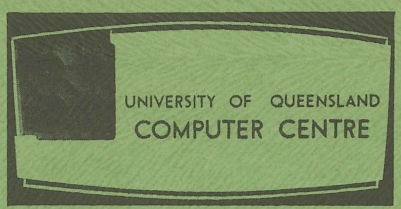
UNIVERSITY OF QUEENSLAND

COMPUTER CENTRE



SEVENTH ANNUAL REPORT

1st January to 31st December 1968

UNIVERSITY OF QUEENSLAND

COMPUTER CENTRE

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FOREWORD

This seventh annual report records two most significant events in the development of the academic and service bureau aspects of the Computer Centre. These are the appointment of a Professor of Computer Science and the installation of a large dual-processor multiprogrammed computer, with remote terminals. Both events are a consequence of the rapid rise in demand for teaching and research in the field of Computer Science and for more extensive computing services.

As Chairman of the Executive Committee, I wish to record my personal thanks to staff of the Computer Centre, and in particular Mr. R.E. Kelly, for their contribution to the present stage of academic development and also for their part in establishing excellent relationships with users of all categories.

S.A. Prentice
Chairman
Computer Centre Executive Committee

April, 1969.

COMPUTER CENTRE EXECUTIVE COMMITTEE 1968

Professor S.A. Prentice, B.Sc., M.E.E., FIE(Aust.), FIEE	Professor of Electrical Engineering (Chairman)
Professor D.W. McElwain, M.A., Ph.D., F.BPsS	Professor of Psychology (Deputy Chairman)
Professor D. Mugglestone, B.Sc., Ph.D., FRAS, FIP, FAIP	Professor of Physics
Professor J.C. Mahoney, ED., B.Litt., M.A., B.A.	Professor of French (President, Professorial Board)
Professor C.S. Davis, D.F.C., M.Sc., Ph.D.	Professor of Mathematics
Professor R.G.H. Prince, B.E., B.Sc., Ph.D., AMIChemE	Professor of Chemical Engineering
Professor R.C. Gates, B.Com. (Tas)., M.A. (Oxon)	Professor of Economics
Professor S. Lipton, M.Sc.	Professor of Mathematics
Dr. S.A. Rayner, M.Ed., Ed.D., M.A.	Deputy Registrar
Mr. R.E. Kelly, B.E.	Senior Lecturer in Computing (Officer-in-Charge)
Mr. E.J. Sokoll, B.E.	Lecturer in Computer Electronics
Mr. E.D. Murray, M.C., B.E., FIE(Aust.), FIEE	Chairman, Computer Centre Advisory Committee, University College of Townsville
Mr. I.M. Hunter, B.Sc., MIE(Aust.), AMIMechE, MIEE.	Lecturer in Computing, University College of Townsville

STAFF OF THE COMPUTER CENTRE 1968

(at 31.12.68)

Officer-in-Charge and Senior Lecturer in Computing	*R.E. Kelly*, B.E.
Lecturers	*E.J. Sokoll*, B.E.
	I. Oliver, B.Sc., B.Econ., Dip.A.C.
	C.C. de Voil, B.E., M.Eng.Sc.
	J.D. Noad, B.Sc.
	R.N. Buchanan, B.Sc., Dip.Ed., Dip.A.C. (*Temp*)
Demonstrators (Programmers)	*J.S. Williams*, B.Sc., Dip.A.C.
	W.N. Fulton, B.Sc., Dip.A.C.
	L. Mor, B.E. (*Part Time*)
Administrative Officer	*J. Jauncey*
Maintenance Technicians	*G.L. Jerrard* *D. Brunner*
Computer Operators	*Pat Cusack* *Noela Leschke* *Pat Loder* *Pat Matthews* *Anne McArthur* *Helen Otte* *Diann Wilkins*
Data Preparation Assistants	*Diane Ball* *Angela Vidanovic*
Secretary	*Delphine Dare*

ANNUAL REPORT

INTRODUCTION

The continued demand by University Departments and Administration required full three-shift operation in 1968 and confirmed the need for making the new computer system fully operational as soon as possible.

The academic functions were further extended to meet demands for courses with consequent limitations on the research work of the staff. Further, a great deal of time has been devoted by all members of academic staff to details of the new computer system, particularly to preparation of software.

The rearrangement of facilities and installation of the new computer system also required a major contribution of time by Computer Centre staff.

EXECUTIVE COMMITTEE ACTIVITIES

A.U.C. Questionnaire on future needs

Unfortunately, it has not yet been possible to have any detailed discussions with the Australian Universities Commission on the proposals for development of the PDP 10 system. It is hoped that this can be arranged early in 1969.

Remote Terminal Priorities and Disposition

The Executive Committee have formulated criteria for the allocation of priorities for Remote Terminal installations and it is expected that 16 Remote Terminals will be installed in 1969. Of these, three or four will be for non-University users in the Brisbane Metropolitan area.

Functional Classification of Staff

Consideration was given to the creation of a new set of staff classifications more appropriate to the service bureau work of the Computer Centre. A sub-committee has been formed to develop a proposal in greater detail.

Charges for Administrative Type Work

The Executive Committee agreed that the charge of $40 per hour for University administrative type work on the GE 225 Computer System should be reduced to $20 per hour provided a special allocation towards salaries for future staff appointments could be made.

Review of Charges for PDP 10

A minor revision was made to charges for the PDP 10 computer system which will result in economies in large scale data processing work.

I.B.M. 1620 Computer System

The Committee recommended that the I.B.M. 1620 system be offered for sale to Townsville University College, instead of the present arrangement by which the system is on loan without charge.

STAFF CHANGES

New academic appointments

Lecturer in Systems Programming	-	C.C. de Voil, B.E., M.Eng.Sc. (formerly Senior Demonstrator)
Senior Demonstrator	-	J.S. Williams, B.Sc., Dip.A.C. (formerly Demonstrator)
Lecturer	-	J.D. Noad, B.Sc.
Demonstrator	-	W.N. Fulton, B.Sc., Dip.A.C.

Chair in Computer Science

Approval was obtained for the establishment of a Chair in Computer Science and Associate Professor G.A. Rose, University of New South Wales was appointed to take up duty early in 1969. The Computer Centre, previously attached to the Department of Electrical Engineering, has full departmental status from 1st January, 1969.

TEACHING AND LIAISON ACTIVITIES

General

The teaching activities were further augmented and a number of persons attended programming courses bringing the total since 1961 to approximately 2,330. In addition to the programming courses, staff gave over 600 lectures, conducted 150 tutorials and seminars while demonstrating and consulting services occupied a further 1100 contact hours.

Programming Courses and Postgraduate Courses

During 1968, six basic FORTRAN courses were given by the Computer Centre for which a total of 128 students enrolled. In addition to the "service" courses, undergraduate teaching of computer courses increased substantially.

Enrolments for the postgraduate Diploma in Automatic Computing increased to 18 (4 full-time, 14 part-time). The introduction of the new Diploma in Information Processing jointly by the Faculty of Commerce and Economics and the Computer Centre resulted in 11 enrolments (3 full-time, 8 part-time).

Computer Centre staff participated in a number of conferences and symposia and delivered lectures to various professional bodies, including the Australian Computer Society; the Operations Research Group of the Australian Computer Society; the Institution

of Engineers, Australia, Queensland Division; a Vacation School on Mineral Processing; and a Winter School in Power Systems Electrical Engineering.

The Officer-in-Charge of the Computer Centre, Mr. R.E. Kelly was Chairman of the Australian Computer Society, Queensland Branch, and delegate to the Federal Council of the A.C.S. for 1968. Mr. R.N. Buchanan delivered "careers lectures" at fifteen metropolitan high schools.

RESEARCH AND DEVELOPMENT

With the installation of the PDP 10 planned for mid 1968, it was necessary to curtail the development of programs for the GE 225. A number of FORTRAN IV subroutines were reprogrammed ready for use on the PDP 10 and a FORTRAN IV manual was produced for use with both computer systems.

Most of the effort of the staff was directed towards planning for the implementation of batch-processing and timesharing on the PDP 10. This has involved modifying and extending the facilities contained in the standard systems programs. In particular, the staff have worked on the command language, task control, file management, and accounting functions of the operating system. The major objective of this effort has been to produce a simple, reliable and consistent timesharing operating system to cater for the specific requirements of a university environment. Much of the work has been original and should result in a number of publications in the future.

