

History of the Commuter Services Centre

[This document is a timeline of the early history of the Computer Centre (called ICT Services in 2012), probably compiled from various memos, reports and personal recollections up to 1963, and subsequently from Computer Centre meeting minutes (that's the editor's guess from looking at how the document reads after this point). It was updated by Mr Bruce Moon, the original Computer Centre Director, in July 2012, and edited by Tony Dale.]

THE BEGINNING

16 June 1960

An application for an educational allowance was presented on the 16 June 1960 to the Vice-Chancellor, outlining the need for courses in Business Data Processing and Scientific Computing. It was proposed to appoint a senior lecturer to manage these courses with the support of an assistant lecturer. A list of University staff with computer experience was presented. It was proposed to house the computer in the new School of Engineering where a room 15 feet by 10 feet was available for storage, working space and off-line tape preparation. Finance for this was to be principally by public subscription.

7 November 1960

Before coming to the University, Mr Bruce Moon was the IBM Applied Science Representative in New Zealand and manager of the IBM Educational Allowance Program.

The Vice-Chancellor of the time, F J Llewellyn, contacted IBM asking for guidance in the purchase of a computer system that would suit the needs of the entire University. Bruce Moon advised the University in a letter that the "IBM 1620, working an eight-hour day, can carry out more scientific calculations than 120 skilled men, at less than one fortieth of the cost". For example: it could compare pairs of numbers for equality up to 5,000 times a second, or multiply two five-digit numbers together two hundred times a second.

1960

The University received substantial support from Mobil Oil New Zealand, by the way of an educational allowance. IBM also agreed to grant an educational allowance from IBM World Trade Corporation, of 19770.16 English pounds towards the purchase price of the machines, for the exclusive purpose of assisting the Educational Institution in instruction and in unsupported academic research. With assistance by donations from a number of other interested organisations, the University of Canterbury made the decision in 1960 to establish a digital computer laboratory.

Mr F M Henderson (Senior Lecturer in Civil Engineering) and Dr B R Penfold (Senior Lecturer in Chemistry) contacted Dr F Llewellyn, Vice-Chancellor at the time, about the meeting they had with Mr Bruce Moon and Mr Henley of IBM, on the 17 November 1960. From this meeting a time table of events, some decided by mutual arrangement, others which IBM required, was proposed.

What IBM required

(a) February 1st, 1961

Appointment of a project director and an executive committee (Mr Henderson and Dr Penfold conveyed that this needed top priority).

(b) Mid February

A one-day seminar for departmental heads conducted by IBM.

(c) March 1st

Last date for revision of the contract to provide for card input-output instead of paper tape, if auxiliary card equipment is to arrive in time for the 1620 installation. The question of paper tape versus cards as an input-output medium needed to be settled and was given urgent attention.

(d) May Vacation

IBM to conduct programming courses extending over 2 weeks'

(e) June

(i) IBM engineers to inspect and approve areas to house the 1620.

(ii) Last date for advising IBM of extra requirements, such as automatic division and indirect addressing.

(f) July 9th

University to sign "commitment to receive" the 1620.

(g) July

IBM to supply a full set of library programs.

(11) January - March 1962 ?

Final settlement with IBM 60 days after they hand over the 1620. Mr Henderson and Dr Penfold both conveyed in a letter dated 18th November 1961 that they were "rather uncertain of our own position relative to the whole project"! - no-one seemed at this stage to know who had interim control.

February 1961

On the 16 February 1961 Mr Bruce Moon made his first public appearance at the University of Canterbury, conducting a Seminar on the "IBM 1629 DP System". A closing statement from his seminar reads thus: "The electronic computer — one of the greatest products of ingenuity and skill of modern man, one of the greatest tools for advancing his welfare".

April 1961

On the 10 April 1961 Bruce Moon sends the Ford Foundation in New York a report on the use of computers in research and student training at New Zealand universities. The report makes plain that the demand for the services of electronic computers at New Zealand universities is growing rapidly and IBM's contribution in rendering assistance here clearly has a limit and for the present at least, it was felt that universities needed assistance from other sources to keep pace with the increasing demand for them.

1st August 1961

Bruce Moon was appointed a senior lecturer in the Mathematics Department with the responsibility for the computer laboratory, which was set up in the school of Engineering and named the Mobil Computer Laboratory. The laboratory was the first university computing laboratory to be established in New Zealand.

The Laboratory was administered as a sub-department of the Department of Mathematics under Professor D F Lawden. The services of the Laboratory and lectures in computer principles and programming formed an valuable part of formal academic courses in mathematics for all undergraduates in engineering and a considerable number in science.

Mrs J M Lester became the first secretary and card punch operator for the laboratory.

6 November 1961

Mr Bruce Moon sent a memorandum to the Assistant Registrar (Buildings), indicating the Mobil Computer Laboratory's space requirements. Based on advice from IBM, it was assumed that the installation would

continue to be composed of items of the source type as the initial system, and would expand in the course of the next few years to include extra core storage, magnetic tapes and card punching units.

