Prentice Computer Centre

Prominent figures in the development of the Prentice Computer Centre — (from left) Professor S.A. Prentice, current Director Mr Alan Coulter, Professor Gordon Rose and Mr Richard Kelly in one of the Centre's two computer rooms.

AS THE Prentice Computer Centre celebrates its 25th anniversary it looks back on an era which has seen exciting and revolutionary changes in computer technology.

In 1962 the University made history when it acquired the first large-scale computer in Queensland — a General Electric GE225, described by local newspapers as "an electronic computing brain", valued at $200,000.

But the "electronic brain", which occupied the best part of a room in the Department of Electrical Engineering, had less memory than one of today's most basic personal computers.

Today the Prentice Computer Centre is powered by four main-frame computers valued at more than $6 million. These include the sophisticated IBM 3083 and Digital Equipment Corporation's VAX 8650, which with two other central computers and a specialised Computervision CAD/CAM system provide a combined computing

Dramatic era of change in computer technology

power thousands of times higher than that of the original GE225.

From just a handful of users in 1962, the centre has expanded to meet the needs of 4500 users in 160 departments and organisations from the University of Queensland, Griffith University, other educational institutions and State and Federal Government Departments.

These days the Centre provides interactive and batch computing services and assists in teaching, research and administrative work throughout the universities. Services include specialised programming, engineering development, data preparation, network facilities including electronic mail, typesetting and printing, applications packages, training and advisory services and personal and mini computer support.

From its humble beginnings, the Prentice Computer Centre has come a long way. To review its development we invited Emeritus Professor S.A. Prentice, Foundation Professor of Electrical Engineering, and also the four successive directors of the Centre to recall their experiences.

Professor S.A. Prentice:

"The first proposal to have a University Computer Centre was made in April 1957 after my return from study leave overseas in 1956," Professor Prentice said.

"I had seen many universities and industrial organisations with digital computers and was impressed in particular by their application to engineering research.

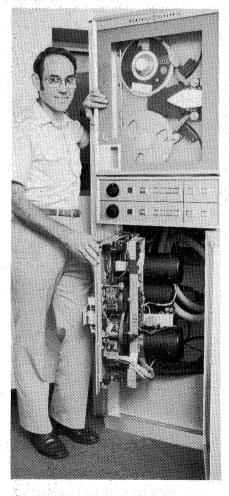"I was convinced that a digital computer was an essential requirement to assist with developments in science and technology, but it was clear that even a small facility was beyond the resources of this University unless a co-operative scheme providing for a group of departments was devised.

"In October 1958 there began a series of meetings which explored the ways and means of meeting University needs in this field. At this stage a very comprehensive survey of University needs in data processing and computing was carried out and this provided ample evidence that there was a case for more adequate facilities.

24 yrs on the job with PCC

Prentice Computer Centre's longest serving employee Mr Graham Jerrard with the tape drive for the GE225 — the first computer at the University of Queensland.

1962—1987 a dramatic era of change

"It was finally decided to seek outside finance for a computer from government departments, electricity authorities and private industry.

"In brief this meant raising capital to set up a computer facility by the advance sale of computer time. When enough money was found, tenders were called and the GE225 was purchased. Accommodation was provided by extending the basement of Hawken Building.

"The Centre came into regular operation in June 1962 and on August 1 was officially opened by Sir Douglas Fraser, then State Public Service Commissioner who had given invaluable help during the negotiations with State Government departments.

"Thus were taken the first steps in a venture which has developed far beyond the predictions of 30 years ago."

Dr Don Overheu, 1962-1964:

Dr Overheu recalled further early developments during his term as the Centre's first Director.

"I arrived in 1962 to see a half completed building and no idea where I would sit. Hugh Webster provided me with some temporary space in Physics and, by the skin of our teeth, we moved to the Centre in the basement of Engineering just before term started.

"One looks back with amazement at what we had. A machine of 20kb that took up the goodly part of a reasonably sized room. Yet it was a brave venture in days when computers were still a novelty and academics regarded them with suspicion.

"A fire in the air conditioning duct nearly lost the Centre for us and this certainly would have been the case if it had not been for the efforts of Bill Robson, the laboratory manager of Electrical Engineering.

