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MONASH UNIVERSITY GAZETTE

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THE UNIVERSITY'S FIRST DECADE

30 May 1968 marked the tenth anniversary of the proclamation of the Act which established the University.

In recognition of the event a special supplement giving some account of the development of Monash was published by *The Age*.

In a comment on the occasion the Vice-Chancellor, Dr. J. A. L. Matheson, said:

The ten years of Monash's life can now be seen to fall into definite phases, each characterized by some distinctive features that clearly differentiate it from other periods.

The first phase belongs to the Interim Council and to Sir Osborn McCutcheon, the planning architect. This was a time of great urgency when the dominant consideration was speed, so that the new University might be able to take students before the University of Melbourne was completely overwhelmed by numbers.

Into this short period of less than two years was packed all the preliminary investigation and planning that might well have taken twice as long; the site was chosen, surveyed and laid out; the broad lines of the academic structure were decided; senior staff were appointed.

The second phase occupied the year 1960 and centred on the Vice-Chancellor's house. This home of the former owner of the property was fortunately available and large enough as to act as headquarters for the Registrar as he assembled his staff and set up the administrative arrangements for purchasing, keeping accounts and so on. Professors, as they arrived, were given desks in a nearby gardener's cottage and in a hut which was hired from the builder; temporary buildings were avoided completely.

During this year which, incredible as it now seems, was very wet, the first group of buildings was being constructed. A violent rainstorm in April destroyed most of the early work and throughout the year the site was inches deep in mud. It seemed as though water flowed uphill at Monash, but in spite of the discomfort and the hard work it appears, in retrospect, as a happy, uncomplicated period. There was a job to be done and not much time to do it in and we were all content to work together in reasonable harmony.

11 March 1961, the day of the official opening, saw the end of that stage. The buildings were ready, almost; the final sweeping up at the entrance was done by the Vice-Chancellor and his wife as they waited for the Premier (Sir Henry Bolte). An academic procession was formed; speeches were made; a little undergraduate humour brightened the scene; tea was served; we were open.

13 March was the first day of teaching in the five faculties of Arts, Economics and Politics, Engineering, Science, and Medicine with which we opened. All these classes were accommodated in the science buildings, the only ones ready, while building operations continued all round.

Thus began the game of academic chequers, which is still not quite complete; at the end of each building phase a redevelopment of activities took place, each aimed at getting departments into their right place.

In 1961 improvisation was the order of the day and perhaps neither students nor staff were any the worse; there was no Union, of course, and only rather elementary canteen facilities; the library was in a future physics laboratory; car parking was easy and cows grazed where buildings now stand.

In a sense this phase still continues for we are still growing and building and developing new activities. Perhaps a change could be detected about 1964 when we held our first graduation ceremony for those who had been with us from the outset. This was the purpose of it all; Monash graduates were moving out into the world to take their place alongside the graduates of other universities.

After that we had to wait until 1966 for the first doctors to graduate and until 1967 for the first Bachelors of Jurisprudence. Somewhere in those years was the end of the beginning.

Now we are in a period of self-criticism and questioning. Why do we do this? Could we not alter our procedure there? Why was that decision taken? Could not the library, the car parks, the Union have been made a bit bigger, with rather more foresight?

With the clarity of vision that hindsight brings one can see what might have been done differently and perhaps better. But at the time the decisions were not unreasonable; resources were certainly limited and, if things did not work out as well as might have been wished, there was the whole of the future in which to make improvements.

So in our second decade we move into a period of revision. It will not be easy to make changes for there are now many more people to convince, more opinions to consider, and a complicated organization to be kept running while the changes are made.

But this is how it must always be; a continual process of self-examination, adjustment and renewal — if that should stop Monash would surely die.

DEVELOPMENT OF BUILDINGS AND GROUNDS

By a Special Writer

Anyone who visited the site of the new University in 1959 would be astonished by what exists to-day. In little more than eight years since construction of the first building started, a muddy paddock has been transformed into a modern and attractive university campus.