The Minister of Education, the Hon R M Algie, announced on Tuesday, 19 December 1961, a new procedure for the planning of the building programs for universities. The implication was that since [this was because] the IBM 1620 was not allowed for when the new Science Buildings were planned. Bruce Moon, then responsible for the Computer Laboratory had to, by request of the Vice-Chancellor, include [itemize?] every new item of equipment that they were likely to require.

1962

In May 1962 IBM 1620 Computer was delivered to the Laboratory; the first in a New Zealand University, the first in the South Island and the first equal (with the New Zealand Railways IBM 1401) transistorised (second generation) computer in the country.

The IBM 1620 was the third computer and one of the first solid state machines to be delivered in the country, being the first to be installed primarily for academic and research work. When it started work only four members of staff of the university had had any direct experience in using electronic computers and a few more had only indirect experience of their use. Yet, notably, within 3 months the weekly use of the machine had risen to 98 hours a week. This rapid build up of demand was similar to that seen in many overseas laboratories.

For research, the IBM 1620 was run entirely on an "Open-Shop" basis, this being initiated by having members of staff and research students attending courses in programming and machine operation when work on the computer laboratory first started.

Use of the 1620 was fairly wide spread through University departments. A small amount of work was also done for external users, particularly other universities in New Zealand who had no computing equipment of their own.

There were frequent occasions when users of the 1620 found storage to be less than that required for their purposes. This limitation was overcome by splitting calculations into blocks and punching intermediate results on to cards for subsequent re-entry, which required extra machine time, of course.

While the addition of the 1623 core storage unit would notably increase the computers capacity, Bruce Moon still felt it would not be adequate to meet developing needs. A complete machine replacement would be the only way, long term, to entirely meet the foreseeable storage demands and other additional benefits as well (from "Development Planning for the Mobil Computer Laboratory" dated 31 January 1963).

Undergraduate courses in computing were underway, and the 1620 soon became heavily used by a wide range of university departments, frequently logging more than 500 hours a month.

Reports from the Mobil Computer Laboratory showed a "tremendous volume of productive research going through the computer, on some day reaching nearly twenty-four hour operation" (The University Chronicle, Feb 1963). The daily average use for January (31 days) was 11.8 hours.

June 1962

On the 27th June 1962, Bruce Moon sent a memorandum to the Vice-Chancellor outlining that the university had a real need for a means of automatic data conversion, that would be met with sufficient flexibility and generality by the IBM 870 system; a tape-to-card converter. This was less expensive than a direct tape reader, but cost was not the only factor: the data could be edited so that incorrectly recorded data could be rejected before input to the 1620. Results could be punched onto cards for subsequent printing on the 870, thus avoiding the need to restrict

the rate of production of results to the speed of the 1620 output typewriter. From the point of view of efficient 1620 operation this was most desirable.

February 1963

Around February 6th, 1963 Professor Sawyer, the head of the department of mathematics at the University of Otago, visited the Computer Laboratory and talked about the possibility of transferring the IBM 1620 to Otago. He agreed with Bruce Moon that it would probably be to their mutual advantage, and Mr Moon sent a message to the Vice-Chancellor (Dr I L Pownall) that “the way was clear to plan the next move and waited for his instruction”.

May 1963

The report of the Mobil computer laboratory for the month of April indicated an average daily use of over 30 days of nearly 12 hours. Major expansion of the 1620 computer was announced to take place at the beginning of 1964. A 1623 storage unit was to be installed, to double the amount of storage of the 1620.

Computer usage for July 1963 increased to nearly 18 hours on an average daily rate, as reported in the University Chronicle.

October 1963

On 18 October the new 870 data conversion unit was installed in the laboratory. Lever Brothers (NZ) Limited made a substantial contribution towards the cost. This machine would print a document and punch cards, simultaneously converted from paper tape or manual keyboard, and also plot a large variety of graphs.

A three day course in the principles and use of this machine was held for staff and students, being attended by 36 people from 11 Departments (University Chronicle)

April 1964

Bruce Moon writes a 5 page review on “Computers” for the University of Canterbury Chronicle.

July 1964

The extent, depth and variety of uses within the University for the IBM 1620 continued to grow rapidly. By July 1964, after 2 years of use, the University's computer had been used in more than 120 projects by 14 departments, and more than three-quarters of these projects could not have been tackled without a computer. Average monthly use was 400 hours. Twelve months later, the Computer was being used by 18 departments, on a further 78 projects, and in spite of various steps which had been taken to improve efficiency and use of time, the average monthly use now exceeded 600 hours, and the load on the peripheral printing units more than doubled.

