COMPUTER LABORATORY

ANNUAL REPORT

1989/90

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Section 1 Introduction.

1989/90 was an encouraging year for the Laboratory as a number of new developments came to fruition.

The two new ICL UNIX machines, ordered in the Summer of 1989 as a replacement for the old ICL Series 39 Level 80, went into regular service in September, and have performed very satisfactorily.

The new student record system was also phased in during the year and initial experience suggests that it is preforming well and is a considerable improvement on the older procedures which it replaced.

Perhaps the most important development during the year was the approval by the Policy Group on Staffing for the appointment of three additional personnel, two programmers and a technician, to the Laboratory's staff. These appointments will make a significant improvement to the department's capacity to cope with the ever increasing demands, especially in the communications area and have also constituted a major boost to the morale of existing personnel.

The year also saw the formalisation of the maintenance service for microcomputer and related items which the Laboratory's technicians provided on an occasional basis in the past. It is hoped that this will become a self-funding activity and will be reviewed in Trinity term after its first full year of operation.

Considerable planning by the Computer Users' Committee, Computer Management Committee, and the Laboratory together with a substantial funding initiative by the Deans, resulted in the provision of a major new Microcomputer Teaching Facility in the Beckett Room 1 of the Arts Building. This was installed in late September, 1990, for operation by the beginning of Michaelmas term and is a significant step in redressing a major deficiency in College's computing resources.

An aspect of the Laboratory's operations which continues to be a source of difficulty is the continuing fragmentation of staff accommodation between the O'Reilly Institute and 200/201 Pearse Street. This is causing constant problems of liaison and co-ordination of activities and, since it is not possible to duplicate some services such as secretarial support, results in much wasted time.

Overall, however, the year was one of significant achievement for the Laboratory with the successful operation of major new systems including the on-line library catalogue, the new student administration system, the UNIX service, and the ETHERNET network and the recording of a higher level of user satisfaction than has prevailed for a considerable period.

Section 2 Use of Services

As before, the principal services offered by the Laboratory are considered under the following categories:

Mainframe related services

Microcomputer related services.

Communications

The net running cost of the Laboratory has been apportioned to each of these and to the main categories of user of each. This is the first year in which an attempt has been made to allocate costs to the provision of communications services, both internal and external. The basis of the costings is described in more detail in Appendix C.

It must again be emphasised that most of this information is based on estimates rather than on measurement. While usage measurement software is in place for all mainframes and for some network activities, it is not feasible to record most microcomputer activity or use by individuals of the Local area Network.

The format of some of the tables has been modified slightly as a first step towards a form of presentation which will be compatible with the "unit-cost" figures which it is believed will form the basis of a more standardised reporting environment in future.

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

	Overall Cost of Services			
User	Mainframe	Micro.	Comms.	Total
	£	£	£	£
Academic	369077	102902	85978	557957
Academic Svcs.	158438	41264	44200	243901
Admin.	116941	85105	31742	233788
Total	644457	229270	161919	1035646

Table 1

	Percent of total use			
User	Mainframe	Micro.	Comms.	Total
Academic	35.64%	9.94%	8.30%	53.88%
Academic Svcs.	15.30%	3.98%	4.27%	23.55%
Admin.	11.29%	8.22%	3.06%	22.57%
Total	62.23%	22.14%	15.63%	100.00%

Table 2

User	Overall Cost of Services Pay	Non-pay	Total
	£	£	£
Academic	266035	291922	557956
Academic Svcs.	127563	116339	243901
Admin.	176208	57580	233788
Total	569805	465840	1035645

Table 3

2.1 Mainframe Computing

The following tables summarise use of the central machines which, for brevity, are identified by their network names. The machines themselves are described in Appendix A.

