Group will also remain in Pearse Street and this fragmentation of the department will cause major operational difficulties.

The development of the data communications facilities will continue. The new Ericsson MD110 PABX will facilitate the connection of individual terminals or microcomputers in locations where telephone service already exists and in addition to this connectivity function, will offer a switching capability which will partially superceed the ageing Gandalf PACX equipment originally installed in the mid 1970's. The interconnection of concentrated clusters of terminals and of bigger departmental computers is still carried out on an ad hoc basis and no integrated network approach has yet emerged which is financially feasible. However, a number of factors, such as the use of Ethernet by the new VAX machines and the very similar OSLAN by the ICL system and of Ethernet related local microcomputer networks are working towards some simplification of the situation.

Section 4. Other Activities

4.1 Sale of Equipment and Supplies

During the year, volume of equipment and supplies bought by the Laboratory under bulk purchase and educational discount schemes reached such proportions that a special unit was established to deal with this activity and a staff member, funded by a handling charge on turnover, was appointed to help.

It has proved to be a very valuable part of the Laboratory's service from the users' point of view and this is reflected in the volume of business which amounted to £193,212.99 during the six month period since separate accounting records were established on 1st April.

The activity is confined to sales within College, however, since its attraction lies in the special academic discounts which ,in most cases, do not permit resale of the material externally on the same terms.

2.2 Sale of Services

Revenue from the sale of services was satisfactory. However, the income from the sale of mainframe system time continued to fall and was balanced by the increase in sale of laser printer service as the demand for high quality output rose reflecting the growing use of word processing in College.

APPENDIX A

EQUIPMENT

The specifications of the equipment installed on September 30th, 1987 are as follows:

Digital DECsystem-2060:

1 x 2060 CPU with 1024K words of memory and 80 asynchronous communications ports
4 x RP06 200 Mbyte disc drives
2 x TU45 120Kb, 9-track, 800/1600 b.p.i. tape drives
1 x DN20 synchronous communications port
1 x LA36 Console
1 x Calcomp Model 81 Plotter
1 x Kaiser Optical Mark Reader

Digital DECsystem-2020:

1 x 2020 CPU with 512K words of memory, 32 asynchronous communications ports and 1 synchronous communication port
3 x RP06 200 Mbyte disc drives
2 x TU45 120 KB 9-track, 800/1600 b.p.i. magnetic tape drives
1 x LA36 Console

ICL Series 39 Level 80

1 x Series 39 Level 80 Node with 32Mb of memory and a Scientific unit and three Macrolan switches.
1 x FDS2500 2.5 Gb Disc Storage Unit.
1 x FDS640 640 Mb Disc Storage Unit
1 x GCS 6250 bpi Magnetic Tape Unit
1 x ICL 1440 Line Printer
1 x DRS20 Operator Console

Digital PDP 11/34:

For real-time Library Circulation Control System:

- CPU with 256K memory
- 8 asynchronous lines
- 2 x RL01 Disc drives
- 1 x RL02 Disc drive
- 1 x LA36 Console

Digital VAX 11/780:

1 x VAX 11/780 system in the Department of Computer Science comprising the following:

- Central Processor with 8 Mbyte of memory
- 80 asynchronous lines
- 1 x LA120 Console
- 2 x RA81 456 Mbyte disc drives
- 1 x RM80 120 Mbyte disc drive
- 1 x RM03 67 Mbyte disc drive
- 1 x TS11 Magnetic tape drive

Communications

It is estimated that over 250 terminals or microcomputers, most of which belong to user departments, have access to the equipment. Most of these compete for the limited number of entry ports on the appropriate computer via a Gandalf PACX IV switching unit. Many of the public terminals which may be booked in advance and located in the Terminal Room of the Laboratory have dedicated ports, however, to guarantee access. The Laboratory is a node of HEANET which links the major HEA funded institutions and is connected to EIRPAC, Telecom Eireann's packet switched public network.