In terms of money, the campus today represents an expenditure of about $32 million, and although a further $8 million will be spent in the next two years the University will still be far from complete. This money has been provided by the Commonwealth and the State on a fifty-fifty basis. In addition the University has been greatly assisted by donations towards the cost of the Great Hall and the gift by the Churches of the Religious Centre.

It is interesting to turn back to the initial plans that were drawn up in 1958 and 1959 and to compare them with the situation of today. The basic factor was a maximum full-time student body of 8000. That figure has been passed already and the University is still growing.

The site, of about 244 acres, was described as satisfactory though lacking in special dramatic interest or quality. It was unsewered and was occupied in part by the Talbot Colony which had to be transferred elsewhere. But it had a fine view eastward to the Dandenong Hills and the master plan was drawn so as to preserve that view.

The master planner was Sir Osborn McCutcheon. Bates, Smart and McCutcheon were appointed architect-planners to the University at the end of 1958 and drew up the development plan which has been followed to this day. In 1964 they were requested to revise the master plan to provide for a larger number of students, but there was no need to alter the original concept.

The first buildings, for science and engineering, were designed by Bates, Smart and McCutcheon and constructed of dark manganese brick with very dark pointing and white concrete columns and slabs. This character has been maintained, wherever appropriate to the particular building, by the eleven other firms of architects who have designed buildings for the University.

The initial plan was that no building should have more than three or four storeys with the exception of the Arts building. The latter, now named The Robert Menzies School of Humanities, has thirteen storeys and is one of Melbourne's landmarks. However, growth of the University within the limitation of 244 acres has forced a change of policy for other buildings. Evidence of this is Howitt Hall, a residential hall of fourteen storeys, and the medical school tower block which has seven storeys. Most of the new buildings have been designed for future vertical extension.

The layout of buildings is in the form of a horseshoe, open to the east and with a central pedestrian precinct. The maximum walking time between faculties is six minutes. The arrangement of roads and car parks on the perimeter of the campus posed a problem of access to the Union which was sited centrally to serve pedestrians, but which generates a large volume of goods traffic for catering and the bookshop. The solution was a large tunnel 300 feet long leading into the basement of the building.

Another problem, not yet satisfactorily solved, is car parking. The area of car parks built and under construction is twenty-five acres, giving a capacity of about 3,500 cars. It was originally thought that thirty to forty acres would be sufficient but, judging from experience, fifty would now be nearer the mark.

The eastern part of the campus is devoted to sports, but here again the University is short of space. Thirty-four acres have been developed into playing fields against a requirement that was originally thought to be sixty acres but may be nearer 100 when the University has grown to its full size. The pressure has been eased by the purchase of thirty-six acres off the campus.

The north-east corner has been reserved for halls of

residence of which three have so far been built. There is no room on the campus for affiliated colleges, nor for the University CMF Training Depot, but sites have been acquired nearby. One college, Mannix College, is nearly complete and a second, the Marist Brothers College, is now under construction. Taking account of the necessary expansion of faculty buildings and allowing for new developments it can be seen that the University is sorely pressed for space.

The current construction programme has acquired increased impetus with the acceptance of new building tenders so that, in October, the University had eight contracts in progress worth some $4.5 million.

The eight new buildings embrace the Education building which will rise to four floors and be connected to a child study centre where the present Birch Cottage kindergarten facilities will be incorporated. The second stage of the main library is also going up to four floors and will eventually have three additional floors added. This new stage will greatly increase the present reading facilities and more room will be provided for research stock.

The Great Hall is another of the new projects which have been started, and the completion of this building is expected at the end of 1969. Other new buildings of note are the Science North building to house Mathematics, Information Science and the Computer Centre, and the Science South building for Botany and Psychology. This latter project also covers an extension to the medical school for Anatomy and Physiology.

Student amenities are receiving attention with additions to the Union which will provide a further 1000 dining seats and incorporate additional games and music rooms.

The biggest new development is the Monash medical centre which is being planned to occupy the south-west corner of the campus, about fourteen acres, and to contain a major teaching hospital joined to the University's medical school, a development unique in Australia.