Cost of Mainframe Activities

User	Pay	Non-pay	Total
	£	£	£
Academic	125058	244019	369077
Academic Svcs.	57133	101305	158438
Admin.	74251	42690	116941
Total	256441	388015	644456

Table 4

System	User Category Academic	Academic Services	Admin.	Total
	£	£	£	£
VAX1	268142	1301	1068	270511
LBVAX1	38	157137	192	157367
ADVAX1	0	0	115682	115682
UNIX1	50449	0	0	50449
UNIX2	50449	0	0	50449
Total	369077	158438	116941	644457

Table 5

Faculty	System VAX1 £	LBVAX1 £	UNIX1 £	UNIX2 £	Total £
Arts (Humanities)	4685	0	0	0	4685
Arts (Letters)	414	0	0	0	414
B.E. & S.S.	9584	0	0	0	9584
Engineering	155034	13	15229	1097	171373
Health Sciences	4339	0	0	0	4339
Science	94084	25	35220	49352	178681
Total	268142	38	50449	50449	369077

Table 6

2.2 Microcomputer related Services

Cost of Micro. Related Activity

User	Pay £	Non-pay £	Total £
Academic	78804	24097	102902
Academic Svcs.	33208	8055	41264
Admin.	77049	8055	85105
Total	189062	40208	229270

Table 7

The sale of microcomputer equipment within College is mentioned in more detail in Section 3.1.

2.3 Communications

Cost of Communications Activities

User	Pay £	Non-pay £	Total £
Academic	62173	23805	85978
Academic Svcs.	37222	6978	44200
Admin.	24908	6834	31742
Total	124302	37617	161919

Table 8

2.3.1 Internal Communications

The internal Ethernet Local Area Network performed very satisfactorily during the year and was extended to a number of additional locations. These included the Arches Microcomputer Laboratory, the Computer Laboratory offices in Pearse Street, and further houses in Westland Row. At the time of writing, there are over 20 computers belonging to some 7 departments connected to the network together with nearly 200 terminals connected via servers.

2.3.2 External Networking

The external connection via HEANET to the other Irish Colleges and to international networks including EUNET and EARN/BITNET was heavily used, largely for international electronic mail purposes. As predicted in earlier annual reports, the overall traffic charges for network usage now exceed the HEA's earmarked funding for this purpose and it will be necessary for the participating colleges to meet a substantial part of their own costs from the beginning of 1991.

Section 3. Other Activities

3.1 Sale of Equipment and Supplies

The Computer Laboratory shop had another successful year although the increase in sales, from £586,000 to £587,700, was not as great as last year. The shop, which aims to operate on a self-funding basis, acts as a central purchasing unit to channel the benefits of academic discounts and bulk purchasing to members of College. In addition to microcomputers and related accessories and supplies, it also administers most of the Laboratory's services for which a cash charge is made.

3.2 Sale of Services

The sale of mainframe computer time continued to decline and is no longer a significant part of the Laboratory's income. Most of the income recorded under this heading now comes from those internal services for which the Laboratory makes a charge, such as the issuing of "Entacards" and laser printing tokens.

Section 4 Future Developments

It is anticipated that major developments will be required in a number of areas in the immediate future. The following are the most important of these:

The recent microcomputer development in the Beckett Theatre is seen as the first step in the provision of adequate microcomputer facilities in College. It was originally proposed as the first phase of a development which would take place in three stages and it is hoped that funding of some £150,000 can be found to implement the next phase, consisting of a similar facility based on Apple Mackintosh equipment.

The ETHERNET local area network will form the centre of College's internal data communications strategy for several years to come. While much of the site is now served by this, major areas are still unconnected and the extension of the fibre-optic backbone cable to more buildings and the extension of the network within individual buildings will continue to be a high priority. The Laboratory has funding of £20,000 p.a. "earmarked" for network development. This committed to paying for the existing ETHERNET plant until the end of 1990/91 so no significant work can be done in this area until 1991/92 unless other sources of funding are available.

In the wide-area network field, work is already in progress to make College the Irish node of the international Internet network. It is also hoped to eventually interconnect the ETHERNETs of the HEANET participating institutions to provide greatly improved connectivity between colleges.

The eventual need to upgrade the academic and library VAX machines was mentioned in last year's report. Overloading is now a much more frequent occurrence, especially on the Library machine, and it is believed that this problem must be addressed in the near future. It is, however, premature to estimate the cost at this stage.

In the administrative computing area, also, a number of old microcomputer based applications are approaching the end of their useful life. Furthermore, because of the range of different equipment and software involved, the effort needed to keep them in operation leaves little staff time for the development of replacements. The new student administration application was developed using the ORACLE database and "fourth generation language" system which promises considerable benefits in the area of programmer productivity and ease of future software maintenance. Following the success of the student record system which was regarded as a pilot project, it is hoped that ORACLE will be adopted as a standard for both new and replacement systems and will make possible much more productive use of scarce staff resources. In particular, it is believed that the new funding arrangements currently proposed for universities will add a new urgency to the replacement existing obsolete administrative systems by procedures which will be more adaptable to changing requirements and make possible the analysis of data on an ad hoc basis for management information purposes.