An extensive publication programme has been undertaken during the year and has resulted in the issue of a number of manuals and technical memoranda. These are listed in Appendix I. The regular publication of a Computer Centre Bulletin was commenced. This Bulletin contains announcements, programming advice and articles of general interest which attempt to maintain communication between the staff and users of the computer facilities. It is proposed in the future to issue Technical and Research Reports on various aspects of computing.

COMPUTER USE

The distribution of computer time (GE 225) is illustrated in Figure 1 which shows the proportion of time used by various functions.

The total switched-on time for the year was 4,860 hours with a total usetime of 4,195 hours. This latter figure should be compared with a scheduled availability of 5,196 hours.

Appendices III and IV show the distribution of computer time used by University Departments and non-University organizations, respectively. The computer time shown as 'Computer Centre' is significantly greater than other users, this time being distributed between development projects, demonstrations and normal operating overheads. It should be noted, that use of the computer by University Departments is increasing rapidly, while external use is gradually falling off. Despite the installation of a number of other computer systems in Queensland during recent years, the use of the computer by external organizations continues to be significant.

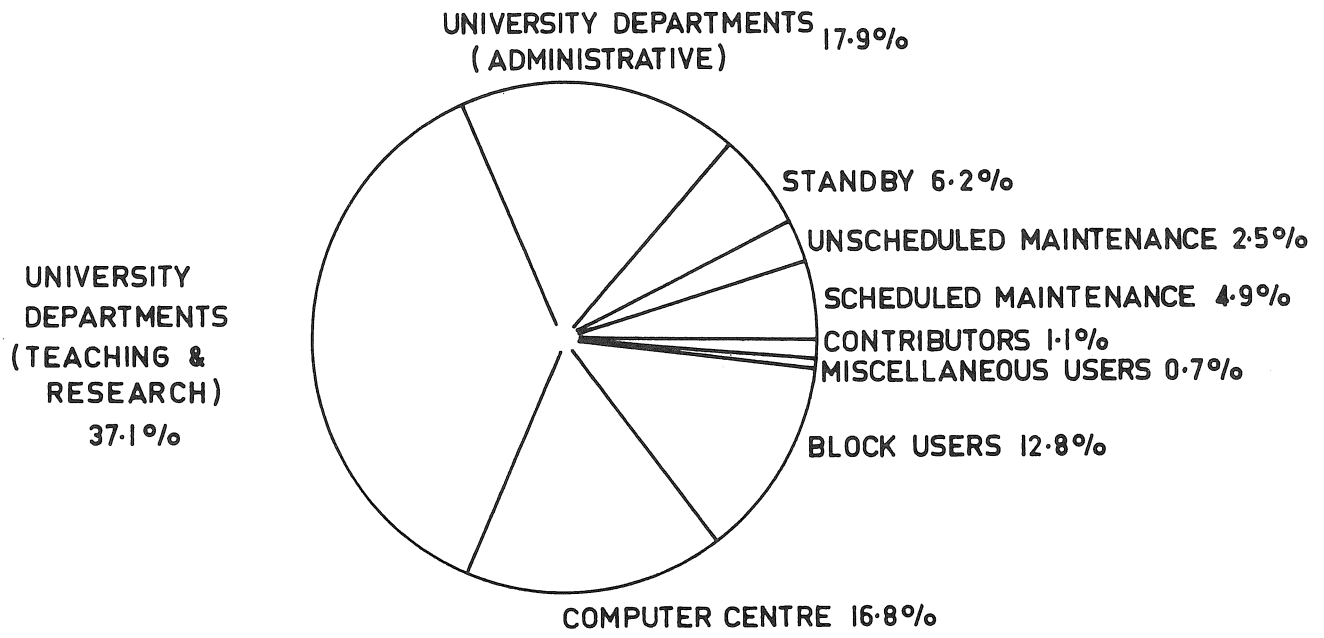

Fig. 1. *Distribution of Hours of Total Switched-on Time (4,860 hrs. = 100%)*

A graph of the growth of computer use since 1962 is shown in Figure 2. The continued upsurge in computer use for University purposes results from increasing requirements for undergraduate teaching and administration.

Most users of the computer facilities have provided a list of new programs developed during the year, and this information, edited for uniformity of presentation, is given in Appendix V. Attention is drawn to the very wide variety of computation and data processing work which has been carried out with the present facilities.

BUILDING AND AIR CONDITIONING MODIFICATIONS

Following the decision to instal a new computer system in 1968 while still retaining the GE 225 system, and agreement by the Faculty of Engineering to transfer the Applied Mechanics Laboratory to the Computer Centre, a major rearrangement of the building space and redesign of the air conditioning were found necessary. The Commonwealth Department of Works redesigned and constructed the air conditioning services while ensuring that the existing computer system continued in service. The complexity of the programme would have made it impractical to call tenders and the University is greatly indebted to personnel of the Department for excellent planning and the fullest possible cooperation.

Additional space has been provided for staff thus enabling a postgraduate room to be transferred to the Department of Chemical Engineering. Accommodation is however likely to be a limiting factor in staffing the Department of Computer Science after 1969.

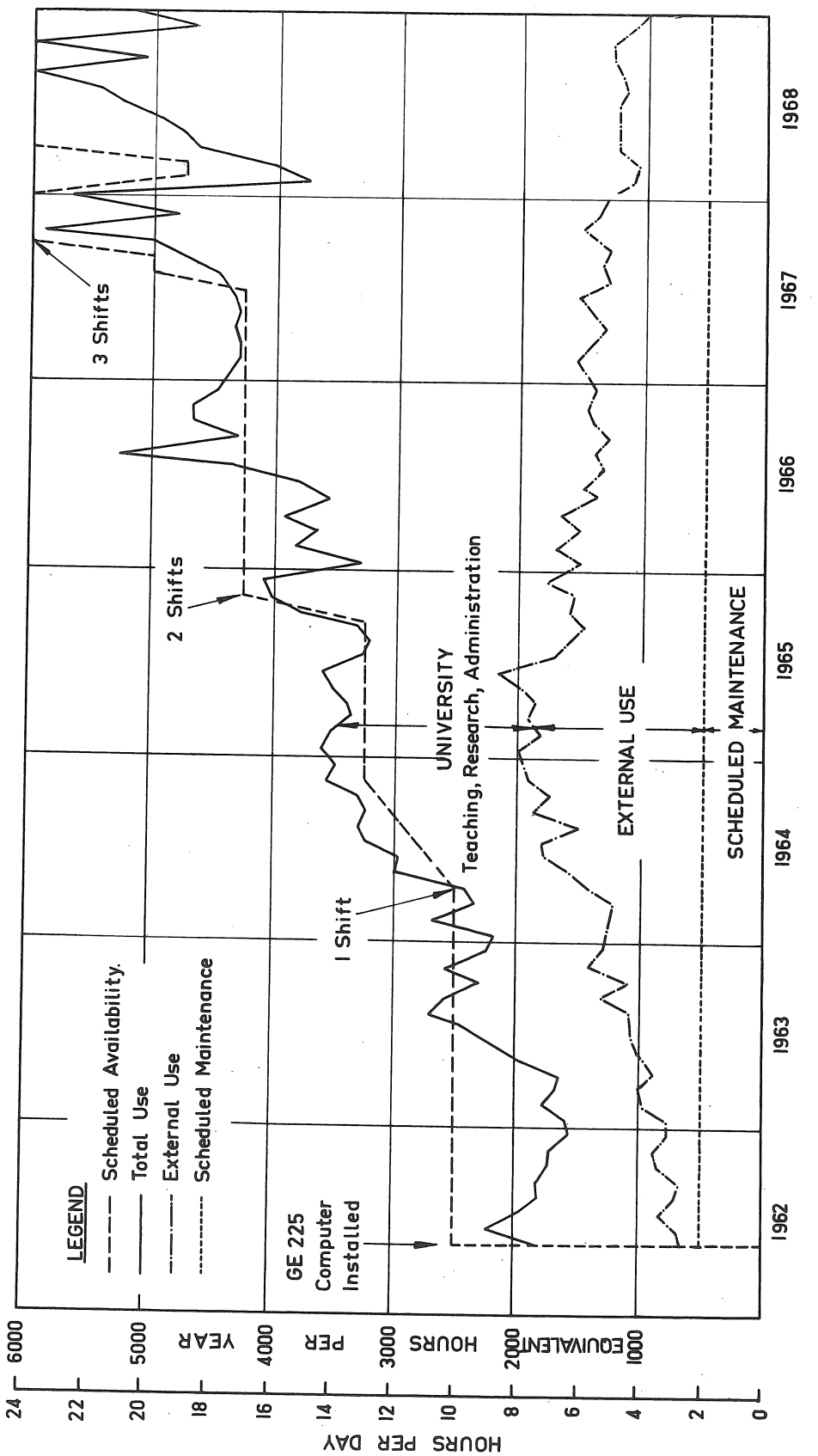

FIG. 2. GROWTH OF COMPUTER USE GE 225 SYSTEM 1962–1968

NEW COMPUTER SYSTEM

In October the University accepted the major part of the dual processor PDP 10 computer system, manufactured by Digital Equipment Corporation, Mass., U.S.A.,delivery of which commenced in April.