The University buildings speak for themselves. Their surrounds take longer to mature, but there can be no doubt that the ground work already done will result in a campus worthy of its purpose.

Student cafeteria in the Hargrave Library building

The Forum. Buildings shown left to right are: The Main Library, The Robert Menzies School of Humanities, The Bio-medical Library, the Union, and University Offices

MUSIC ON HIGH

By T. A. Jones, Professor of Music

When the chair of Music at this University was established in 1964, the advertisement for it stated that "it is not intended to establish a conservatorium or to provide training for professional performers", but rather "to introduce within the faculty of Arts courses in music at both pass and honours level, with emphasis on the history of music and analysis of musical forms". Though many people thought then, as they do now, that this was a cripplingly narrow and misguided approach to music, I believed then, and continue to believe, that the underlying philosophy implied was both right in general terms and peculiarly applicable to the special position of Monash as Melbourne's second university. Without here going into the pros and cons of whether or not professional performance and composition are truly academic functions of a university, experience has shown that they are nowadays so demanding of time and effort that the serious study of musical history, style, criticism and scholarship, let alone of non-musical subjects, is virtually precluded. Thus it seemed logical and desirable for Monash to develop a department of Music that would offer a genuine alternative to the specialized and essentially professionally and vocationally oriented courses in music already available at Melbourne University. Considerations of finance, staff and space supported such an approach, but did not determine it.

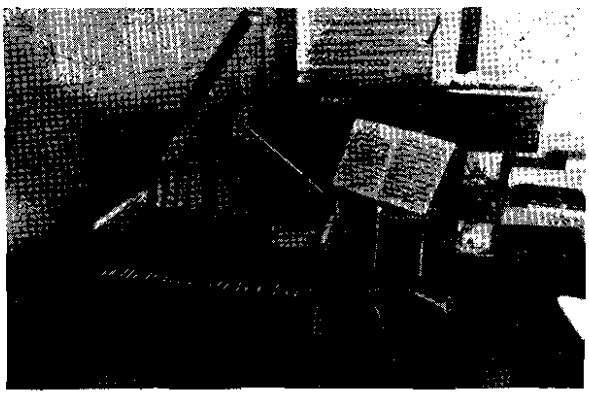
The department of Music is now well into its third year of operations, at the top of the Menzies building, and although the first Arts graduates with a major or honours in music have not yet completed their work it is possible to see some of the results of this approach. The major facilities that have been developed in the department are the Music Laboratory, the Sound Laboratory and the Ethnomusicological Research Laboratory. The Music Laboratory, in addition to housing an extensive collection of records and scores, has a modified language laboratory comprising twenty-two listening booths, each equipped with record-playing and tape-recorder facilities and interconnectable in a variety of ways. Here students may listen to records or tapes, copy records onto tapes and carry out programmed instruction work in aural training, as well as use scores in the reading room, and the help of a music librarian is available to them. The Sound Laboratory contains a variety of electronic equipment for recording music and for copying, editing and reproducing recorded music, including a "Tempophon" offering independent variation of pitch and tempo of tape-recorded music. The Ethnomusicological Research Laboratory, equipped and staffed through grants from the Australian Institute of Aboriginal Studies in Canberra, acts as a research and documentation centre for the study of Australian Aboriginal music, and a research fellow and research assistant will shortly be joined by a specialist lecturer in Ethnomusicology. Musical instruments at present include one grand and eight upright pianos and a small harpischord, but we hope greatly to expand this collection beyond keyboard instruments in the near future.