APPENDIX A

EQUIPMENT

The specifications of the equipment in service on September 30th, 1990, are as follows:

Digital VAX8350: **LBVAX1**

1 x VAX8350 CPU with 32 Mb of memory, an Ethernet port, an X-25 port, and an ULTIMATE co-processor running the PICK system.
1 x SA482 2.5 Gbyte disc storage unit
1 x RA60 203 Mb disc storage drive
1 x TA81 Magnetic Tape Drive
1 x LA100 Console printer

Digital VAX 6230: **VAX1**

1 x VAX6230 CPU with 32 Mb of memory, an Ethernet port.
1 x SA482 2.5 Gbyte disc storage unit
1 x RA82 600 Mb disc storage drive
1 x TA81 Magnetic Tape Drive
1 x LA100 Console printer
1 x Calcomp Model 81 Plotter
1 x Kaiser Optical Mark Reader

Digital MicroVAX 3500: **ADVAX1**

1 x MicroVAX 3500 system with 16 Mbyte of memory, an Ethernet port, and 280 Mbytes of disc storage

ICL DRS 500/75 **UNIX1**

1 x ICL DRS 500/75 Processor with 32 Mbytes of memory, 1500 Mbytes of disc storage, Ethernet port, magnetic tape cartridge drive, and half-inch magnetic tape drive.

ICL DRS 500/75 **UNIX2**

1 x ICL DRS 500/75 Processor with 32 Mbytes of memory, 1200 Mbytes of disc storage, Ethernet port, and magnetic tape cartridge drive.

Communications

It is estimated that over 300 terminals or microcomputers, most of which belong to user departments, have access to the equipment. Many of these compete for the limited number of entry ports on the appropriate computer via a Gandalf PACX IV switching unit or the Ericsson MD110 exchange. Others, including the public terminals which may be booked in advance and are located in the Terminal Rooms of the Laboratory, are connected directly to the Ethernet via servers. Individual terminal servers use only one communications protocol, either LAT or TCP/IP depending on whether the terminals they serve are intended for DEC or ICL system 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