"Eventually a fast printer and tape drives were added to the system giving it much more effectiveness. It is truly surprising how much valuable work was done, such as the heuristic program for laying out transmission lines, the road contouring programs and the acceptance by Queensland courts of calculations of timber cutting dues.

"The Centre, in conjunction with the Mathematics Department, was also responsible for introducing the first Diploma in Automatic Computing at the University, mo-

delled on the one at Sydney University.

"I shall always be glad to have been associated with this venture which has now grown into one of the major university computer centres in Australia."

Mr Richard Kelly, 1965-1968:

The next few years were years of intense activity, according to Mr Kelly, Dr Overheu's successor.

"The availability of a 'modern' digital computer had been well received by both the University and the (mainly scientific/engineering) community. The small professional staff was stretched to the limit, writing new software, consulting with clients, conducting programming courses, introducing new academic offerings and delivering lectures to professional and learned societies.

"During the period 1961-68, over 2300 people had attended programming courses, conducted by the Centre. An average of over 2000 hours per year was devoted to consulting with and assisting clients.

"In 1968 a new postgraduate Diploma in Information Processing was introduced under the aegis of the Faculty of Commerce and Economics.

"A 70-80 hour working week was not uncommon and the success of the Computer Centre during this phase was undoubtedly due to the efforts of such dedicated individuals as Jim Sokoll, Ian Oliver, Graham Jerrard, John Jauncey and many others.

"It became obvious during 1966 that additional computing capacity would soon be required, so Professor Prentice again unleashed his entrepreneurial skills. A grant of $160,000 from the Australian Universities Commission and substantial financial backing from the then Commissioner for Main Roads, Mr Charles Barton, were combined with the substantial profits accruing from the operation of GE225.

"Thus the University was able to leap into the then new era of 'time-sharing' with the acquisition of a DEC PDP10 computer system for $670,000, providing a considerable lift in computing capability and convenience of use.

"Those years of almost frantic growth and expansion are probably best remembered for the camaraderie and enthusiasm between Centre staff and clients.

THE NEXT 25 years of computing development will be characterised by no less change than the past 25 years.

Systems providers and users have not yet taken advantage of the past 10 years of intensive research and development into computing hardware and software.

World-wide research into computing and related technologies continues to expand, and at a faster rate.

The close association of computing and communications is now well accepted. Integrated Services Digital Networks (ISDN), offering facilities for voice, video and data and global communications networks, will be usual in the next 10 years.

Very specialised computing services will be associated with those networks and be capable of being accessed by more than a privileged few. The range of computer based applications will expand in response to new technologies.

Apart from changes in technology, the Prentice Computer Centre as a central resource unit must also respond to changes in demands and organisational structure of the University community which it serves.

Universities are undergoing structural and management

All set for an age of supercomputers

By Alan Coulter: Director, Prentice Computer Centre

changes with greater devolution of authority. The more that computing is embedded in the teaching, research and administrative functions of nearly autonomous units, the more there will be a desire for computing to be under the control of such units.

The central computing units at universities must in the future place a greater emphasis on support through development of relevant infrastructures of networks, expertise, standards and specialised services.

The philosophies and standards of Open Systems Interconnect (OSI) will have a major impact on future developments. All computer hosts and network services should be equally accessible by all users.

By far the major challenge for central computing support units will be the development and the retention of people expertise.

We must help our existing staff meet the fast rate of change in technology through professional development programs. After a period as a professional novice, there needs to be an industry competitive contract and remuneration package that will enable centres of computing expertise to retain the best staff and buy in expertise that they do not have.

There is a need for access to supercomputer facilities. The availability of large computers at CSIRO in Canberra has been shown over many years not to be the best solution for universities.

With the development of effective networks, it would be possible to develop a co-operative arrangement to establish a supercomputer in Queensland to serve the scientific needs of Queensland industry, government and tertiary institutions.

And so after 25 years, there is again a need for a Syd Prentice to develop a co-operative arrangement to enable Queensland to enter the supercomputer era.

1962—1987 a dramatic era of change

"The client's room became a meeting place for advice to be given and received, for the exchange of ideas, for the meeting of minds.