Departmental Usage of the 1620

Department	1963 Hours	1964 Hours
Chemistry	1416	726
Civil Engineering	869	586
Physics	712	774
Chemical Engineering	704	205
Computer Lab (Maths)	356	551
Electrical Engineering	266	539

Accountancy	182	258
Geography	132	466
Lincoln	86	462
Geology	75	139
Psychology	20	33
Mechanical Engineering	6	46
Extension Studies		13
History		10
English		8
Economics		
Botany		
Zoology Education		

Total hours use by University of departments in 1963: 4807, in 1964: 4891

Foreseeing that the IBM 1620 would shortly become fully loaded, the University of Canterbury sought means to re-equip with modern equipment of adequate capacity to meet its future growth. An application was made to the Scientific Research Distribution Committee of the Golden Kiwi Lottery Fund for the sum of 63,500 pounds for this purpose, but this application was rejected.

February 1965

The Mobil computer laboratory was reported to be critically overloaded through another peak in demand and that other avenues of relief were still being explored. There was also a possibility of a land line link but these measures were too costly. The University Chronicle reported that "Extra equipment in the University would be the only satisfactory solution".

August 1965

Over the 31 days of August the IBM 1620 was used for an average of nearly 21 hours a day.

February 1966

Work started on the 60,000-pound-budget Computer Centre and telephone exchange building, the first of the administration buildings at the Ilam campus. It was hoped that the Computer Centre, occupying the overhanging upper floor, would be ready in 30 weeks!

The February Chronicle advertised the University of Canterbury's first modern communications system, "When the telephone exchange opens in July or August, a unique entrance communication system will also come into use. Visitors arriving at any of the five main gates of the University will be able to speak from their cars into a microphone stating the person or office on which they wish to call. The operator will then give directions on how to get to the building, where to park and where to find the person required"

May 1966

The Mobil Computer Laboratory was transferred to new quarters shared with the University Central telephone exchange [This is the “Butterfly” building, so-called because of its roof line, where the telephone exchange still is]. At this stage the University Computer Facilities Committee were considering the purchase of a second computer for research purposes and possible use by the University Registry.

In late 1966 [date unconfirmed] a review of a survey undertaken by Mr B] Clarke (Accountancy) was printed in the Chronicle, saying that, “Contrary to popular opinion, the computer is not only a tool for the mathematician”. The article went on to say that the survey showed that most departments of the University were making use of the IBM 1620 Computer, and a list of the various projects was printed in the February 1966 edition of the Chronicle. [Mr Bruce Moon commented in June 2012: “Had we made the point at this early stage that the real role of the computer is as an information management tool, not just for doing arithmetic. Its wider acceptance would have been much more rapid.”]

“[If] The University was to provide computer facilities during the next 5 years approaching the above developments then it would be necessary that the University purchase or rent a computer of capacity equivalent to that of the IBM 360f44. This machine is regarded as having the capacity necessary to meet the needs of the University during the next 5 years.” (A D Brownlie; Chairman, Professorial Board Committee on Computer Facilities at the University of Canterbury, 25 May 1966, writing for an import license application for computing equipment.)

Eighteen departments now made use of the IBM 1620 Computer, so it seemed logical that there should be a service centre catering for the whole University, in the same way as the Library.

Acting on a recommendation from the Professorial Board, the University Council decided to establish a “Computer Centre” the next year, when the new IBM 360/44 computer was to be installed. The Centre would be under a director who would be directly responsible to the Vice-Chancellor, assisted by the Computer Facilities Committee. This step was taken in line with the recommendations of the report from the “Flowers Committee” (see <http://www.chilton-computing.org.uk/acl/literature/manuals/flowers/foreword.htm>) which inquired into the control of computer facilities in Britain, published in January 1966. A joint working group of the United Kingdom University Grants Committee set out what it considered to be the minimal computer needs of British universities. For universities comparable with the University of Canterbury it recommended that computer capacity be increased to a level greatly in excess of their existing facilities. The Australian scene was similar, except that, having earlier made substantially the same assessment as the Flowers Committee, the Australians had already acted and the relevant computers were already installed.

February 1967

In February 1967 the Computer Centre it was set up as a separate entity within the University, with Mr Bruce Moon as Director. In October of the same year an IBM 360/44 computer was installed to give a major increase in computing resources. The IBM 360/44 was chosen above other machines at the time because of its cost and performance. [In 2012, the front panel of the 360/44 is mounted on the wall of level two of the ICT Services building.]

The IBM 360/44 accepted punched cards and paper tape for input and possessed a card punch and 600 lines-per-minute printer for output. Twin disc drives permitted direct access to half a million words of information stored on magnetic discs that were used for the individual records of users, these disc drives holding about 1.2mb each. It could calculate using binary and hexadecimal (base 16) numbers, and the May 1968 Chronicle noted that the 360/44 would be “possibly be one of the fastest computing machines in the country!” The performance of the machine was about 60 times faster than that of the 1620 (ie: the 360/44 would carry out in a minute as much work as the 1620 would do in an hour).