A number of items including the core stores were supplied on a temporary basis until the items as ordered were delivered. The major problem has been the failure of the Contractor to supply adequate documentation although some improvement was evident late in 1968.

OVERSEAS VISITS

I. OLIVER

Arrangements were made for Mr. I. Oliver to extend his overseas leave by approximately twelve weeks from 22nd January to 10th April, 1968 at the head office of Digital Equipment Corporation to study programming of the PDP 10 and improve the lines of communication between Digital Equipment Corporation and the University. The people with whom contact was made were very helpful and have continued to supply information to supplement that required by the contract. Whilst in the U.S.A. Mr. Oliver also visited a number of other computer centres, in particular at Massachusetts Institute of Technology and Harvard University and a number of useful discussions were held.

R.E. KELLY

Mr. Kelly visited Digital Equipment Corporation in the U.S.A. in January, 1968. The purpose of this visit was to discuss technical details of the PDP 10 computer system with the suppliers and to visit a number of timesharing computer installations. Detailed discussions were held with a number of Digital Equipment Corporation personnel regarding the installation and design of the PDP 10 computer system. Visits were also made to the University of California, Dartmouth College, Massachusetts Institute of Technology and Applied Logic Corporation.

After visiting the U.S.A., Mr. Kelly travelled to the U.K. where he visited a number of computer installations including the Institute of Computer Science at London University, the Atomic Energy Authority and International Computers and Tabulators Limited.

E.J. SOKOLL

Mr. Sokoll visited the U.S.A. in August, 1968 primarily to attend a course on the maintenance of the PDP 10 computer system. The course of five weeks was conducted by the Field Service Training Department of Digital Equipment Corporation. A week was spent at the plant on technical details and other matters concerning the supply of the computer system. Mr. Sokoll also visited other computer installations in the U.S.A., in particular Massachusetts Institute of Technology where he obtained papers presented at a recently held conference on timesharing. These have proved to be very valuable in the development of the University's timesharing system. Discussions were held with Professor Gordon Brown of M.I.T. and Professor Glaser of the Jennings Computer Centre, Case-W.R.U., U.S.A.

POSTGRADUATE DIPLOMAS

Diploma of Automatic Computing

The Diploma in Automatic Computing was made available for the fifth successive year. The course comprises three computing subjects: Programming Techniques, Logical Design of Computing Devices, and Numerical Analysis. In addition, some specified mathematics subjects must be undertaken. Detailed descriptions of subjects and the rules relating to admission to the course are published in a separate brochure, obtainable from the Computer Centre.

Four full-time and fourteen part-time students enrolled in 1968 and four students completed the requirements for the Diploma.

The Programming Techniques projects completed by students during the year as listed in Appendix VI.

Diploma in Information Processing

The postgraduate Diploma in Information Processing was introduced by the University. This one-year full-time course is run within the Faculty of Commerce and Economics in conjunction with the Computer Centre.

The course is oriented towards the design and application of computer-based information processing systems and gives particular emphasis to electronic data processing systems and decision-making in the business and governmental fields. It covers the functions and use of data processing equipment, computer programming and programming techniques, some basic mathematics, the analysis and design of information processing systems, and the application of computers to economic information processing and managerial decision making. In addition to the basic theory of systems and programming, particular emphasis is placed upon the application of computers to the problems of business and industry.

Nine students enrolled in 1968; a considerable increase in numbers is expected in 1969.

Projects completed by the students during 1968 are listed in Appendix VI.

FINANCIAL POSITION

The financial position, shown in Appendix VII, is considered satisfactory. The salary payments of the members of staff are arranged thus:

University General Funds	11 staff
Computer Centre Operations Account	11 staff

Some rearrangement of funding of salaries is planned for 1969.

The Capital Equipment and Operations Accounts and the Sinking Fund are being used to assist with meeting the payments on the new system.

FUTURE NEEDS

In spite of the difficulties already encountered over the finance of the Stage 1 of the new system, plans for expansion of the system have been developed for the period 1969-1972. The additional needs will include a further number of remote terminal stations and file storage facilities.

Finance for these has been sought from the Australian Universities Commission.

As stated elsewhere, accommodation will be fully taken up in 1969 and the proposed future developments will be limited unless provision of several thousand sq.ft. can be made in an adjacent area.

APPENDIX I

DEVELOPMENT PROJECTS – COMPUTER CENTRE STAFF

The following programs have been developed by Computer Centre Staff members during 1968.

R.N. Buchanan	Conversion of subroutines HDIAG (eigenvalues and eigenvectors of a real symmetric matrix) and SIM (solution of simultaneous equations) to FORTRAN IV format.
	Revision of subroutine ROOTS (roots of a polynomial)
I. Oliver	Design of command language for PDP 10 operating system.
C.C. de Voil	A series of FORTRAN IV routines for the manipulation and checking of calendar dates.
	A program to prepare a table of dates vs working days, allowing for specified holidays and weekends.
	A program to create a BRIDGE compatible tape from magnetic tapes of various formats.
W.N. Fulton	Extension and improvements to the WISP compiler and operating system
	Incorporation into the system library of MACROGAP which allows macro facilities to be used within a GAP program.
	Modifications of CSIRO program EIGEN to ensure compatibility with the U.Q. system.
J.S. Williams	EIGN: A FORTRAN IV subroutine to compute the eigenvalues and eigenvectors of a real symmetric matrix.
	RGENMT: Generation of a real symmetric matrix with a determinant and inverse that can be calculated independently of the inversion process. The subroutine is written in FORTRAN IV
	A series of elementary matrix subroutines in FORTRAN IV

Note: A large proportion of the development work in 1968 has been concerned with the PDP 10 system.

APPENDIX II

PUBLICATIONS – COMPUTER CENTRE STAFF

I. Oliver	*Factorial Analysis of Variance.* Algorithm 330, Communications of the Association for Computing Machinery, Vol. 11, No. 6, June, 1968.
I. Oliver	*Tree Searching School Timetables.* The Australian Computer Journal, Vol. 1, No. 3, November, 1968.
C.C. de Voil	*A Digital Instrumentation System.* I.E.A., Qld. Division Technical Papers, Vol. 9, No. 6, June, 1968.