"Regrettably, timesharing has distanced the users from the Centre and from each other but that may be the price of 'progress'."

Professor Gordon Rose, 1969-1972:

Professor Rose guided the Centre into the 1970s as its third Director.

"On January 1, 1969, the Department of Computer Science was established and administrative responsibility for the Computer Centre was transferred from Electrical Engineering to the new department," he said.

"The GE225 computer had been operating extremely successfully and had accumulated $760,000 in revenue, 80 percent of which was from external clients for less than one third of the consumed computing units.

"During the first year of operation of the Department of Computer Science the service and the academic functions were formally separated. A largely autonomous Computer Centre became the service unit and the Department confined its activities to teaching and research.

"Life in the Centre was never static. 'Routine' was a misnomer. Some of the major problems of the 1969-72 period were: a changing pattern of usage from batch to remote terminals, using a system which was to an extent unproven; a changing pattern of revenue, from largely external to largely internal as outside bodies purchased their own equipment and commercial bureau commenced operation.

"It was no longer possible to maintain high differential charging rates. In brief, the period of external revenue subsidising internal computing was over.

"There was no AUC grant for the triennium of 1970-72. This was a major disappointment as funds were essential to develop the PDP10 to its full potential.

"Accommodation for both Centre and Department was totally inadequate, a situation which persisted for years to follow.

"The early 70s were also years of marked unrest on the campus, primarily arising from the Vietnam War and an awareness that computers implied unemployment and military associations. Security had become a new issue and external glazing was replaced by brickwork.

"Personally I found the 1969-72 period extremely demanding. I would like to record my appreciation for the guidance given by Professor Prentice and the advice and dedication of all staff. I also acknowledge the considerable contribution during this period of Professor Ronald Gates, Mr Jim Ritchie and Professor Don Nicklin and to all who served on the Centre executive."

PCC keeps closer eye on client satisfaction

IF YOU have ever had problems using the Prentice Computer Centre's facilities and services, or if you have any ideas for new services, Mr Geoffrey Dengate is the man to see.

Mr Dengate, a systems analyst with extensive experience at Prentice, has been assigned as PCC's troubleshooter to improve communications between the Centre and its clients and to explore current and future needs of departments.

When you have a range of systems and services as large as PCC, communications can become stretched, according to Mr Dengate. So, this year he is visiting every department in the University to collect feedback on problems with existing services and to solicit ideas for new ones.

"This is your chance to tell PCC your problems," he said. He would like to hear about any frustrations you have with any service — persistent technical problems, maintenance troubles, delays in deliveries — anything that the HELP Desk cannot fix in fact.

Mr Dengate is aiming to devel-

Prentice Computer Centre deputy director Mr John Noad (left) and Mr Dengate review the early results of his discussions with departments on their future service needs.

op a strategic plan for the next two years to provide additional services. He said this was particularly important because of the virtual explosion in the number of personal computers on campus — from nil 10 years ago, to approximately 1000 today.

"Ten years ago the majority of computer power on campus was in our basement. Now the majority is distributed through departments," he said. "We need to find out what new computing services are needed to complement teaching, research and administration. Computing is changing rapidly and we have to change too."

From the 35 departments he has visited so far he has found the biggest unsatisfied need is for personal computer support services — how and where to buy PCs, how to use them and general advice about hardware and software products.

There seems to be a need also for better link-up between computers and for better communication generally. Mr Dengate is finding that many people simply don't know how to use the Centre or how it can help them.

He is happy to talk to any department and can be contacted on 377 3944.

• Continued from page 15

Mr Alan Coulter, 1972-present:

The current Director, Mr Coulter, said the next 15 years from 1973 to 1987 were typified by rapid growth in the demand for computing and the variety of services offered.
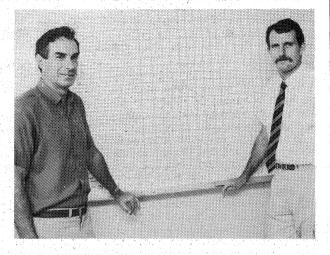
"During this period the Centre responded to major changes in technology and to the pervasiveness of computing applications across the total academic community.