[Wikipedia tells us that the 360/44 used the System/360 peripherals but had a different internal design. The 360/44 was designed for scientific computation using floating point numbers, such as geological or meteorological analyses. Because of the internal differences and the specialized type of work for which it was designed, the 360/44 had its own operating system, PS/44. The 360/44 and PS/44 had no direct successors.] The 360/44 was only capable of single processing, there were no interactive terminals; communication with the computer was by the 80-column punched cards, which were prepared on a card-punch machine and then fed into the computer's card-reader. Both program and data were entered in this way, and when an error was found, the offending card(s) had to be found and a replacement card punched, and then the whole deck resubmitted to the computer. This process was repeated until the program appeared to work correctly. The results were printed on a line printer in the computer room.

The 1620 was adapted to become an off-line control unit for a Calcomp plotter, purchased with the aid of a research grant to the Department of Chemical Engineering. It continued in this role until finally disposed of in July 1972 when a PDP 11/20 was installed to replace it. [The 1620 was bought cheaply and sent up to Auckland. Years later, the Director of the Computer Centre heard that the 1620 was finally going to the scrap heap, and he arranged for the return of the front panel and the core memory. The front panel of the 1620 is stored in the ICT Services building.]

20 June 1968

A second review on Computers, six pages long, was written by Bruce Moon and published in the University Chronicle.

1969: The birth of the Cantran compiler

Alan D Causer took up duties with the Computer Centre on January 20th 1969, and John Good was also appointed as a senior programmer/analyst.

A large proportion of the University's programmes were written in the FORTRAN language, which a computer had to translate into its own machine code, using a FORTRAN compiler, before it could execute them. To cater for all the powerful programming and operating procedures advanced research workers needed, the standard IBM FORTRAN compiler contained a large number of features, and programme translation took place in several stages. This all took considerable computer time, and not all FORTRAN programmes needed the full power of the standard compiler. This was especially true for undergraduate class work, where hundreds of short programmes might need to be checked and translated very quickly.

In response to increasing general needs, the central storage of the 360/44 computer was doubled in size. This presented another opportunity to the Computer Centre programmer analysts: now there was enough storage to hold a stripped-down FORTRAN compiler, tailored to deal with small programmes and remaining in storage while a large number of FORTRAN programmes went through the whole checking, translating and execution processes. This would make operations that much faster.

Compilers of this kind had been produced for much larger computers elsewhere and overseas opinion was consulted. The reply was that the idea was all right, but that it would take the entire effort of the Computer Centre for two years to produce one.

Alan Causer took up the challenge and in four months wrote a FORTRAN compiler to meet the tough specifications he had written for it. Test runs showed at the time that it was eight times faster than the standard compiler.

This FORTRAN compiler was put in to service and the number of FORTRAN programming exercises produced in undergraduate classes increased rapidly in the next few years. During the first six months of 1970, 4038 student programmes were processed using the Cantran compiler!

Alan Causer's compiler was renamed the CANTRAN compiler, with the approval of the then Vice-Chancellor.
1970

In January 1970 the Computer Centre published its first Newsletter, with a commitment was to try and produce one more-or-less monthly. About 12 issues later the method of production was changed to photo-offset, which dramatically improved the quality of production. The Newsletter was the prime medium for conveying topical and novel information to Computer Centre users, and was distributed to all registered users and any other interested persons for many years. For some items such as additions to system software or new facilities, the initial announcement appeared in the Newsletter but for more permanent retention the Centre also issued a "User's Reference Handbook", which supplied a set of loose-leaf sheets, for ease of addition and removal, and these were made available to any computer user on request.

Also in January 1970, the New Zealand Vice-Chancellors Committee sent to the United States and Britain a small working party to investigate university computing developments generally and regional centres in particular. The idea of regional centres was strongly represented in the party, and on its return this was largely unaltered although the organisational problems were recognised. At a meeting of a larger committee of Universities in May it was decided, although the Canterbury Computer Centre was against it, that two regional systems would be established: one based at Auckland to serve Auckland and Waikato and the other based on Christchurch to serve the remainder.

The argument on the pros and cons of regional computer centres became irrelevant when Burroughs Ltd made a proposal to provide NZ universities with five B6700 machines, in December 1970.

July 1970

Bruce Moon wrote a third review in the University Chronicle entitled "Academic Impact of Computers Assessed". This review was written after his study leave in 1969 during which he gained an MSc in Computer Science with distinction, from the University of London.

1970 also marks the birth of the "Computer User's Group", an informal committee composed of Computer Centre staff and a number of representative computer users, established to provide a forum for discussion of matters of mutual interest. User Group members wanted membership to be fluid and not exclusive.

Catherine Bennett and Christine Mansfield left in January 1971. Miss Hamilton [possibly started around this time]. In February 1971 Zita Adams joined the staff as secretarial assistant and card-punch operator.