Among the unique (in Australia) or unusual aspects of the department's course work are the lack of any formal special prerequisites, the use of programmed instruction materials, the ethnomusicological influence, and the emphasis on analysis rather than imitative composition as the basis of stylistic studies. We decided at the outset that to impose some kind of prerequisite for entry into Music I was both undesirable and unnecessary. Students who, for a variety of reasons, had undergone little or no formal musical instruction before coming to Monash deserved, we felt, an opportunity to discover and extend whatever latent talents in musical understanding they might have, and should not have the door slammed in their faces in order to restrict our enrolments to a hypothetical elite. We also doubted the value of certain public examinations in music, including the matriculation examinations, as indicators of achievement or predictors of future success. The results, in our first two years of teaching, of this permissiveness speak for themselves: in 1966, out of twenty matriculants in music who took Music I only eight passed, while fifteen out of twenty-eight non-matriculants in music passed; in 1967, the pass rate for matriculants was fourteen out of sixteen, and for non-matriculants sixteen out of eighteen. Despite the greater difficulties of teaching placed on us by this decision, therefore, we already have good reasons to believe that it was the right one. We do, however, place the onus of rapidly acquiring basic skills and factual knowledge on students who are seriously deficient in them, and we have found that this onus is cheerfully accepted when they realize that they are, in a real sense, lucky to be accepted into Music I.

Closely related both to our freedom of entry and to our dissatisfaction with much secondary education in music is our experience with programmed instruction in aural training. In courses such as ours no less than in conservatorium work, aural perception of a high order is essential, yet it is almost universally either neglected or bungled. Using a system based on recorded tapes and programmed texts developed by Professor James Carlsen in the U.S.A., most of our students in their first year acquire a degree of trained perceptiveness that is not a little astonishing. The system, as we use it, develops a rapid response to melodic and rhythmic patterns, accurate retention, and notational skill in reproducing these heard and remembered patterns on paper, as well as the ability to notice any discrepancies between music as notated and performed. We administer a preliminary test at the beginning of the year, which almost all (including matriculants in music) fail. At the end of the year a similar test is administered, and so far an average of seventy per cent have passed, with many students achieving very high scores. The difference between the results of matriculants and non-matriculants is of the order of only ten per cent. We ourselves know perfectly well that we were taught by, graduated with, and subsequently worked alongside, musicians some of whom could not have passed these tests, and we feel that a major breakthrough has been achieved by providing an efficient means not only of training ears as they should be trained but of weeding out the unfortunate few students who apparently cannot respond to, and therefore should not proceed with, further musical training. Such students are not deprived of Music I, but their acceptance

into subsequent years is restricted according to their level of performance in these tests.

It is too early to judge whether our frankly experimental decision to replace the traditional exercises in "harmony", "counterpoint", "fugue" and "orchestration" with intensive analysis is completely successful. Experience elsewhere had convinced us that the older approach not only took up an inordinate amount of the average student's time (and therefore severely restricted



The Sound Laboratory, showing harpsichord

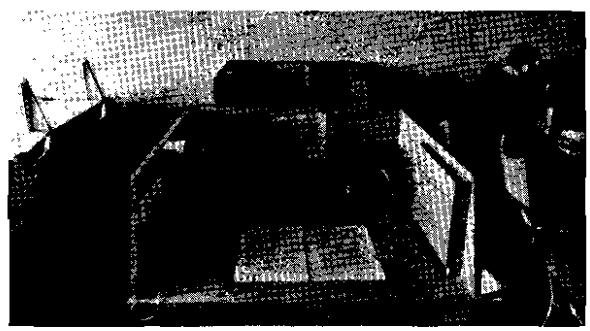
the scope of courses) but often proved largely irrelevant to his overall understanding of style, history and structure. In first year our students are introduced to the techniques of analysing music from various compositional aspects, and in later years these aspects are selectively studied at far greater depth. We have found that we have to rely on our own methods (which, incidentally, we ourselves were not adequately taught) in this field, since we are working in an area largely devoid of authoritative textbooks. Analysis as an essential critical and scholarly tool is our aim.

The ethnomusicological approach is making its mark on many aspects of our course work without in any way denying or weakening the importance of our European cultural heritage. Students are encouraged from the outset to think of music as a universal, though not an absolute, phenomenon, and it is expected that this influence will continue to widen and deepen as our honours and graduate studies in this science expand.