"The agreement with Griffith University in 1974 for the Computer Centre to provide central computing support for that university was the first co-operative resource sharing venture in computing by any Australian university and, indeed, was the first of a number of co-operative projects involving costly equipment between the two universities.

"In 1975 the University of Queensland Senate recognised the importance of the contribution of Professor Prentice by renaming the Centre the Prentice Computer Centre.

1962—1987 a dramatic era of change

"Although the Centre operates significantly more central computers of greater power than it did 15 years ago, the major change has been the development of the Centre from a supplier of computer time to a supplier of computing services.

"The association of computers and communications provides substantial user benefits. The number of remote devices having access to central computer systems has grown from around 30 in 1972 to 170 in 1979 and to well over 1000 currently.

"The Centre installed the first operational ETHERNET (providing transmission speed of 10 million bits per second) in Australia between PDP11 and VAX systems in 1982. The ETHERNET network is being extended throughout the campus with optic fibre technology replacing coaxial cable.

"In 1984 the communications link between Griffith University and the Centre was upgraded to two million bits/second. Gateways

with external research networks have been established commencing with a joint development with CSIRO in 1978.

"The Centre was one of the first to install relational data base technology and computer based typesetting services. Current developments are to improve the mechanisms of access to be more 'user friendly', particularly for personal computer users.

"The total demand for computing services has grown. Computing applications have extended from the traditional areas of engineering and physical science to cover now all the disciplines of the University.

"There is need within the University for a hierarchy of computing resources linked by network services. As in the past, the role of the Prentice Computer Centre will be influenced by new technology and new applications and the challenge will be to be innovative, relevant and cost effective."

Powerful central computer network

THE VAST changes in computer technology in the past decade have brought about a rapid expansion in the facilities of the Prentice Computer Centre.

At its heart now are four mainframe computers, including the state-of-the-art IBM 3083 and VAX 8650. Backing up these are the VAX 11/780 and the older KL10, all under the control of the Central Computing section.

Together the IBM and the VAX 8650 are the most powerful computers in the Centre. The IBM, VAX 11/780 and KL10 are used for teaching and research, while the VAX 8650's primary role is to support the University's administration, although it too is available for some teaching and research.

For more detailed information about each of the systems and which is the best to use, see WHICH SYSTEM? below.

All machines are accessible via the University's network through terminals in each department and personal computers can be hooked up too, via modems and telephone lines.

The Central Computing section is also responsible for maintaining and developing the software used on the main systems — both Digital Equipment and IBM. This includes extensive statistical, text processing, data base and graphics packages.
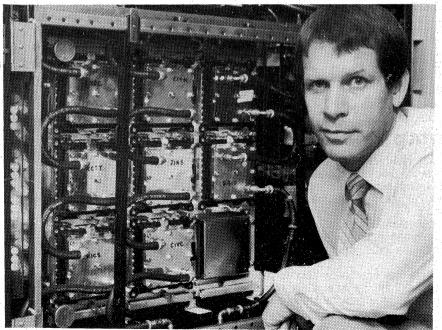
Software maintenance managers Mr Ian Burgess and Ms Noela Meier are responsible for evaluating new software, as well as ironing out software bugs and solving problems. Major problems are reported to manufacturers.

This section has vast experience, which anyone can tap into, in software uses and problems. For advice contact the HELP Desk (see story page 18).

When it comes to printing, the Centre has a typesetting machine and a range of high quality printers for use with the central computers. These include the sophisticated Compugraphic MCS8400 typesetting machine, accessible from the VAX and KL10 systems, with about 80 fonts available in various type sizes from 5 to 72 point.

Mr Barry Maher is in charge of the typesetting service which produces camera ready copy for a wide range of publications including handbooks, brochures, books, journals and letter heads. Just bring him your manuscripts, either on paper or on disk and he will format them and take it from there. Alternatively users can produce their own typeset material on the system.

For printing, the Centre offers a laser printer which prints high quality documents from material prepared on the IBM; an electro-erosion printer, also attached to the IBM, which produces camera ready masters; plotters which can be used to produce graphs and charts and a letter quality Facit printer for use with all systems.

In charge of all these facilities is Central Computing Facilities manager, Mr Allan Woodland, a systems analyst with 11 years' experience at Prentice. He heads a staff of operators and programmers who take care of the day-to-day running of the computers.