APPENDIX III

DISTRIBUTION OF COMPUTER TIME (HRS.) USED BY UNIVERSITY DEPARTMENTS

Code	Department / Month Ending / Working Days	Jan.19 14	Feb.16 19	Mar.22 25	Apr.19 18	May 24 23	Jun.21 19	Jul.19 20	Aug.23 24	Sep.20 20	Oct.18 20	Nov.22 25	Dec.24 22	1968 TOTALS	TOTAL TO DATE
	Teaching and Research														
001	Computer Centre	24.4	35.2	46.4	43.6	71.7	61.7	79.2	130.3	106.8	120.9	40.8	55.9	816.9	3,774.5
002	Civil Engineering	2.0	7.5	11.5	11.7	12.8	16.1	17.9	25.7	27.4	23.9	2.8	2.2	161.5	492.9
003	Economics				.2			.7	.3	1.2	4.3	.9		7.6	15.6
004	Physics	11.7	13.2	33.9	37.9	55.7	37.2	42.6	49.6	35.5	38.5	77.0	45.1	477.9	2,070.6
005	Psychology		1.1	1.3	3.4	2.5	2.1	5.0	4.2	4.5	8.9	8.2	3.7	44.9	315.0
006	Electrical Engineering	3.8	2.3	7.3	.5	3.0	4.3	4.2	9.7	25.2	21.9	11.3	3.5	97.0	411.9
007	Mechanical Engineering	9.1	3.5	8.5	4.7	4.3	3.9	7.3	9.9	8.8	5.7	3.2	8.6	77.5	412.1
008	Mathematics	1.5	1.4	.2	.3	1.6	1.2	1.9	2.2	3.8	5.5	5.9	1.8	27.3	181.9
009	Geology				.3				.2	.5	.2		.5	1.7	27.7
010	Animal Husbandry	.6	2.0	3.6	8.9	1.1	2.0	2.4	2.0	2.0	1.2	.6	.5	26.9	269.5
012	Agriculture	2.3	2.6	22.0	5.2	12.7	9.4	3.4	5.7	5.6	5.0	6.0	4.8	84.7	276.5
013	Education	.3	2.3	7.3	5.7	8.6	11.6	5.9	8.3	3.3	5.4	7.2	4.9	70.8	213.8
014	Mining and Metallurgy	1.9	4.3	6.0	5.7	12.7	7.7	6.1	5.3	9.7	15.5	1.2	5.4	81.5	279.8
015	Computer Research														33.7
016	Parasitology		.3	1.3	.1	.1	1.2	.1					.3	3.4	25.5
017	Veterinary Preventive Medicine														43.1
018	Surveying		.2				.1	.2				.6	.7	1.8	28.4
019	Veterinary Anatomy			.1										.1	17.2
020	English		1.0	1.6	.3		1.2		.1	2.6	.5	.4		7.7	31.1
021	Veterinary Clinical Studies						.1							.1	2.7
022	Remedial Education				.1	.1	.1			1.7	.6	.9	.5	4.0	13.0
023	Accountancy			.2		.1								.3	4.4
024	Microbiology	.6		.6				1.7	2.9	2.0	2.6	.5	2.2	13.1	66.4
025	Physiology		.1			1.5	.2	.2	1.1	.4	.7	2.4	2.3	8.9	20.4
026	Chemistry	2.8	6.6	12.2	11.9	12.8	6.3	12.4	10.4	8.5	3.6	5.3	5.4	98.2	238.3
027	Geography														12.6
028	Townsville University College														7.1
029	Child Health											.1	.5	.6	11.1
030	Social and Preventive Medicine	1.8	3.5	4.1	2.7	1.6	5.2	2.8	3.2	.4	.5	9.3	6.0	41.1	87.8
032	Botany		.2	1.9	1.3	1.2	6.7	1.6	.8	2.2	3.5	6.6	5.5	31.5	36.1
034	Chemical Engineering	3.9	13.5	9.7	14.3	17.2	15.6	20.7	18.7	17.8	16.6	10.3	7.3	165.6	410.3
035	History														2.0
037	Dentistry	9.7	17.0	14.2	13.3	7.2	1.1	1.1	.3	.3	.4	1.7	9.8	76.1	252.9
039	Surgery														18.0
041	Social Studies		.8			.1	.4	1.6	3.0	2.2	.7	3.5	.9	13.2	18.1
042	Anatomy														2.8
045	Neurology														2.5
046	Anthropology and Sociology	4.0	.6											4.6	24.7
047	Institute of Technology														0.2
048	Veterinary Science Faculty														2.1
049	Medicine (Medical School)		.5	1.2	.3	.1			.4		.2			2.7	6.9
050	Government	7.8	2.1	5.5	15.8	16.1	17.7	14.7	15.7	8.7	12.8	15.3	13.1	145.3	179.9
051	External Studies									2.8	1.1			3.9	28.6
052	Pharmacy			1.2	.5		.6	.3	3.3		1.6	1.1		8.6	12.3
053	Biochemistry			.8	.9	1.1			.1		.4		.1	3.4	3.4
054	Student Counselling				.3		.3	1.1	.7	.3	1.2	2.0		5.9	16.3
055	Medicine (P.A.H.)	.6												.6	.9
056	Entomology		.1	.1				.2		.2	.1	.3		1.0	1.6
057	Pathology														.8
059	Thatcher Library External Studies				.2							.2		.4	.4
060	Japanese												.1	.1	.1
062	Psychological Medicine								.4	.4	.3	.1		1.2	1.2
063	Zoology											.7		.7	.8
	SUB-TOTALS	88.8	121.9	202.7	190.1	245.8	212.9	236.4	314.6	284.8	304.3	226.4	191.6	2620.3	10,407.5
	Administrative														
306	Electrical Engineering	.4	.6	.5	.1	.4	.5	.5	.1	1.1	.9	1.3	.6	7.0	7.0
311	Data Processing	22.9	74.9	87.7	46.4	65.2	51.4	60.3	72.4	58.1	63.5	78.1	127.1	808.0	2,425.3
312	Agriculture			.8	.8	1.2	1.1	.5	1.4	.6	.9	.8	.8	8.9	8.9
331	Examinations Section														42.9
334	Chemical Engineering										.3			.3	.3
338	Administration														2.1
340	Photography	.8	1.0	1.4	1.2	1.5	1.4	1.9	1.6	1.5	1.4	2.0	1.3	17.0	54.1
343	King's College														.5
351	External Studies				.7									.7	.7
352	Pharmacy					.8	2.7	1.7	.3	.4	.9	.7	.4	7.9	7.9
354	Counselling Services				.4									.4	.4
358	Faculty of Engineering		2.0	1.5										3.5	3.5
359	Union Office			1.2		.9		.4						2.5	2.5
361	Bookshop						5.3	.3	2.1		.8	1.2		9.7	9.7
364	TALSA Credit Union										.7	.1	.3	1.1	1.1
	SUB-TOTALS	24.1	78.5	93.1	49.6	70.0	62.4	65.6	77.9	61.7	69.4	84.2	130.5	867.0	2,566.9
	TOTALS	112.9	200.4	295.8	239.7	315.8	275.3	302.0	392.5	346.5	373.7	310.6	322.1	3,487.3	12,974.4