March 1971

Preliminary enquiries were initiated by the Department of Psychology and Sociology for the possibility of recording data on, for example: mark-sensed cards and port-a-punch cards, the idea being that data could be read directly into a computer.

At the end of March 1971, Judith Whall joined the Staff as a full-time card punch operator and Isobel McArthur was appointed as a card punch Supervisor. Mrs Gretchen Kivill joined the Computer Centre as an Assistant Programmer/Analyst in April 1971, and Richard Goldsbrough and Tim Court took up appointments in May as Computer Operators in May 1971.

Also in May 1971, ICL made available "conversational facilities" using low-speed terminals connected by telephone line to the ICL 1904A service bureau machine in Wellington. However, this was not proceeded with.

June 1971

Approval was received for extension of the Computer Centre building by 4100 square feet, more than doubling the existing area. Not long after this announcement the University Grants Committee gave authority for sketch plans and a preliminary assessment of costs to be prepared.

In the November 1971 issue of the Chronicle it was reported that “The additions will comprise a duplication of the existing building linked by a walk-way”.

On September 1st, 1971 the new equipment to be supplied to New Zealand Universities on a national basis was announced: The Burroughs proposal to supply five B6700 machines had been accepted: B6714 models for Canterbury and Auckland with DC 1200 terminals at Lincoln and Waikato respectively and B6712 machines at Otago, Victoria and Massey.

The Burroughs 6700 system architecture had a number of advanced features, making it different in its internal organisation from the traditional kind of computing machine and it had substantial capacity for growth and communications. One of the features of its development was expected to be the attachment of a large variety of devices in departments around the campus: smaller computers, remote batch terminals, experimental equipment and low-speed terminals for remote entry and initiation of jobs.

While the new Burroughs configuration proposed had significant magnetic tape handling and disc storage capacity, it did not provide the card punching or graph plotting facilities the Centre possessed with the 360/44. Suitable substitutes were needed.

Alan Wilkinson was appointed as a Programmer/Analyst in March 1972, and Robin Harrington was appointed to the new position of Development Engineer on June 1st, 1972. His responsibilities included the design and development of interfacing equipment and communication lines and special purpose items for machines to be connected to the B6714 mainframe. Gyllian Turner and Cheryl Shaw were appointed as Computer Operators. Jan Schrader resigned in order to undertake full university studies and Richard Coldsbrough also departed for a position in Canberra.

Provision was made on the Cantran system of a “Disc File” for student source programs in any class and an editing facility for amending any programs so held.

April 1972

Alterations of existing Computer Centre building commenced in preparation for the installation of new equipment, and by July 1972 building alterations were well underway. When completed the Centre would be entirely devoted to machinery, data preparation and user service areas. At this time the quarters for the Programmer/Analysts were transferred temporarily to a small house on the opposite side of the Avon River, formerly occupied by the Bursar of the School of Engineering.

William (Bill) Davis was appointed as Senior Programmer/Analyst at the same time as John Good became Chief Programmer/Analyst. Bill Davis came from the Computer Centre at the University of Delaware where he was Associate Director. Before leaving he installed a B6714 computer similar in configuration to the Canterbury Machine.

Burroughs indicates that they were prepared to run seminars and courses for the NZ universities. Some of the packages covered were: GASP, SIMULA, DYNAMO, TEMPO, BASIS etc.

September 1972

With the help of the Director's car, the PDP11 was moved from Kirkwood house to the Computer Centre.

August 1972

Ross Jorgensen joined the team of operators to help reduce the strain on operating staff generally, and enabled the plotting service to be continued after 9.00pm. After a training period Ian Bennett took up the position of Operations Manager, with overall responsibility for computer operations and data preparation.

October 1972

Burroughs informed the Centre that the Burroughs 6714 computer mainframe had been shipped on the "Timaru Star", and the projected arrival date was listed in the Lyttelton Shipping News in the local newspapers of that time. The disc units were coming independently from Scotland hopefully with better luck with than the University of Auckland, whose discs were lost in a shipping strike.

With split operation between Kirkwood House and the Computer Centre there continued to be changes in people's place of work. In the course of these activities the Centre's staff thought they had discovered Murphy's eleventh law - "what ever it is you need right now (card deck, piece of paper etc.) is always in the other place!"

At this period of time Centre's staff were placed as follows:

Kirkwood House: Mr Moon, Mrs Kivell ,Mr Causer, Dr Wilkinson, Dr Davis, Miss Adams, Mrs Finnegan, Miss Shackel, Mr Harrington, Miss Whall.

Computer Centre: Mr Good, Mr Bennett, Mrs McArthur, Mr Court, Miss Fitzgerald, Mr Elliott, Miss Hamilton, Mr Jorgensen, Mrs Prattley, Miss Shaw, Miss Turner.

To improve the flow of information the Centre invited heads of departments, if they wished, to appoint liaison officers to deal with the Computer Centre. The Liaison officers functions was to convey information, opinions or questions from departments to the Centre.