Operators are on duty, taking care of all the machines, between 8.30 a.m. and 11 p.m. To become a user you have to establish an account at the Centre and be issued with a user identification code. To obtain information telephone 377 2188.

WHICH SYSTEM?

The following is a quick guide for those wondering which system would be most economical and suited to their needs:

IBM 3083 — has the widest range of software packages for teaching and research, including word processors, databases, statistical and mathematical packages. It is best for large research projects, especially big number crunching exercises which involve lots of calculating and computing time because there are ceilings on its charges.

VAX 8650 and 11/780 — the 8650 is mostly used for administration, the 11/780 mostly for teaching and research, although they do not have as many teaching and research packages as the IBM. However, for small research projects or occasional users they are better because they have incremental charges. You pay only for what you use so if the project is small it makes more sense to use one of these systems.

KL10 — it has a limited life span and although still used for teaching and research, users are encouraged to develop new work on the IBM or VAX systems.

Mr Woodland shows the unusual water cooling system for the powerful IBM 3083 mainframe, one of the computers at the heart of the Prentice network.

On-going education gets top priority

WITH THE RAPID changes in technology and new hardware and software appearing almost every week, the Prentice Computer Centre has recognised the need for ongoing computer education.

So, the Centre regularly conducts short courses in the uses of the central mainframe computing systems and PCs. The courses are free for staff, postgraduate students and student kit owners.
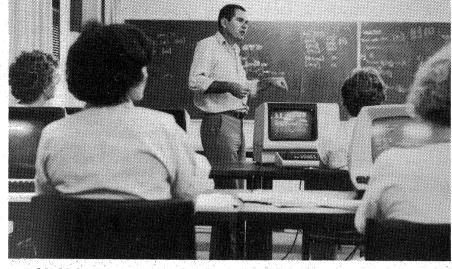
The courses are divided into: (1) introductory courses which teach the basics of using either the mainframes or PCs, including keyboard usage, file management and editing; and (2) specialised courses on various computing applications such as statistical packages, database systems, text processing and graphics packages (for both mainframe and PCs).

In addition there are elementary programming courses in FORTRAN and BASIC languages.

All courses are conducted in the Centre's up-to-date laboratories near the Physics Annexe which have large overhead projection screens, 14 terminals and 10 PCs for hands-on experience.

The courses are taught by education officers Mr Barry Maher and Mr Nick Evans, both former high school teachers with years of experience teaching computing.

Mr Maher, who has been with

Mr Maher takes a computer class in one of the teaching rooms of the Prentice Computer Centre.

the Centre for seven years, believes hands-on experience is essential when learning to use computers and all courses have been structured this way. There are between 80 and 100 courses every year.

Forthcoming ones are printed below. If you have any queries or would like to enrol, telephone 377 3018.

JUNE
(all courses are half days unless otherwise specified)
SPSS-X (VAX/IBM) .... June 1-5
Introduction to DBASE III ..... June 2-4
Introduction to the IBM ...... June 9-12
SCRIPT .... June 9-12
Introduction to SAS .... June 15-19
Conversion to the IBM ...... June 16-18
Conversion to SPSS-X ...... June 23-24
Further IBM features .... June 25-26
Intro. to Datatrieve ...... June 29-July 3
RUNOFF (DSR) .... June 29-July 3
JULY
Introduction to BASIC .... July 6-10

General Graphics .... July 7-10
Text facilities on the IBM ...... July 8-9
Intro. to FORTRAN July 13-17 (full days)
Intro. PCDOS/MSDOS ...... July 14-16
Intro. DBASE III .... July 21-23

Help Desk is a source of good advice

IF YOU ARE having problems using the Centre's systems or have a query about some aspect of its programs or packages, then contact the HELP Desk.

The HELP Desk (telephone 377 3025) operates from 8.30 a.m. to 4.-30 p.m. and is designed to provide immediate advice on the use of the central systems as well as more detailed consultations.

After hours, you can make contact by using the electronic mail service, sending your message to CCHELP.

The HELP Desk operator has a terminal and can quickly log in to any system to assist with problems. Minor problems usually can be sorted out fairly quickly. The operator will also provide backup advice on how to use software packages.