APPENDIX IV

DISTRIBUTION OF COMPUTER TIME (HRS.) USED BY EXTERNAL ORGANIZATIONS

Code	Organisation	Month Ending / Working Days	Jan.19 / 14	Feb.16 / 19	Mar.22 / 25	Apr.19 / 18	May 24 / 23	Jun.21 / 19	Jul.19 / 20	Aug.23 / 24	Sep.20 / 20	Oct.18 / 20	Nov.22 / 25	Dec.24 / 22	1968 TOTALS	TOTAL TO DATE
Contributors																
101	Main Roads Department	*														1,046.2
102	Southern Electric Authority	*														204.0
103	Primary Industries Department	*														120.9
104	Irrigation & Water Supply Commission	*														266.7
105	Co-ordinator General's Dept.	*														141.7
106	Forestry Department	*														157.2
107	Survey Office	*														105.4
108) 109) 110)	Brisbane City Council	*														157.1
111	Aust. General Electric	ϕ														9.0
112	Queensland Govt. Railways	*														52.2
113	P.M.G. Department	*														61.6
114	C.S.I.R.O.	*														148.0
115	State Electricity Comm. of Queensland	*														26.9
116	Mt. Isa Mines Ltd.	Θ										.1			.1	167.9
117	Wide Bay-Burnett R.E.B.	Θ	3.1	.1				4.1	2.3						9.6	30.2
118	Capricornia R.E.B.	Θ	3.0		.3		.2	6.8							10.3	50.9
119	Cardno and Davies	Θ								.9		.2	1.6		2.7	50.0
120	Townsville R.E.B.	Θ	.4		.6	5.8	3.7								10.5	56.2
121	Cairns R.E.B.	Θ		.3	6.7	1.5	1.1								9.6	46.4
122	Mackay R.E.B.	Θ			.3	.1	6.3	.5	1.8						9.0	12.1
	TOTAL CONTRIBUTORS		6.5	.4	7.9	7.4	11.3	11.4	4.1	.9		.3	1.6		51.8	2,910.6
Block Users																
401	Main Roads Department		.1	.1			.1							.1	.4	470.8
402	Southern Electric Authority		2.7	4.0	6.0	2.6	11.3	7.9	11.9	21.2	11.2	10.4	9.1	3.4	101.7	130.5
403	Primary Industries Department		4.2	2.8	9.9	3.1	7.1	5.2	9.1	5.9	5.3	4.9	7.6	4.1	69.2	140.2
404	Irrigation & Water Supply Commission		5.0	10.4	12.8	12.5	11.5	9.6	6.7	6.1	3.2	2.3	1.4	4.7	86.2	94.7
406	Forestry Department			.8	.4	.2			.1	.4			1.1	1.1	4.1	149.9
407	Survey Office		1.4	.5	2.8	1.9									6.6	117.3
408)	(Transport)															4.0
409)	Brisbane City Council (Works)				.4	.2	.8	.1		.5				.4	2.4	4.5
410)	(Elec.)		1.8	1.2	4.3	1.8	5.4	4.2	2.4	1.4	5.8	9.2	5.8	4.1	47.4	142.2
412	Queensland Govt. Railways						.6	.8	.2						1.6	23.9
413	P.M.G. Department		1.8	3.9	10.6	4.4	3.1	4.2	.8	2.0	1.2	2.4	3.0	.9	38.3	203.9
414	C.S.I.R.O.						1.3	.2						.8	2.3	185.2
415	State Electricity Comm. of Queensland		4.4	11.0	2.8		.1		7.9	10.9	12.8	9.6	9.0	7.6	76.1	193.6
423	Commonwealth Dept. of Works		5.8	8.7	15.3	16.7	14.0	12.6	9.5	14.5	19.0	19.7	12.2	11.0	159.0	397.1
424	Sugar Research Institute		.2	.2	.4	.3	3.4			.1	.5	.6	1.1		6.8	96.9
425	Computing Pty. Ltd.								.4	2.7	2.7	7.2	5.3	2.0	20.3	20.3
	TOTAL BLOCK USERS		27.4	43.6	65.7	43.7	58.7	44.8	49.0	65.7	61.7	66.3	55.6	40.2	622.4	2,375.0
	TOTAL MISCELLANEOUS USERS		2.8	2.2	1.4	3.3	2.4	1.5	2.5	2.8	2.0	3.6	5.7	3.4	33.6	340.4
	TOTALS		36.7	46.2	75.0	54.4	72.4	57.7	55.6	69.4	63.7	70.2	62.9	43.6	707.8	5,626.0

* Converted from Contributor to Block User status. ϕ Special contract now terminated. Θ Converted from Contributor to Miscellaneous User status.