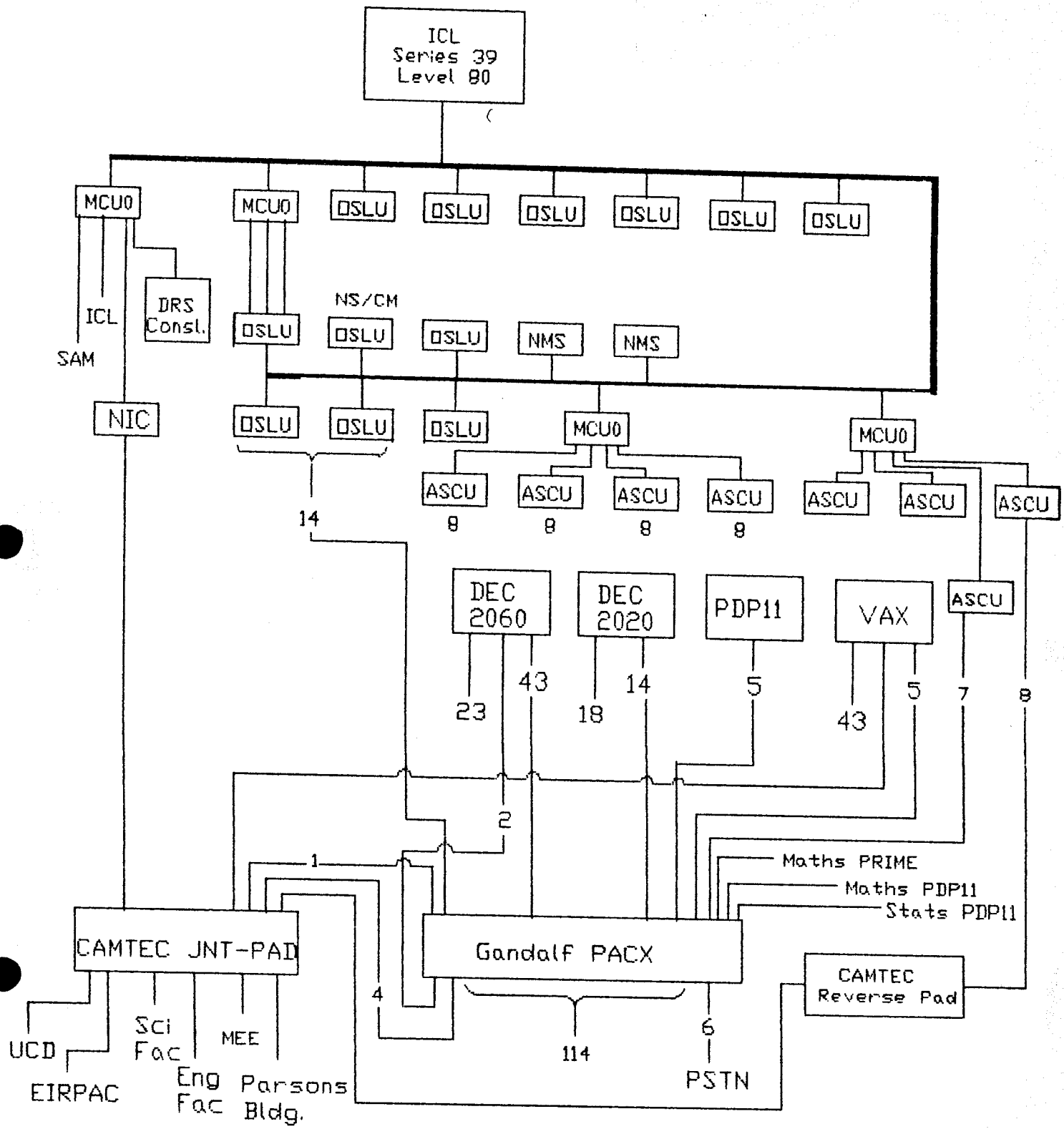
Microcomputers

A selection of microcomputers are available to users in the Laboratory at 200/201 Pearse Street. These include the following:

1 x BBC Microcomputer
2 x Apple Macintoshes
1 x Apple II
1 x Apple IIC
1 x IBM PC
1 x Commodore Amiga
1 x Amstrad PCW8256
1 x DEC Rainbow
2 x ICL multi-user PCs

A microcomputer laboratory, located under the railway arches near the parade ground has the following equipment:

16 x ERGO PCs
16 x Apple Macintoshes



COMPUTER LABORATORY

Central Equipment

Figure A.1

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APPENDIX B

STAFF

The Laboratory staff is organised as shown in Figure B.1. The functions of the main groups are as follows:

ACADEMIC USER SERVICES GROUP

This Group, comprised of programming staff, provides assistance to computer users by means of:

- an advisory service
- courses for users
- publications such as the Users' Guide and Computer Laboratory Newsletter.