Some special attributes of the various subjects taught in the department may be mentioned briefly because they represent a departure from common practice. Over and above the solid core of historical, critical and analytical studies that one would expect to find in such courses, Music I begins with a thorough introduction to acoustics and the basic physics of music, subjects a masterpiece of twentieth century music to depth analysis, offers classes in Dalcroze Eurhythmics, and draws on the resources of several other departments (including English, Classical Studies, Philosophy and Psychology) for a broadening segment of lectures entitled "Music in the Life of Man". Music IIA concentrates on music as drama, and includes the neglected fields of ballet and incidental music as well as opera. Extensive use is made of filmed operatic productions. It also devotes a series of lectures to the history of musical instruments and elementary organology. Music III offers a choice of three fields of study, orchestral, chamber and keyboard, or vocal music, but also includes studies in *Aufführungspraxis* (i.e., the styles of *performance* of music of the past as recorded in historical sources) and in various non-western musical cultures (such as Australian Aboriginal, Indian classical, Bulgarian folk, Indonesian and Pacific musics). Honours students in their second year take an additional subject (Music IIB) entirely devoted to the study of the life and work of a composer of dramatic music; Wagner is currently the awesome subject of this study. Thereafter they specialize in one of three fields, ethnomusicology, historical and systematic musicology, or music education, with a variety of appropriate options. (The last-mentioned field will not be introduced until a special staff appointment can be made; we are all well aware of many courses in "music education" taught elsewhere that might succinctly be described as "method without content" and which we have no desire to emulate!) We have instituted a combined honours course in ethnomusicology (anthropology and music) with the ready co-operation of the department of Anthropology and Sociology. It is pleasing to note that thirty per cent of our present second year students are reading for an honours degree in music.

A music department is, of course, responsible for the promotion of music in many ways beside the purely academic. The free lunch-hour concerts held on Mondays and Thursdays continue to draw capacity audiences, and choral and instrumental activities in the University are under the guidance of members of the department's staff. We have also organized through the Union private lessons by first-class teachers in various instruments and in singing. The popularity of such activities as these is gratifying, but we must nevertheless regard them as peripheral to our essentially academic function as a department in the faculty of Arts.

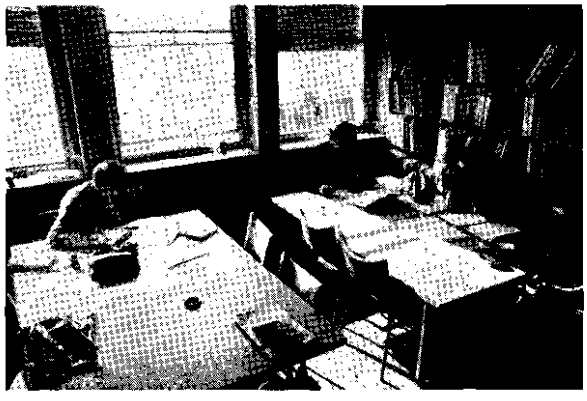
Although this report of our work thus far lists a few achievements, these are more than balanced by our awareness of deficiencies and our plans for the future. We expect a significant expansion in graduate studies,



Listening room 2 in the Music Laboratory

particularly in ethnomusicology, with the continued valuable support of the Australian Institute of Aboriginal Studies. We want to amass a practical collection of early European and non-western instruments and to set about learning and teaching to play them since this is not being done anywhere else here, and needs to be done. We wish to see our students more involved in the making of music, as an essential concomitant to its academic study, than many of them are. We have included in this

University's current submission to the Australian Universities Commission a request for the establishment of a resident string quartet. We see a need, and entertain a strong desire, to pioneer an electronic music studio at Monash.



Students in the reading room

These and other plans are, of course, dependent on the solution of the twin, related problems that every department faces — space and money. We urgently need a fairly large auditorium-cum-classroom where valuable equipment can be kept and used and music made both informally and publicly without hindrance. We need sound-proofed and temperature- and humidity-controlled practice-rooms to house instruments. We need a larger library area in which books and periodicals can be kept where they logically and practically belong — alongside our scores and records — and we need considerable funds to augment our score collection itself to provide for practical as well as scholarly, performing as well as referential needs. Perhaps some of these problems may be met when we move into properly designed quarters around 1972. At that time music may no longer literally be heard "on high" (i.e., the un-sound-proofed eleventh floor), but its aims will, we trust, be nonetheless lofty!