APPENDIX V

SOME WORK CARRIED OUT BY USERS OF THE GE 225 COMPUTER IN 1968

Dept. No.	Department	Work carried out on Computer
002	CIVIL ENGINEERING:	
	J.L. Meek	Finite-element Analysis of Elasto-Plastic Axisymmetric Solids
		Contour Plots based on Linear Interpolation over triangles
		Elementary Structure Cutter Program
	D. Sewell *J.L. Meek*	Analysis of Determinate Planar Frames
	W. Stitz *J.L. Meek*	Frame Analysis, including Large Displacements and Plastic Strains
	J. Gralton *J.L. Meek*	Analysis of Plate Structures by Finite Elements
	L.T. Isaacs	FEFLUIDS 1 - Solves Laplace equation for two dimensional and axisymmetric irrotational incompressible ideal fluid flows
	A.L. Brown	CIVCOM 3 - Backwater curves: adoption of Townsville University College program for backwater curves in natural streams using standard slip method
	M.J. Abbott *J.E. Behan*	CIVCOM 4 - Pipe network solution: adoption of Townsville University College program.
	B.E. McKay *J.E. Behan*	CIVCOM 6-Solution of three-dimensional determinate truss.
	P.D. Wruck *J.E. Behan*	CIVCOM 7 - Estimation of depth of flow in natural stream cross section referenced by coordinates
	G.S. Davidson *J.E. Behan*	CIVCOM 8 - Frocht's shear difference technique for obtaining stresses from photoelastic analyses
	J.G. Keays *J.E. Behan*	COVCOM 12 - Obtains principal axes and section properties for irregular sections, defined by co-ordinates of perimeter.
	A.T. Philbrick *K.B. Davidson*	COVCOM 22 - Highway 1. Calculation of Optimum signal settings and the resultant delays at intersections
	B.C. Davis *K.B. Davidson*	CIVCOM 23 - Highway 2. Estimation of traffic on alternative routes.
	B.W. MacFarlane *K.B. Davidson*	Highway 3. Estimation of traffic given trip ends using, (a) gravity method; (b) Furness method.
003	ECONOMICS:	
	A. Fitzgibbons	Econometric study of the Australian capital market.
	N. Podder	Analysis of Consumers Behaviour
	P. Cassidy	Compiling Monte Carlo Simulation Program to be used on Sensitivity Testing of Benefit/Cost Analysis.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
004	PHYSICS:	
	G. Bowman	Calculations of directions of arrival of ionospheric signals.
	M.J. Burke	Least square fit and error analysis of linear and non-linear equations.
	J.R. Catchpoole	Further programs relating to the electric field precipitation of magnetospheric electrons.
	A. Doobov	Analysis of quasi-sinusoidal, heavily damped variations in the earth's magnetic field. Filter and fourier transform programs.
	E.W. Dearden	Further tracing of rays in variable ionospheric models.
	L. Dryburgh	Simulation of operation of large aerial array for different conditions. Trials of various data processing techniques.
	R. Dunlop	Teaching and analysis of experimental data (Physics III and IIIH students).
	R.J. Dyne	Electron broadening and shift of spectral lines. Calculation of dipole matrix elements by solution of Schrödinger equation with Thomas-Fermi ion potential.
	G.D. Finn	An investigation into a numerical technique for inverting Fredholm integral equations of the first kind in the cases of noiseless and noisy data.
	M. Johnston	Statistical analysis of differential proton magnetometer results.
	K.L. Jones	Satellite tracking. Reduction of radio signal data from satellites. Statistical analysis of this data.
	E. Kantarizis	Model ionograms for tests of N(h) methods suitable for a Phase Ionosonde. Development of a polynomial method of reducing $\Phi(f)$ data to N(h) profiles.
	S. Khan	Direction of arrival: calculates zenith angle azimuth angle of ionospheric signals. Plotting of histograms and punching on cards. Fourier spectrum analysis: Determination of compotent of zenith angle, azimuth angle and microbarographic time series. Correlation: Auto and cross correlation of different time series. Plotter SKI: Memorizes 1500 points and plots in progressive order. Prints negative if 1500 th value is smaller than the first value.
	A.T. Linde	Harmonic analysis of geophysical data.
	K.J.W. Lynn	Derivation of sunrise and sunset times along great circle propagation paths. Computation of very low frequency radio mode conversion and propagation parameters.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
004	CONTD.	
	J.P. McGilvray	Routine use of existing programs in GAP and Card Fortran for x-ray and dosimetry problems. Two programs for use with problems in Cobalt-60 and Deep Therapy were written and are in the process of being tested. The programs for reconstruction of sealed source locations from stereo-radiographs, started in 1967, are complete and a program for the calculation of Strontium-90 dosages written and in use.
	L.F. McNamara	Preparation of data for use in programs run on the CSIRO CDC 3600 in Canberra.
	L.A. Meara	Great circle path geometry for points on earth's surface. Solar geometry - - sunrise and sunset times at ground and upper atmosphere. Non linear regression - - least squares parabola, cubic and sinusoid. Airy functions of complex argument. Solution of general (complex) modal resonance equation for VLF propagation Height gain functions for VLF modes. Scattering coefficients in mode conversion.
	A. Mir	Calculation of Backscatter coefficient.
	E.C. Morris	Data processing and integration.
	Z. Rahmani	Calculations of sunrise and sunset times at different ionospheric heights. Calculations of height gain functions, excitation factor and different mode parameter for L.F. Radiowave Calculations of hop structure for L.F. Radio Wave
	B. Rigby	Calculation of magnetosphere shape using Inouye-Lomax method.
	I. Shortt	Solution of the equation of radiative transfer applied to scattering of light in spherical dust nebulae.
	R.W. Simpson	Integral analysis: concerned with the computation of astrophysical parameters and quantities using Simpson's Rule, Gauss-Hermite, Third-Order Gauss and generalized Simpson's rule approaches.
	R.J. Stening	Calculation of height-integrated conductances in the ionosphere. Iterative calculation of ionospheric current systems by an equivalent circuit method.
	R.G.S. Taylor	Standard Deviation and Multiple Linear Regression; Investigation of correlation between Atmospheric and Soil Gas Radon concentration and meteorological factors.
	S.J. West	Numerical Filtering, Power Spectra, and Coherency analysis of the Micropulsation signal.. Unique determination of polarization by specifying (a) the degree of polarization (b) the orientation of the polarization illipse, (c) the sense of the polarisation.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
004	CONTD.	
	J.D. Whitehead	The gradient instability in plasma; Calculations have been made of the changes which occur in electron density when a perturbation is inserted in a plasma with a background gradient.
005	PSYCHOLOGY:	
	R.H. Foggitt	Analysis into differences in cognitive processes between two different ethnic groups.
006	ELECTRICAL ENGINEERING	
	L.V. Skattebol	Fourier spectrum analysis of experimental waveforms. Entropy calculations of homogeneous and first order Markoff stochastic processes.
	G.F. Shannon	Root Locus Plotting. Program reads number of and location of poles and zeros. Output consists of a tabulation of points on locus together with corresponding gain. Graphical output is also obtained through use of PLOTTER.
		Running averages of set of data with variable number of pieces of data per set.
	M. Darveniza	Prediction of the lightning performance of EHV transmission lines.
	R. Caldwell	Prediction of the effect of non-standard waveshapes on the impulse strength of HV insulation
		Calculation of surge voltage waveshapes at various points on a model power system using travelling wave theory. (Program supplied by Snowy Mountains Hydro Electric Authority.)
007	MECHANICAL ENGINEERING:	
	C.N. Jones *T. Walker*	Hovercraft fan selection by digital computer program.
	T.F. Leahy	Development of program for automatically fitting the best polynomial to a set of experimental results.
	M.F. Winders	Parametric studies of crossflow cooling tower designs. Determination of packing heights of crossflow and counterflow cooling towers.
	R.J. Hooker	Analysis and curve-fitting of results from experiments on damping properties of metals. Prediction of combined stress behaviour.
	G.E. Russell	Development and use of programs to predict the extraction performance of sugar cane crushing trains under steady-state conditions.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
007	CONTD.	
	G.E. Russell *W. McWhinney*	Development of DYSMIL, a program to simulate the dynamic extraction operation of sugar cane crushing trains.
	G.A. Foster *N.R. Hall*	Reduction and plotting of centrifugal fan test results.
	I.R. Barnett	Nonlinear dynamic simulation of a hovercraft travelling over random ground surface.
		Accounting program for Department of Mechanical Engineering.
	K. Bremhorst	Reduction of hot-wire anemometer data collected with the aid of the analogue computer to yield spectral and correlation data in isothermal and non-isothermal turbulent pipe flow.
		Calculation of correction factors to be applied to hot-wire anemometer data.
	G.L. McDonald	Program for analysis of tractor accident data.
	T.B. Walker	Analysis of power spectral data.
	G.F. Harvey	Program for the vibration analysis of a vehicle model with two identical, time delayed inputs.
		Subroutine for calculating natural frequencies and normal modes.
		Program to determine tractor dynamic properties from drop test data.
		Program for the reduction of B & K spectral density results.
		Analysis of ground spectra and cross spectra for two parallel tracks.
008	MATHEMATICS:	
	B.L. Adkins	Analysis of multifactor dental experiment.
	L. Bass	Computations of membrane potentials.
	N.S. Clarke	Effect of surface tension and viscosity on accelerating fluid jets.
	L.E. Howard	Earthquake location problems. Gravity interpretation.
	A.S. Jones	Calculations of blood flow.
	C.F. Lee	Computations of numerical solutions of some nonlinear differential equations.
	H. Rasmussen	Numerical solution of differential equations arising in viscous flow between rotating discs.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
012	AGRICULTURE:	
	I.F. Horton	Factorial Analysis Program, other special analytical programs for genetics experiments, programs for processing special data from dental experiments.
	M.C. Waldron	Development of programs for the study of the aspirations, attitudes and social structures of successful and less successful farmers' discussion groups.
013	EDUCATION:	
	M.A. Colston	Analysis of the Verbal Interaction in some Brisbane primary school classes.
		Hem analysis of attitude scales for primary school pupils.
	D.J. Drinkwater	Analysis of personality characteristics of Australian adolescents.
	J.M. Genn	Factorial and discriminant analyses in connection with a study being made of chemistry scholars in school and university contexts.
	R.D. Kitchen	Varimax factor analysis of the attitudinal components of student teachers based on the semantic differential.
		Examination of basic personality variables of student teachers and teacher role conceptualisation.
	R.V. McSweeney	Analysis of personal values of Queensland secondary school pupils.
	C.N. Power	Item analysis of science achievement tests.
		Analysis of variance of classes receiving or not receiving feedback from tests.
		Analysis of variance of groups receiving various amounts of feedback from teacher.
		Multiple discriminant analysis to determine differences of various groups of learners in classrooms.
014	MINING AND METALLURGICAL ENGINEERING:	
	J.E.M. Barnes *R.A. Slaughter*	Calculations related to optimising the transport of men into a mine.
	J.R. Braes	Programs for the simulation of complete flotation plants.
	P.T. Isles	Reduction of data from and simulation of beach sand concentrations.
		Calculation of the flow in ore storage bins.
	A.F. Luscombe *N.W. Johnson*	Reduction of data from froth and flotation tests.
	M.J. Lees	Reduction of data from hydrocyclone tests.
	H. Petrie	Reduction of data from sieve bend tests.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
014	CONTD.	
	W.J. Whiten	Programs for the simulation of industrial crushing, grinding, flotation and beach sand concentrations. General purpose programs for graph plotting, non-linear least squares, optimisations using spline interpolation functions, and calculation of zeros by inverse interpolation.
016	PARASITOLOGY:	
	R.W. Sutherst	Routine regression and covariance. Routine probit analyses. Factorial arrangements of probit data.
018	SURVEYING:	
	I.A. Harley	Camera resection in three dimensions. Partial calibration of close-range camera. Simple survey computations.
	P.C. Miller	General survey computations.
	S.J. Broughton	Vertical photogrammetric control by tachymetric methods.
019	VETERINARY ANATOMY:	
	E.R. Johnson	Beef Research. The Applied Anatomy of Beef Cattle.
022	FRED AND ELEANOR SCHONELL EDUCATIONAL RESEARCH CENTRE:	
	J. Elkins	Auditory discrimination in children.
	J. Elkins	Hierarchical grouping of children into types.
	J. Elkins	Intercorrelation, factor analysis and canonical analysis of cognitive tests at Grade 4.
024	MICROBIOLOGY:	
	E. Szabo	Single-linkage cluster analysis of the Sneath type. Complete-linkage modification of the Sneath type of analysis. Sokal and Michener unweighted variable group average-linkage cluster analysis. Complete-linkage cluster analysis devised by Skerman and Szabo. Intra-cluster and inter-cluster similarity estimation. Printout of similarity matrix in triangular format. Median organism estimation, based on frequency of occurrence within a cluster of + characters, and of + and – characters. Listing of the departmental culture collection catalogue.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
024	CONTD.	
	G.H.G. Davis	Cluster analysis by the single linkage and complete linkage methods and similarity matrix printout as described by Szabo of an extensive range of Gram positive bacteria using taxonomic data collected over a three-year period.
	M.L. Jones	World microbiological culture collection catalogue.
	K.E. McNeil	Single linkage and complete linkage cluster analysis using quantitated data according to the Sokal and Sneath method.
025	PHYSIOLOGY:	
	A. Lipton	Programs for analysis of experimental results.
	G.J. Huxham	Ion determination in heart and uterus muscle.
	D. Hamilton	Specific ion electrode. Ion activities in solution.
		Marking and analysis of student examination results.
		Analysis of multiple choice questions.
	S.R. O'Donnell	Linear least squares regression for analysing dose-response relationships.
026	CHEMISTRY:	
	D.W. James	Calculation of magnetic susceptibility, taking into account spin orbit coupling and distortion from octahedral symmetry for electronic d^9 ions.
		Conversion of crystal magnetic susceptibilities to molecular susceptibilities.
		3 Simulation of e.s.r. hyperfine spectrum for NO_2/N_2O_4 system.
		Normal coordinate vibrational analysis for octahedral and pyramidal ions.
	E.C.M. Grigg	Isotope effects on reaction rates.
	T.E. Peacock	Molecular orbital calculations.
	J.H. O'Donnell	A double integration program was used to calculate radical concentrations in irradiated organic solids. Theoretical electron spin resonance spectra were obtained for a variety of different interaction parameters. Kinetics of radical reactions in the solid state were analysed.
	C.J. Hawkins	Conformational analysis of metal chelate rings systems: Geometrical details such as interatomic distances, bond angles and torsional angles are computed in order to calculate the various contributions to the conformational energy.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
026	CONTD.	
	C.J. Hawkins	Experimental absorption bands are analysed in terms of two Gaussian components. Equilibrium constants concerned with complex formation in solution are determined. These include the acid dissociation constants for the ligands and the stability constants for the complexes.
029	CHILD HEALTH:	
	H.M. Pavlin	Summation of data from ante-natal survey.
030	SOCIAL AND PREVENTIVE MEDICINE:	
	J.H.A. Cane	Development of programs for stepwise information analysis. Preliminary processing of chronic morbidity data. Applications of statistical routines to various medical research problems.
032	BOTANY:	
	H.T. Clifford	Testing of models for classifying sets of plant genera. Classification of groups of plant genera using established models.
	D.J. Connor	Routine analysis of neutron moisture meter data. Development of models to describe light penetration and photosynthetic response of plant communities.
034	CHEMICAL ENGINEERING:	
	D.B. Batstone	Computer-aided process design – Algorithms for partitioning, ordering and solution of systems of algebraic equations describing the steady state behaviour of chemical processes have been incorporated in a general simulation program.
	R.L. Muller	Solution of hyberbolic equations describing flow from a broken dam by numerical integration along the characteristics.
	D.J. McCann	Solution of equation describing bubble formation and weeping from a submerged orifice.
	G.E. Ho	The generalized plate efficiency for binary distillation systems.
	L.R. Flint	A relaxation technique for the solution of the Navier-Stokes equations is being developed.
	I.C. Sandford	Published data has been analysed by Golden Section Search techniques and also be simple iterative procedures.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
034	CONTD.	
	C.T. Kock	Two Phase Flow – Digital solution of laminar flow theory for annular flow to determine velocity profiles, interfacial shear stresses and relative velocities between liquid interface and gas.
		Iterative solution of turbulent flow theory of Calvert and Williams.
	R.N. Wensley	A program was developed to study the collision between a number of rigid particles in a vertically oscillating system with the aim of determining the type of patterns resulting.
	A.S. Anderssen	A direct technique of system identification using Laguerre functions as models has been developed.
		A weighted moments technique for the simulation of the parameters of models is being investigated.
	P.G. Wright	A mathematical model for the growth of sucrose crystals in a batch crystalliser.
	C. Misra	Crystallisation of alumina trihydrate.
	R.J. Batstone	Optimal control of chemical processes.
	J.R. Woodhead	Axial dispersion in a Tabular Reactor.
	A.J. Liem	Optimisation of the Ammonia Synthesis Loop.
	J. Hendry	Optimisation of an Ammonia Synthesis Loop Using Discrete Maximum Principle.
	B. O'Neill	Counter Current Tabular Reactors with Axial Dispersion.
037	DENTISTRY:	
	I.F. Horton *B.T. Homan*	A longitudinal study of dental health in 2,300 Brisbane children.
041	SOCIAL STUDIES:	
	F. Pavlin	Professional Identification Process Computation of statistical significances – correlations – factor analyses of data.
050	GOVERNMENT:	
	C.A. Hughes *J.S. Western*	Use of mass media by a national sample.
	J.S. Western	Professional education in Australian universities.
	J.S. Western *P.R. Wilson*	Political participation of a sample of Queensland voters.
	J.S. Western *P.R. Wilson*	Content analysis.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
050	CONTD.	
	J.S. Western *P.R. Wilson*	The Ashgrove electorate study.
	J.S. Western *P.R. Wilson*	The effect of a political message on different media.
	P.R. Wilson	Attitudes to abortion, homosexuality and prostitution.
	P.R. Wilson	Police-public relations.
	P.R. Wilson	Immigrant assimilation in relation to political behaviour.
052	PHARMACY	
	W. Owen	Analysis of variance in a five factor experiment using 7 x 7 orthogonal latin squares.
		Least squares curve fitting up to a tenth order polynomial using orthogonal functions.
		Fitting a recursive line, test for linearity and calculation of inverse fiducial elements.
		Analysis of DSC data to calculate purity values.
053	BIOCHEMISTRY:	
	E.C. Webb	Calculation of parameters for kinetics of enzymes not showing normal Michaelis-Menten behaviour.
054	COUNSELLING SERVICES:	
		Summary statistics for psychological survey and survey of destinations of graduates.
056	ENTOMOLOGY:	
	G.H.S. Hooper	Project Analysis of Toxicological Data.
059	THATCHER LIBRARY:	
	E.J. Row	A cataloguing system for produce cross-referenced catalogues in a form suitable for printing.
EXTERNAL ORGANIZATIONS		
119	CARDNO & DAVIES	
	L. Stanley	Computation of flows and pressures in pipe network for a town water supply reticulation system.
	S. Williams	Computation of stresses in prestressed concrete sections for a highway bridge.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
122	MACKAY REGIONAL ELECTRICITY BOARD:	
		Calculation of power system load flow.
208	PROVINCIAL TRADERS PTY. LTD.:	
	H.J. Hornbuckle	Calculation of least cost rations for livestock using linear programming techniques.
		Statistical analysis of data from research projects dealing with animal production.
210	NORTHERN ELECTRIC AUTHORITY:	
	F.C. Chase	Power system load flow and transient stability computations as part of system planning and development investigations.
212	TITLES OFFICE:	
		Processing of survey computations.
221	AUSTRALIAN MILITARY FORCES:	
	M.A. Colston	An analysis of the Eysench Personality Inventory using data obtained from Citizen Military Forces applicants.
235	NORTHERN RIVERS COUNTY COUNCIL:	
	R. Stillman	66 kV transmission system analysis.
237	CAIRNS REGIONAL ELECTRICITY BOARD:	
		Stringing chart calculations for overhead transmission lines.
		Power system fault calculations.
		Statistics from consumers' complaints.
402	SOUTHERN ELECTRIC AUTHORITY OF QUEENSLAND:	
	L. Olsen *P. Frangos*	Analysis of power system interruption records. Calculation of power system fault current distribution. Determination of fault location on a transmission system from readings of neutral current.
	L. Watts *D. Hill*	Analysis of power system load flow, fault level and transient stability.
	N. Galwey *J. Hamilton*	Calculation of coal consumption and energy generated at power stations. Determination of economic generation schedules for forward planning.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
402	CONTD.	
	B.C. Pyra	Survey calculations, profile plotting, and tower spotting for H.V. steel tower transmission lines.
	M. Belfield	Critical path analysis for Swanbank "B" Power Station.
403	DEPARTMENT OF PRIMARY INDUSTRIES:	
		Statistical analysis of data from an extensive range of research projects dealing with plant and animal performances in field and laboratory trials.
	B.R. Champ	Analyses of dosage mortality and other data associated with entomological experimentation.
404	IRRIGATION AND WATER SUPPLY COMMISSION:	
	H. Griffith	GAP program to produce discharges from paper-tape inputed information obtained from the translation of continuous stream gauge-height recorder plots.
		CARD FORTRAN programs outputting current meter rating tables (OTT and ALBERTA propellor-type meters).
		GAP program to event-record height-discharge information stored on tape.
		CARD FORTRAN program to punch discharge rating tables on cards.
		GAP program to produce periodic totals and rainfall intensities from paper-tape inputed information obtained from the translation of continuous pluviometer charts.
	A. Kinder	FORTRAN IV program to calculate afflux over a weir.
	D. Doran	FORTRAN IV programs to calculate probabilities from Bivariate Normal Distribution, array probabilities into a matrix suitable for storage probability analysis after Moran, and solve for stationary state probabilities using the Gauss Elimination method for simultaneous equations.
	P. Eden *D. Doran*	FORTRAN IV program to generate a time-series of a set of mutually correlated random variables artificially; while maintaining the basic parameters (mean, variance, serial correlation, cross-correlation) of the original time series.
406	DEPARTMENT OF FORESTRY:	
	N.B. Henry	Plantation Register data processing.
		Preparation of card key for identification of rain forest species (preliminary version for field testing).