COMPUTER SERVICES GROUP

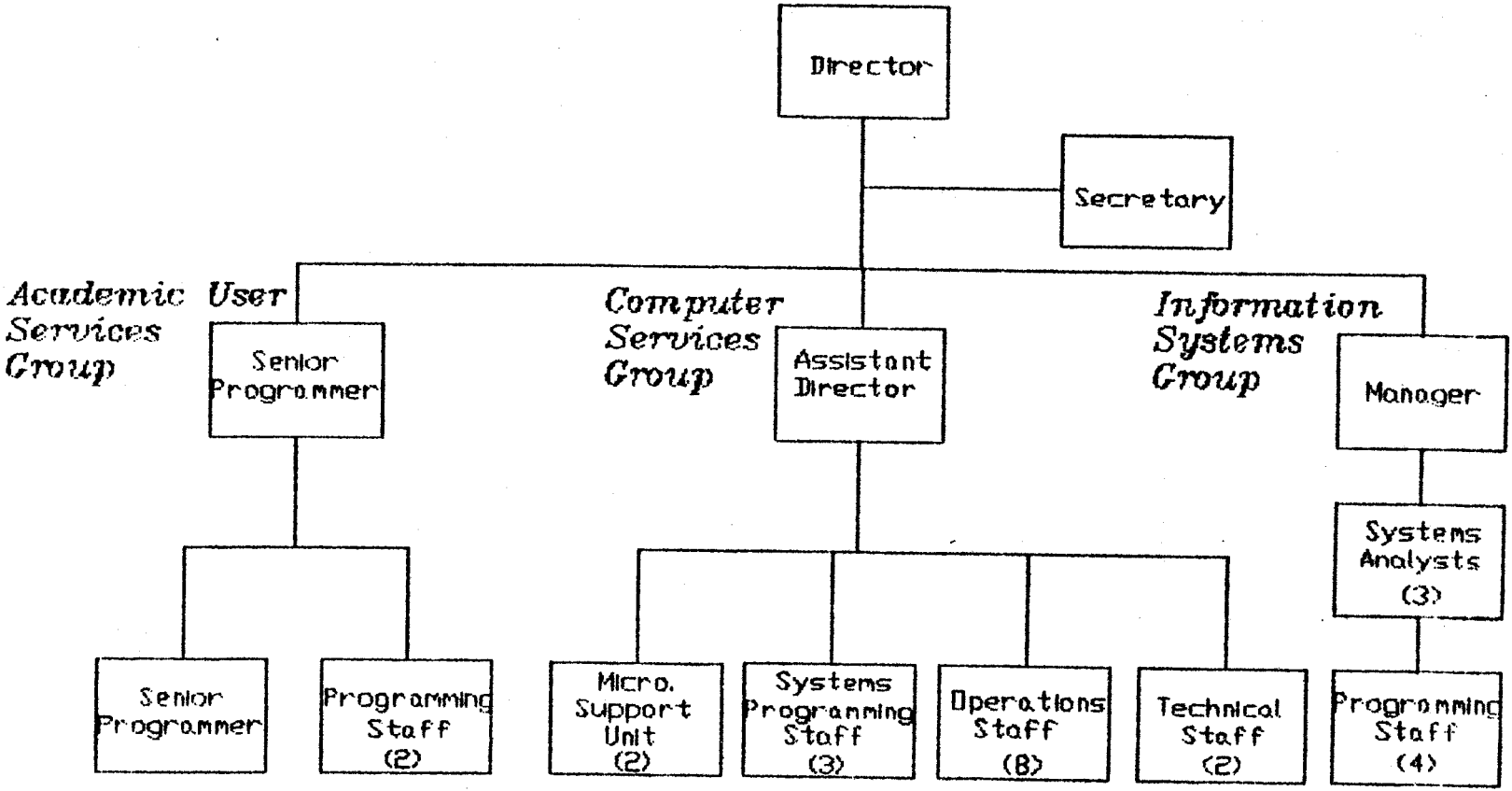
This Group is responsible for the running of the central computer equipment. It is staffed by operations personnel who look after the running of the machines and perform the associated ancillary functions, systems programmers who generate and maintain the central systems and network software, technicians, and janitors who are responsible for security. This Group is also responsible for the provision of specialised technical advice and support on both mainframe, microcomputer, and communications matters to the other two user oriented Groups in the Laboratory.

The sales unit which retails microcomputer equipment and supplies within College is also part of this Group.

INFORMATION SYSTEMS GROUP

This Group is responsible for the regular operation of existing administrative and Library mainframe computer applications and for the development of new ones.

Development of new projects is performed by Systems Analysts and Programmers who design the applications and perform an ongoing supervisory role in the running of the more complex systems.



COMPUTER LABORATORY ORGANISATION

Figure B.1

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APPENDIX C

COSTS

The services provided by the Laboratory may be divided into those related to the central mainframe systems and those relating to microcomputers. Furthermore, for each category the Laboratory provides access to machine capacity and assorted support services of an advisory nature.

The total cost of running the Laboratory is shown in Table C.1 under the main expenditure headings used in the College accounts. The cost of providing each services mentioned above was determined by analysing all the categories of expenditure shown in Table C.1 to estimate the fraction of each used to provide each service. For example, in the case of salaries the cost of Systems Analysts is charged partly to Mainframe Support and partly to Micro Support but not to machine service in either equipment category whereas operations staff are charged mainly to the cost of providing Mainframe and Micro machine service. The cost of others such as the Director is distributed over all categories in proportion to the estimated effort spent on each by the individuals concerned.

In the case of Mainframe Machine Service, the expenditure was further apportioned between the ICL system, the DECsystem-2020, the DECsystem-2060, the PDP 11/34 and the machine operated by the Computer Science Department.

COMPUTER LABORATORY

ACCOUNTS

Year Ended 30 September 1987

	Actual	Budget
	£	£
Income:		
Income from Sale of Computer Services:	12,821	12,000
Net Sale of Goods	(3,021)	0
Total Income	9,800	12,000
Expenditure:		
Cost of Staff:		
- Salaries	457,807	458,250
- Wages	21,693	21,385
Total Pay Cost	479,500	479,635
Rentals of Equipment	52,702	52,800
Purchase of Ancillary Equipment	208,804	197,782
Maintenance	147,437	149,000
Consumable Supplies	34,923	38,500
Cost of External Services	3,909	3,500
Insurance Charges	5,624	5,600
Miscellaneous Expenses	11,589	12,000
Total Non-Pay Cost	465,988	459,182
Total expenditure:	945,488	938,817
Net annual cost:	935,688	926,817

Table C.1