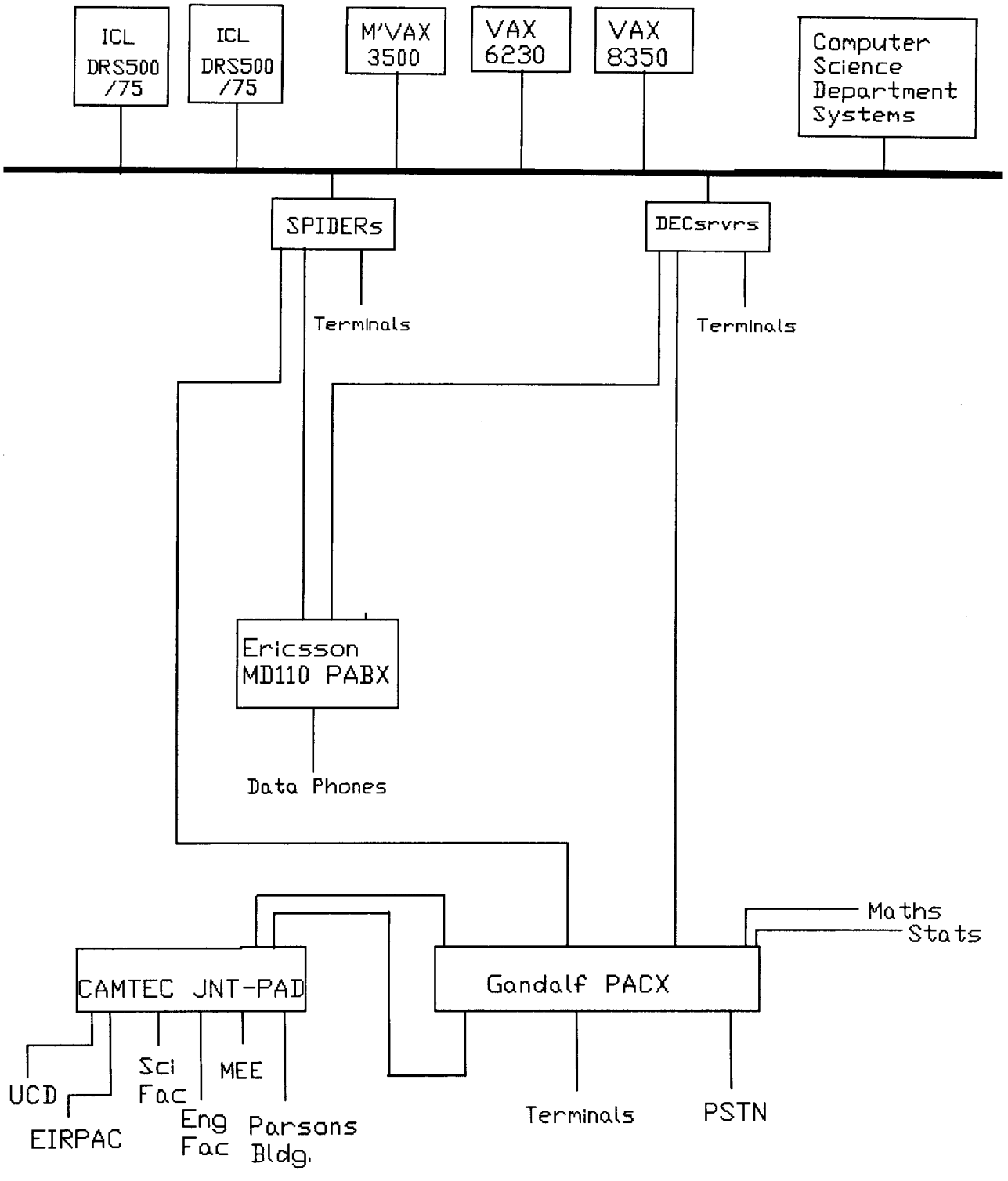
A selection of microcomputers are available to users in the Laboratory at 200/201 Pearse Street. These include the following:

1 x BBC Microcomputer
2 x Apple Macintoshes
1 x Apple II
1 x Apple IIC
1 x IBM PC
1 x Amstrad PCW8256
1 x Apple Laserwriters
1 x QMS Laser printer
1 x Prompt PC with Braille printer and VOTRAX voice output unit.

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

16 x ERGO PCs
16 x Apple Macintoshes
1 x Apple Laserwriter

A new microcomputer facility is located in Beckett Room 1 of the Arts Building and is equipped with 28 x 80386 based IBM compatible PC's with colour monitors and networked to an 80486 based fileserver using 3COM + network software running on the main Ethernet cabling.