Personal visits with specialist consultants can be arranged by appointment. The service is available to staff, postgraduate students and undergraduates who have bought student kits. Other students should take their computing problems to their academic supervisors.

Kits offer cheap computer access

THE CENTRE offers students access to the IBM 3083 via two student kits, providing cheap alternatives to the purchase of personal computers.

The kits, costing $40 and $53.50, depending on requirements, provide access during semester to 1.25 megabytes of memory and between 600 and 1100 kilobytes of disk space. They are ideal for preparing papers, theses or for processing research and statistical material. Kits include about $5 worth of printing (about 60 pages on the laser printer).

Kit holders can use any of the software packages available on the IBM and can have access to facilities 24 hours a day, seven days a week, via terminals in the Centre's public terminal room. Access is also available from PCs or remote terminals via modems on telephone lines.

Students can learn how to operate the kits by attending regular advisory sessions or they can attend formal courses run by the Centre (see above story).

For more information contact the Centre on the ground floor of the Hawken Building.

Contracts boost PCC's external reputation

THE ENGINEERING and Communications section provides a range of services both within the University and elsewhere.

Manager, Mr Graham Rees, heads a team of 12 engineers, programmers and technicians who take care of the installation and maintenance of computers and other equipment at the Centre and provide a computer advice and consultation service for outside organisations.
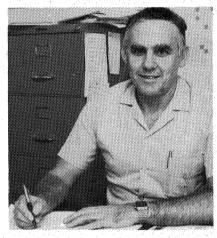
Engineers from the Centre also undertake, on contract, special projects such as designing printed circuit boards and interfacing personal or micro computers to a wide variety of scientific instruments and other machinery.

Their biggest success to date has been the designing of a complex, six-layer board for an encryption (data security) system for a Gold Coast technology company, Eracom. With the board, the company has been able to increase the speed of its encryption processor by 50 percent and has hailed it as an outstanding success.

The section also looks after data communications facilities both on and off campus. These include the installation and maintenance of coaxial cables and optical fibre, modems, multiplexers and line drivers, the development of net- works such as Ethernet, and the development of software for network services.

In 1982 Digital Equipment Corporation presented the Centre with a plaque to commemorate the installation of the first operational Ethernet local area network in Australia. Operating between the PDP-11 and VAX systems on campus, it provides high-speed transmission of data at 10 million bits per second.

The Ethernet network is being extended throughout campus with optical fibre technology replacing coaxial cable.

Mr Rees

Specialist team can assist with applications

Ms Barry: advice on projects

IN THE Applications Development section you will find a team of programmers with experience in a wide range of mainframe computers and PCs.

Here you can get free advice on how best to tackle your project, whether it be related to teaching, research or administration. They will advise on appropriate software, undertake preliminary system design work and provide estimates of programming and machine costs for submissions to research funding bodies.

Applications Development programmers are happy to assist you with all aspects of projects including systems analysis, programming, documentation and data entry. Contact the manager, Ms Sarah Barry, for advice.

If you have special needs, not catered for by existing applications, the section does programming on contract — small or large projects — with charges determined by the size of the job.

It's worth noting that the Centre already has a variety of special systems which have been developed so it may be useful to find out first what software is available in the Program Library.

The data preparation service, covering entry and verification of data, is based on an hourly rate. Special expertise exists for entry of text for typesetting and for survey data.

In a recent project, the Applications Development section was chosen by the Australian Development Assistance Bureau to design, program and implement a major student information program for the University of Technology in Lae, Papua New Guinea.

Key role in developing SPEARNET

PRENTICE COMPUTER Centre has assumed a leading role in the development of SPEARNET (South Pacific Education and Research Network) which provides rapid communications between Australia, New Zealand and 30 networks in 15 countries including the U.S., Canada, Britain and Europe.

The Centre, with four other universities, has been developing the software for SPEARNET, which has come into operation during the past 12 months.

Through the Overseas Telecommunications System, SPEARNET can be used to transfer files and electronic mail around the world and to gain access to major information networks such as the American Telenet and Tymnet which, among other things, provide access to the U.S. Library of Congress and Dialog Databases.