November 1972

Machine shifts and remodelling of the Computer Room brought with it serious and unavoidable problems with dust. The B6714 main frame arrived in Lyttelton towards the end of October and physical installation commenced on 6 November.

Courses conducted by Alan Causer and Bill Davis were set up for experienced programmers on various features the Burroughs 6714 system.

Council approved the establishment of an interactive graphics system and the purchase of six low speed terminals for attachment to the Burroughs, with two each housed in the Computer Centre, the Department of Chemistry and the School of Engineering.

December 1972

The first Burroughs B6714 Open Day ran on the 8 December. Richard Mitchell, resident Burroughs engineer demonstrated features and answered questions from visitors.

A report written by Messrs Good and Moon, on the evaluation of computers for the New Zealand Universities carried out by the Computer Centre prior to the selection of the Burroughs equipment, was published in the November issue of Datamation.

January 1973

Installation of the B6714 hadn't been without its problems. The Director discovered a fire in an electrical distribution board in the plant room that enlivened one afternoon. It was extinguished promptly with only local damage.

The B6714 acceptance date was set for the second half of February. The Burroughs system with the particular configuration installed in the Computer Centre, which had some special features, was now described as the B6718.

At a Computer Facilities Committee meeting back in (August 1972) a committee was formed to look at the issue of "interactive Graphics" (defined as the display of information on a screen with the facility to modify this display in real-time by direct computer control. Some examples would be engineering structures, electrical

circuits etc.) “It is one of the real-time facilities with the widest range of actual and potential users while also being capable of provision as a service to all University departments from a central location.” (from a report of the Computer Facilities Committee dated 5 October 1972).

On the 23 January 1973 the sub-committee recommended that an Interactive Graphics system be installed in the University of Canterbury and should be based upon the GT40 system manufactured by the Digital Equipment Corporation (DEC).

April 1973

Susan Wilson appointed to full-time position as a card-punch operator.

The Computer Centre succeeded in punching cards on the TC500 punch through a communication link to the B6718.

Development work on the paper-tape and plotting facilities was also continuing. This was slowed down somewhat by the slow delivery of extra core for the PDP11/20 (this was due to the US economy coming out of a recession and an unexpected peak in demand). The Centre hoped the facilities would be available by the end of May.

May 1973

During May version 11.4 of the system software was introduced for the B6718. This was a major revision of the previous release and some interruptions in the availability of the machine were unavoidable during its introduction. The operators needed a considerable amount of additional training.

The first batch of user accounts for the B6718, covering the period up until the end of March was distributed.

The Centre examined the feasibility of a software-driven queuing system for the B6718 using software supplied by Burroughs [?]. Jobs were placed in various queues according to the demands they make upon system resources. This was hoped to improve the responsiveness of the system to the needs of users.

A communication link between the PDP11 and B6718 was established successfully on 25 May.

Software for the PDP11/B6718 link was being developed, which in turn caused some interference with plotting work. The software development had to be completed before the plotter could be connected to the B6718.

The Centre was still experiencing problems of late arrival of some equipment from the USA. Paper tape facilities were likewise held up by slow delivery but were expected to be available shortly after the hardware arrives. So the hope was that by the time these units were all in operation the hardware would arrive and allow the programmers to commence bringing the remote terminals into operation.

End May 1973

At a meeting on the 25 May, the Computer Facilities Committee, gave formal approval for the installation in the School of Engineering of a batch terminal to the B6718 Computer. The Terminal was to be based on a PDP11/10 processor and to include a card reader, a Varian electrostatic printer/plotter and a DECwriter printer.

It was approved that Room E8 at the Engineering School would be altered to provide accommodation for the terminal, a consultant programmer/analyst, an operator and two VT05 low-speed character display terminals (delivery of the equipment was expected in October).

The terminal was to be linked to the B6718 through Post Office lines, driven by Computer Centre line-drivers that were designed by Development Engineer Mr Robin Harrington to work at 9600 bands.

July 1973

The IBM 1620 Computer, installed in May 1962 and withdrawn from service in July 1972, was delivered to its new owner in Auckland. He reported: "The machine was running 24 hours after it arrived, and apart from some routine maintenance (cleaning of relays, replacing blown bulbs and worn belts etc) it has not even hiccupped!"

The Lincoln DC200 terminal successfully completed its tests in the Computer Centre after operator training had been carried out, it was shifted to Lincoln on 23 July. At the end of July, more laboratory class programs had been run using Cantran than for the whole of 1972. The rate exceeded 2000 runs per week.

Egg Timers were installed to ration time on card punches at busy periods and provide fair shares for all - "Anyone sitting by an expired egg timer may be asked courteously to vacate the machine."

September 1973

By September the Centres first remote terminal was running successfully and University staff were able to start gaining experience in their use.