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
409	B.C.C. WATER SUPPLY AND SEWERAGE DEPARTMENT:	
	J. Clerke	Computation of flows into and out of lake storage. Computation of river flows from river height information.
410	B.C.C. ELECTRICITY DEPARTMENT:	
	P.A. Clappison	Development of a system for recording and analysing consumer complaints. Further development of a system for distribution transformer load records. Forecasting of loads and growth rates for 33kV zone substations. Load flow and short circuit studies on existing and proposed distribution systems.
	J.S. Lyall	Preparation of transformer tender price schedules.
413	POSTMASTER-GENERALS DEPARTMENT:	
	L.L. Birch	Aerial and transmission line calculations. General network analysis and synthesis. Radio propagation calculations.
	J.F. Connors	Fault analysis of carrier telegraph equipment. Calculation of mean and standard deviation of measurements on trunk telephone circuits.
	J. Fursdon	Respacing of pole routes to reduce 'K' factor to the predetermined limit.
	G.R.M. Grant	Characteristic impedance of coplanar transmission lines. Coincidences of broadcasting skywave coverage. Calculation of field intensity produced by current in a loop.
	P.J. Kitchen	Traffic dispersion measurements to produce collated traffic dispersion percentages. Composite growth factor calculations. Design of crossbar GV stage for production of trunking diagrams. Preparation of metropolitan exchange junction records.
415	STATE ELECTRICITY COMMISSION:	
	G. Billard	Calculation of periodic growth rates and analysis of statistics.
	K.J. Freier *J. O'Regan* *M. Sargent*	Network analysis, and transmission system design.
	L.G. Pane	Load analysis and forecasting. Economic comparisons of generation developments.
	A.L. Hoi	Load Flow studies.
	S.J. Lange	Temperature - demand correlation.