DEPUTY LIBRARIAN

Mr. T. B. Southwell was appointed deputy librarian in October 1967.

He came to Monash as chief reference officer in 1961 after working in the library department of Angus and Robertson Limited. Between 1941 and 1960 he worked in the Fisher Library at the University of Sydney.

Mr. Southwell graduated with a Bachelor of Arts degree from the University of Sydney and is an Associate of the Library Association of Australia.

MONASH MAN TO ADVISE AFRICANS

The Kingdom of Lesotho in Southern Africa has appointed an international lawyer at Monash University as its legal adviser on treaty rights. The lawyer, Mr. Barry Connell, has been given leave of absence from Monash for twelve months to undertake the work.

The post is under the United Nations Technical Assistance scheme.

COMMONWEALTH UNIVERSITIES CONGRESS

The past year, culminating as it has in the meeting in Sydney in August of one of the world's largest gatherings of senior representatives of universities for the Commonwealth Universities Congress, sponsored by the London-based Association of Commonwealth Universities, has been a period of more-than-usually-intense activity and responsibility for the Vice-Chancellor. All the Congress arrangements, and they have been both detailed and multifarious, have been in the hands of the Australian Vice-Chancellors' Committee of which Dr. Matheson is currently chairman. His responsibility has been the greater because of his concurrent appointment as chairman of the Association of Commonwealth Universities itself, an association of approximately 140 universities in twenty countries of the Commonwealth. The discussions which took place in Sydney were not limited to universities of the Commonwealth but were attended by representatives of a number of kindred organizations, for example, the International Association of Universities, the Association of American Universities and many other organizations interested in higher education.

The theme of the Congress, "The Role of Universities in Higher Education" was extremely broad. The keynote address was given by Sir Fred Schonell, Vice-Chancellor of the University of Queensland, whose subject was "The University in Contemporary Society". The plenary sessions were concerned with Commonwealth university affairs during the last five years and with the special role of universities in developing countries.

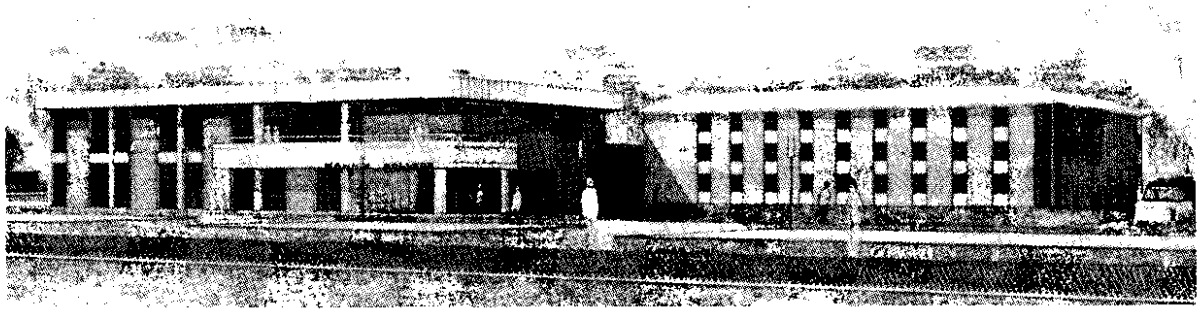
Apart from the formal discussions, the Congress and the meeting of Executive Heads of Commonwealth Universities in Melbourne which preceded it have been significant for the personal contacts made possible between normally widely-dispersed people whose primary concern is with education at the tertiary level.

This was the first occasion on which the Congress has been held in Australia. It is normally held in the United Kingdom at five-yearly intervals and has only been convened elsewhere on one previous occasion, in Canada in 1958.

AWARD TO PROFESSOR

In recognition of his work in Australia Professor R. M. A. Laufer was awarded the 'Ordre des palmes academiques' at a small ceremony on Wednesday 13 September 1967. He was head of the French section from 1962 until August 1967 when he resigned to take up the chair of French and Comparative Literature at the University of Aix-Marseilles.