The Computer Centre reached a stage where it suddenly ran out of space. Users were advised that they could no longer store punch cards at the Centre, and instead they were encouraged to store large files on magnetic tapes that could be accommodated. Users with large batch jobs, such as on line plotting, were advised to run these jobs at times of the day when data communications work was not running, as they did not run satisfactorily then.

October 1973

Extra core storage for the PDP 11/20 and the long-delayed DEC equipment arrived. The DEC writer printers were to be installed in Chemistry and two of the VT05 terminals were installed at the Engineering school and the city site. The PDP 11/10 which was the controller for the Engineering School terminal, however, arrived ahead of schedule.

22 Dec 1973

The GT44 graphics system was due to arrive in January 1974. It was a "newly announced design" with a 17 inch refresh type screen, PDP 11/40 central processor, 16K words of core storage, floating point arithmetic unit, twin disc units and a real time operating system.

Version 11.5 software official software release is expected early November.

20 October 1973

The first Computer Centre Wedding occurred, between Judith Whall, card punch operator and Christopher Elliott, computer operator.

Resignations were accepted for Gretchen Kivell, Ross Jorgensen and Tim Court. Replacement operators hired were Sylvia Windale and Kees Haak.

Mid October 1973

Two Decwiter remote terminals were installed in Room 850 in the Chemistry Department. These facilities were open to all computer users but availability was limited to a short time due to Burroughs engineers working on data communications software. The November 1973 issue of the Chronicle reported: "A small but significant step in the development of computing facilities in the University took place at noon on 30 October, when the first of the remote, low-speed interactive terminals to the B6718 computer went 'live' and were made available to computer users. These were the pair of type-writer terminals installed on the eighth floor of the Chemistry Department".

November 1973

The Government approved extensions to the Computer Centre building.

There was good service from the 1400 card-per-minute Burroughs card reader but it was not designed for feeding plotting paper, wet or dry: "Mrs Arnst will attempt to get them to the right temperature and humidity before putting them through the reader"!

There was an active interest in statistical packages, particularly BMD (a biomedical statistic package) and SPSS (Statistical Package for the Social Sciences), and the Centre was to investigate which statistical packages they should support.

A paper tape reader and punch were delivered during November, and an electrical printer/plotter for Engineering School terminal was delivered on the 30 November.

December 1973

The Director received an invitation from Burroughs Corporation to visit the Proctor, Los Angeles, plant early in the new year, as the guest of the corporation, to discuss the possible development of a Cantran programming system for the Burroughs large computer systems.

February 1974

Charles Brown was appointed as Assistant Programmer/Analyst and Jenny Prattley was appointed to a permanent position as a card-punch operator.

To improve the performance of the B6718 Computer System with data communications operating, Burroughs agreed to install an additional memory module of 16 K words of core storage, to be delivered around the end of February.

Council decided that the 360/44 computer would remain in full operation for the 1974 academic year and that it would be withdrawn from service around the next October, the principal reason for its retention being to provide the CANTRAN programming system for undergraduate work.

Work on the development of a Cantran system for the B6718 commenced.

The New Zealand Computer Society held its Fourth National Computer Conference at the University of Canterbury from 21-23 August 1974. This is the first time such a conference was held in Christchurch.

March 1974

The 16 K Module of core memory for the B6718 was dispatched by Burroughs from the USA. On Wednesday, 13 March the two VT05 character display screen terminals in the School of Engineering were brought into service. These were available under the same conditions as the DECwriter terminals installed in the Chemistry Buildings. Computer Centre staff were in attendance at the Engineering School Terminal while these terminal units were in operation.

At the end of March lines were provided by the Post Office for the town site VT05 terminals but the modems for remoted communication were not yet available.

Messrs Tony Rogers and Harold Smith were appointed as technicians in the Computer Centre. Mr Rogers duties included the day-to-day handling of the undergraduate programming work. Harold Smith who was an electronic technician assisting Robin Harrington, the development engineer for the Centre.

May 1974

The sixth 16 K module of core storage for the B6718 was installed. The GT44 interactive graphics system arrived in the Computer Centre and passed its first operating tests. Detailed seminars were to be conducted on the use of the equipment.

The town site V1'05 interactive character display terminals become operational, housed in the Data Processing Section of the Registry.

Mrs M Black (card-punch operator) and Miss G Turner (computer operator) resigned. Mrs P.A. Favell replaced Mrs Black as card punch operator.

The implementation of the second phase of Computer Centre accounting on the B6718 established two Files on disk: The first file contained an entry for each usercode with the current status and statistics for the account and also some buffer areas for storing changes made against the account. When these buffers were filled they were written to the second file which was large enough to hold accounts for at least three months and was "circular", so that the oldest records were overwritten continuously. Permanent transfer of this file to tape was made periodically. Each job that was run on the B6718 printed details of the job itself, any changes which had been billed to the account from other sources (plotting, 360/44 etc) and the current balance of the account.