APPENDIX V - Continued.

Dept. No.	Department	Work carried out on Computer
424	SUGAR RESEARCH INSTITUTE:	
	E.E. Shepherd	Further use of the system of programs for the analysis of the results of cane transport studies. The system has been successfully applied to road and Government Railway transport as well as mill tramway operations.
425	COMPUTING PTY. LTD.:	
	H. Went	A system of programs for the compilation and editing of technical specifications and other reports.
	H. Went	Subroutines for magnetic tape input/output for Fortran 4, using upper memory for buffer areas.
	D. Muirhead	Preliminary study of system for total energy calculations.

APPENDIX VI

POST-GRADUATE STUDENT PROJECTS – 1968

DIPLOMA IN AUTOMATIC COMPUTING

PROJECT	STUDENT	SUPERVISOR
Fortran IV Bridge compatible tapes (i) Alterations to the Fortran IV monitor to allow source programs to be compiled from a Bridge compatible tape. (ii) Alterations to the monitor to allow the execution of Fortran IV relocatable programs from a Bridge compatible tape.	*A. Kinder*	*W.N. Fulton*
Specify a Fortran style WIZOR (integers, characters, relocatable S/R's) and give a list of compiled instructions corresponding to the specified statements.	*E. Melville*	*R.E. Kelly*
Specifications for the implementation of a general purpose graphic language.	*A. Duus*	*J.D. Noad*
PDP 8 assembler for the GE 225.	*D. Clark*	*J.S. Williams*
Assemble and Go (GAP) with slip and GAL	*H. Griffiths*	*W.N. Fulton*
Specifications for a simple simulation language on the GE 225.	*T. Power*	*R.N. Buchanan*
Design a logic simulator/compiler for testing the design of logic circuits.	*J. Connor*	*E.J. Sokoll*
Design and implement a program for scheduling University Course Examinations.	*K. Loong*	*J.S. Williams*
Design an Abstract Retrieval System suitable for Computer Science references.	*D. Doran*	*I. Oliver*
Specifications for the implementation of an algebraic manipulation language.	*R. Warren*	*J.S. Williams*
Design and implement a program for symbolic differentiation.	*R. Buttsworth*	*R.N. Buchanan*
Disc service routine for PDP 8 (with queuing).	*J. Row*	*C.C. de Voil*
Executive System for GE 225 (re PDP 10 hook up). In testing use two tape units as PDP 10.	*J. Dauth*	*R.E. Kelly* *E.J. Sokoll*

DIPLOMA OF INFORMATION PROCESSING

Client Accounting System I	*W. Powell*	*J. Noad*
Client Accounting System II	*L. Taylor*	*J. Noad*

APPENDIX VI - Continued.

DIPLOMA OF INFORMATION PROCESSING – continued.

PROJECT	STUDENT	SUPERVISOR
Client Accounting System III	*F. Loosemore*	*J. Noad*
Inventory of Magnetic Tapes	*N. Tranberg*	*W.N. Fulton*
Flow-charting Program	*D. Abel*	*J. Williams*
Capital Investment Analysis	*D. Bargenquast*	*I. Oliver*
Labeling Program	*A. Manicaros*	*C.C. de Voil*
Text Editing Program	*C. Sharpe*	*R.E. Kelly*

APPENDIX VII

FINANCIAL STATEMENT TO 31.12.68

CAPITAL EQUIPMENT ACCOUNT – CUMULATIVE TO 31.12.68

RECEIPTS			PAYMENTS		
Receipts to 31.12.67			Payments to 31.12.67		
Contributor Donations	283,054.00		Purchase of GE 225	291,293.09[1]	
University of Queensland Grants	40,000.00		Purchase of IBM 1620	40,864.20[2]	
Transfers from Operations Account	15,825.33		Furnishings	5,058.77	
Miscellaneous	759.48		Equipment Hire	2,048.17	
AUC/State Government Grants	80,000.00		Miscellaneous	5,501.10	
		419,638.81	Auxiliary Equipment	37,678.27	
AUC/State Government Grant, 1968		160,000.00	Building Air Conditioning	65,530.47	
Department of Main Roads, 1968		60,000.00			447,974.07[1,2]
TUC - part payment IBM 1620, 1968		5,000.00	Part-purchase of PDP 10, 1968		445,398.21
Remote Terminal Fund (Univ. Depts.), 1968		17,852.24	Remote Terminal Equipment, 1968		640.97
Transfer from Operations Account, 1968		100,000.00	Building Air Conditioning, 1968		47,406.71
Transfer from Sinking Fund, 1968		213,771.71	Excess Receipts over Payments (cumulative to 31.12.68)		34,842.80
		$976,262.76			$976,262.76

(1) Not including $62,787.05 paid prior to 1968 from Operations Account for major equipment items.
(2) Not including $ 3,092.32 paid prior to 1968 from Operations Account for major equipment items.

OPERATIONS ACCOUNT – 1.1.68 TO 31.12.68

RECEIPTS			PAYMENTS		
Balance brought forward at 1.1.68		65,608.93			
Contributions by University to Recurrent Costs –			Contra to University Contributions to Recurrent Costs –		
Salaries	45,050.22		Salaries	45,050.22	
Maintenance	5,098.54		Maintenance	5,098.54	
Equipment	1,383.62		Equipment	1,383.62	
		51,532.38			51,532.38
Revenue from Operations			Salaries	35,060.48	
University Departments	78,892.52		Maintenance	3,332.00	
Other Users	81,758.69		Equipment	1,316.35	
		160,651.21	Travel	6,321.29	
			Electricity	6,090.89	
			Furniture and Fittings	1,403.01	
			Magnetic Tape	3,583.20	
			Equipment Rental	4,404.05	
			Stationery	12,336.17	
					73,847.44
			Transfer to Capital Equipment Account		100,000.00
			Excess of Receipts over Payments		52,412.70
		$277,792.52			$277,792.52

SINKING FUND – FOR PERIOD ENDING 31.12.68

RECEIPTS		PAYMENTS	
Balance brought forward at 1.1.68	207,404.31	Transfer to Capital Equipment Account	213,771.71
Interest received for the period	14,665.20	Excess of Receipts over Payments	8,297.80
	$222,069.51		$222,069.51

L.N. LIVINGSTON, F.A.S.A.
BURSAR