COMPUTER LABORATORY

Central Equipment

Figure A.1

30-9-90

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

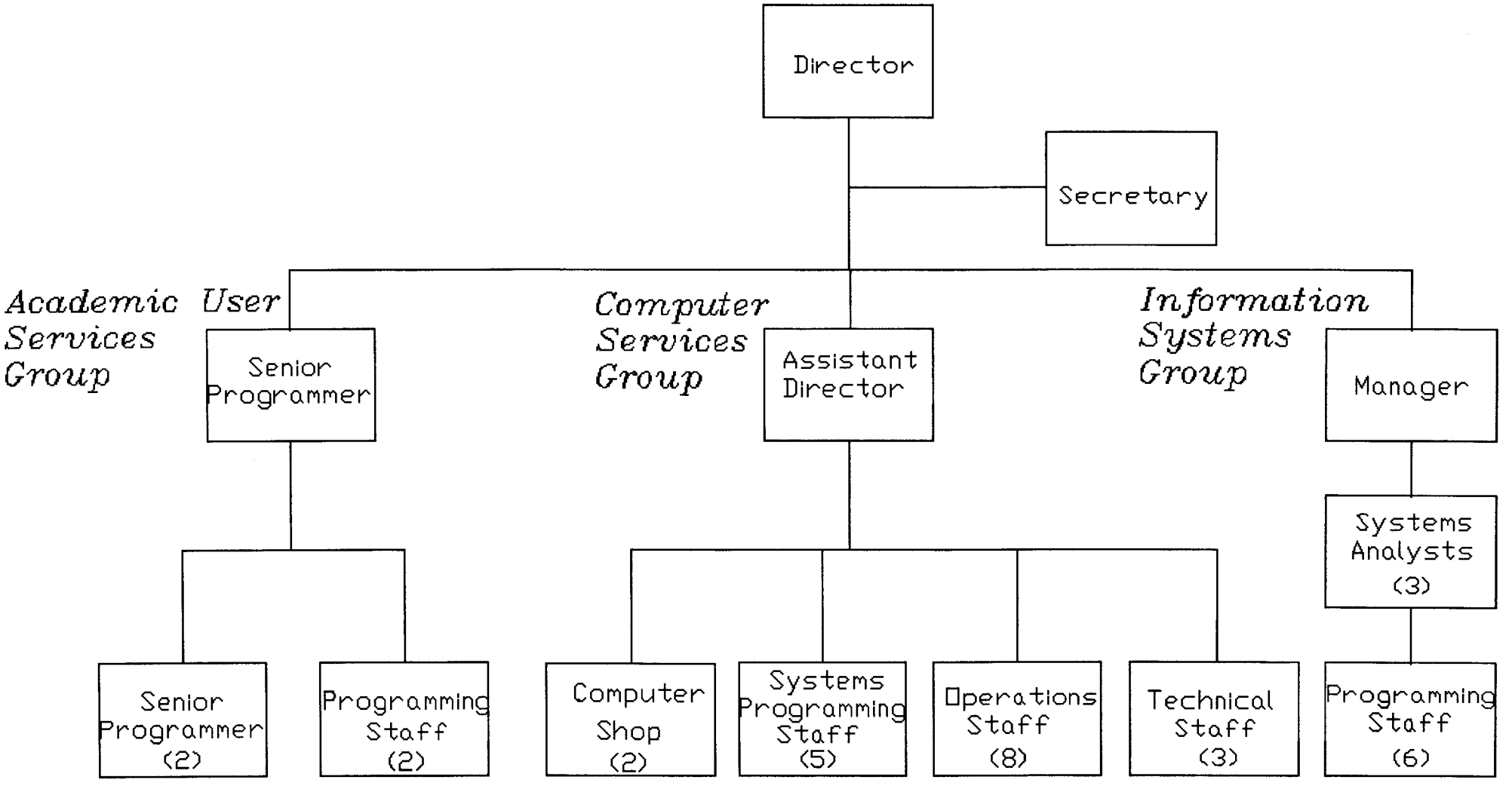
This Group is responsible for the running of the central computer equipment. It is staffed by operations personnel who look after the running of the machines and perform the associated ancillary functions, systems programmers who generate and maintain the central systems and network software, technicians, 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

(Including temporary appointments)

Figure B.1

30-9-1990

APPENDIX C

COSTS

The services provided by the Laboratory may be divided into those related to the central mainframe systems, microcomputers, and communications. The total cost of running the Laboratory is shown below under the main expenditure headings used in the College accounts. The cost of providing each of the three categories of service mentioned above was estimated 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, an estimate of the time spent by each individual member of the Laboratory's staff on each of the three activities was made and the individual's salary costs allocated accordingly. In the case of Mainframe Machine Service, the expenditure was further apportioned between the five machines currently operated by the Laboratory. Allocation of the costs among the different categories of user is based on measured usage in the case of mainframe activity and on estimates in the case of microcomputers and communications.

ACCOUNTS

Year Ended 30th September, 1990

	Actual	Budget
Income:		
Sale of Services	5887	6073
Net Sale of Goods	13126	6800
Miscellaneous Income	0	0
Underspending B/Forward	2127	2127
Total Income	21140	15000
Expenditure:		
- Salaries	556802	570802
- Wages	13003	13885
Total Pay Cost	569805	584687
Rentals of Equipment	68796	70000
Equipment Purchase	268088	222000
Maintenance	111652	122000
Consumable Supplies	15696	29412
Cost of External Services	712	0
Insurance Charges	9039	7700
Telephone Charges	3879	6000
Miscellaneous Expenses	9119	9000
Total Non-Pay Cost	486981	466112
Total expenditure:	1056786	1050799
Net annual cost:	1035646	1035799
Underspending C/Forward	153	0
Total Annual Cost:	1035799	1035799