June 1974

With the sixth module of core storage added, the data communications system met its performance specifications and Lincoln College has then accepted its DC1200 terminal.

A new daily operating schedule for the B6718 was introduced, under release 11.6 of the system software, with data communication in operation for 6 hours a day.

7 am	Preventative Maintenance
9 am	Programmer/Analysts have priority. Some central batch and RJE (Remote Job Entry of batch jobs) work to be run if possible.
10 am	RJE up. Lincoln and Engineering School batch system input and output. Central batch operations.
12 noon	CANDE (the Burroughs interactive terminal system) up. RJE down. Central batch operations.
1 pm	Programmer/Analysts have priority. as at 9 am.
2 pm	RJE up, as at 10 am.
4 pm	CANDE up, as at 12 noon.
5 pm	Queue 10 jobs are processed, central batch operations only. Central batch work will be accepted as at present.
6 pm	(or on completion of Q10 work). Operators run logs, backup procedures etc.
7 pm	(approximately) operations cease.

B6718 Daily Schedule, June 1974. Under this schedule, CANDE booking periods were half an hour.

Two moving head disc drives were expected to be delivered by the end of June. They were intended principally for Registry work. Overseas reports showed that their performance was encouraging. The users would experience some improvement in performance of the system, principally because they provided a second path for disc traffic.

Another order was placed with Burroughs for a module of "bulk" core memory, consisting of 64 K words of storage. This was to replace the sixth 16 K module in September, so there would be a total of 144 K words and a better environment for the system software.

Around the end of the year local memory was to be installed in the data communications processor. This was expected to improve the response time of remote terminal units and relieve the central system memory of the heavy traffic which data communications would generate, especially under peak conditions.

Operating system software release 11.6 was brought into use on 13 June. The principal improvement under 11.6 was that all the batch operations, central or remote, could be processed in the same way, so the same job control cards could be used for a job entered at the Engineering batch terminals as at the central card reader (central batch system users would notice a distinct improvement).

Following a successful two day course at the end of May, thirteen persons qualified as licensed operators of the GT44 Graphics System.

Michael Wolk was appointed as a computer operator.

Registrations for the New Zealand Computer Society Conference to be held at the University from 21-23 August reached the limit of 450 and no more could be accepted.

Operating experience since software release 11.6 was introduced and remote facilities extended indicated that the system was in a fairly "sturdy" condition. If any break downs in equipment did occur, for example: if the fast central card reader broke down, Burroughs engineers Messrs R Sullivan and Doug Chambers were the engineers on call. Doug Chambers later ran the Computer Centre workshop for many years.

The CANDE interactive terminals were available for only two hours daily and this was a fairly limiting factor. The terminals imposed a substantial overhead on the B6718, so if the availability was increased from two hours a day it had to be clearly justified.

For the year to date the 360/44 usage had been 24% of the Centre's total load. Much of this had been in undergraduate work using CANTRAN.

Notwithstanding the best efforts of the University maintenance staff to improve the working conditions, all the Computer Centre staff were working in extremely crowded conditions, particularly the card punch operators and programmers.

The Centre advertised for help in relieving the card punch load which remained at an extremely high level: an advertisement in the Computer Services Centre Newsletter at the time: "Anyone knowing someone with experience in using key-driven machines, prepared to give temporary assistance with card-punching for upwards of 10 hours weekly".

The B6718 accounting system was extended to generate supervisor and departmental summaries for the whole of the year to date, and these would be produced monthly (and for the life of the machine).

Burroughs representatives had been making strenuous efforts to get the Centre more disc storage, but delivery continued to be beset by delays. It was hoped that the storage would arrive at the end of July and be in operation by mid-August.

The Computer Centre at Monash University, which had recently installed a B6700 Computer, offered to make an extensive library of numerical analysis programs available to the Centre. It contained a large number of programs for evaluating special functions, matrix operations, curve fitting, numerical integration and similar functions.

August 1974

Mrs E Harrison, a card punch operator, resigned. There was still no news of the arrival of new hardware for the B6718. The moving head disc, central core storage module and data communications processor storage were all expected to arrive early September. While the Burroughs data communications system, including the Lincoln terminal, had met the conditions required by contract, there were still problems, particularly under heavy load conditions. Things happened to disrupt data communications performance, and the Lincoln DC1200 software had to be completely rewritten by Burroughs. To allow minimal acceptable level of service to be maintained at Lincoln in the meantime, the Centre decided not to run the Engineering School batch terminal.

Amongst the other shortages of those days, the worldwide paper shortage appeared to be getting quite critical. Some computer centres were having to suspend operations for lack of lineflow paper.

Cantran in 1975: Computer Centre staff were working on a new Cantran filing and editing system for the B6718 to interface with the Burroughs batch compilers. Initially, these would be made available with the Fortran compiler but it was planned to extend Cantran to include other languages in due course.