Users can also gain access to the Australian Bibliographic Network in the National Library. Access is gained from any terminal simply by dialling a number which connects users directly into the network.

For small documents the network can provide a cheaper method of transfer than ordinary mail and it is being regularly used by libraries and academic departments at eight universities around the country.

Growing at the rate of 30 percent a year, it is expected to revolutionise information gathering and communications in the academic community in the next decade or so.

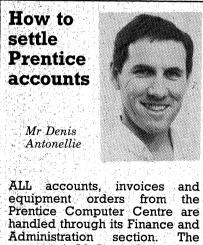# PCs: powerful, convenient, versatile

THE DISTRIBUTED Computing section of the Prentice Computer Centre looks after what is probably one of the fastest growing branches of computer technology today — personal computers.

Already there are about 1000 PCs on campus with the numbers increasing. With rapid updates in technology and new software appearing almost every week, more and more departments are finding the PC a powerful, convenient and versatile tool for both administration and research.

Recognising the growing importance of PCs, the Centre has set up a Personal Computer Support Group (see story this page) to provide advice to the ever-increasing number of users both here and at Griffith University.

Apart from PCs however, Distributed Computing also takes care of sales advice, maintenance and software support for a range of other departmental computers. Manager, Mr A.J. Bird, heads a team of 13 programmers, technicians and engineers who are responsible for maintaining the 50 or so PDP-11 computers and their peripherals in use around campus. They also maintain the large number of terminals used on the central computer systems.

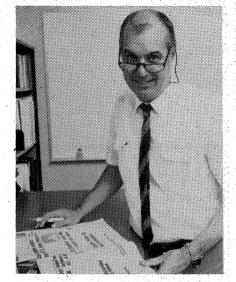Programmers from the section provide support for the PDP-11s, distributing new versions of software and attending to any operating faults that occur.

The section also gives advice to departments wanting to purchase computer systems, peripheral equipment or terminals. It will provide information about the type of equipment available and advise which system will best suit the department's needs.

The Centre negotiates collective purchase contracts for a wide range of computing equipment allowing significant discounts for University users.

Technicians and engineers also carry out evaluations of new hardware and can give expert advice of all aspects of computer systems, as well as ordering and installing equipment.

Mr Bird

Support group for PC users

IF YOU ARE about to become a PC user, you probably have several questions. What PC should you buy? What software will best meet your needs? How much should you expect to pay?

The Personal Computer Support Group was set up to provide advice, sales and maintenance services to the growing community of PC users both at the University of Queensland and Griffith University.

These services are run by Mr Chris Barker, who has years of experience in both PCs and mainframe computers. The PC Support Group has four main functions:

(1) Sales and advice — all IBM PCs and products are available direct through the Support Group to staff and students of tertiary institutions at special discount prices. The Group provides independent advice on purchasing other brands of computers as well and will arrange sales through outside retailers. It also sells software such as Lotus, Data Base III and word processors and hardware add ons.
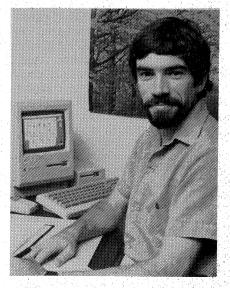
(2) Special services — the Centre provides for PC users specialised printing services, including the LaserWriter, which is a near typeset quality text and graphics printer with very high resolution. The PC Support Group can arrange printing at discounted rates for staff and postgraduate students.

(3) Maintenance and repairs — the Centre currently can carry out maintenance and repairs for IBM, Apple and Cleveland PCs.

(4) PC hire service — the Centre will hire IBM PCs to departments which may need one for a specific project. For instance, one was recently hired to the Equine Blood Typing Laboratory to process the output of its densitometer. The Centre will also hire out hardware peripherals and enhancers such as hard disks and turbo boards for faster processing.

Mr Barker is happy to talk to anyone about their PC problems. Telephone 377 4233.

Mr Barker

How to settle Prentice accounts

Mr Denis Antonellie

ALL accounts, invoices and equipment orders from the Prentice Computer Centre are handled through its Finance and Administration section. The manager is Mr Denis Antonellie.

If you have any inquiries about invoices or orders you may contact Mr Dal Anderson on 377 3166.