M. Germain conferred the award on behalf of the Minister of French Foreign Affairs. He spoke of Professor Laufer's work in the Universities of Sydney and Melbourne where he taught French literature, of his pioneering achievements as head of a new French section at Monash, and of his other contributions to French teaching and culture in Australia such as the foundation of the *Australian Journal of French Studies*.



Architect's sketch of Mannix College which is being erected opposite the University in Wellington Road

FIRST INDEPENDENT RESIDENTIAL COLLEGE

The first independent residential college to be affiliated with Monash is being built on a three-acre site close to the main University entrance in Wellington Road. The foundation stone of Mannix College was laid by His Grace Archbishop Knox on Thursday 23 May 1968.

The College was named by church authorities as a memorial to the late Archbishop Mannix who was responsible for the establishment of Newman College at the University of Melbourne and whose interest in education was evident from the time he first came to Melbourne. The name is especially appropriate since it accords with the University's policy of naming its buildings after outstanding Australians.

Accommodation and a tutorial system will be provided by the College which is to be staffed by the Dominican Order. It is expected that the first stage of the College will be completed by the beginning of the academic year in 1969.

Eventually it will house approximately 200 students, and the selection of applicants will be on a non-denominational basis as is the case with the University halls of residence.

RHODES SCHOLAR FROM MONASH

On 22 December 1967 it was announced that Geoffrey Cumming, a fourth year science honours student, had won a Rhodes Scholarship — the first to be awarded to this University.

Mr. Cumming was educated at Melbourne Grammar and began his studies at Monash in 1964. Having been awarded a Residential Undergraduate Scholarship, he became a resident at Deakin Hall. There he took an active part in student affairs and in September 1966 was elected president of the Deakin Hall Society.

Mr. G. Cumming

A fine student, he did well in every year of his course and in his final year obtained first-class honours in mathematical statistics. Despite the pressure of his studies, he found time for a variety of other interests—music, rock-climbing, photography and bush-walking. He played for two seasons in the Australian Youth Orchestra and organized student activities in the National Music Camp Association.

In 1966 he spent two months climbing in the mountainous regions of New Zealand and in the last long vacation toured China with the Australian Overseas Student Travel Organization.

During vacation work in the Department of Civil Aviation he helped to analyse a number of aircraft accidents and, in conjunction with a member of the Department, wrote a paper describing the study and the conclusions drawn from it.

In the next vacation he worked for Imperial Chemical Industries of Australia and New Zealand Ltd. where he wrote computer programmes and a report on sales prediction.

Mr. Cumming carried out graduate work in the department of Psychology before leaving in August for Magdalen College at Oxford where he will read psychology.

THE CODE FOR LIFE

By B. W. Holloway, Professor of Genetics

The abbreviation DNA hasn't reached the popularity of others like VFL, SEATO (or my own current favourite ICPOTA), but more and more people are beginning to realize from articles in the daily press that these three letters mean something which has general and scientific importance. They stand for Deoxyribonucleic Acid, the chemical substance which is responsible for the basic hereditary functions of life.

Just as computer tape can store all the information necessary for the accounting procedures of a large business, so DNA is the substance which stores the biological information necessary to maintain all those processes which comprise life. It is found in the nucleus of each living cell, located in structures called chromosomes. The chromosomes are assemblages of genes, each gene being composed of DNA and determining a particular heritable characteristic. This DNA is precisely duplicated at each cell generation, and by means of the germ cells (eggs and sperm) is passed on to succeeding generations to ensure the stability of each living species. Just as information on prices and sales in business must be coded before it can be read by the computer, so biological information is stored in the DNA molecule by means of a code. Determining how this information is stored and read from this chemical substance has been a major achievement for the collection of scientific disciplines now known as molecular biology, and by "cracking the code" new fields of endeavour have been opened up for many branches of biology.

Many of the experiments which contributed to this knowledge of the genetic code came from the study of the genetics of micro-organisms — fungi, bacteria and viruses. The history of genetics abounds with examples of the intensive study of individual creatures for the solution of particular genetic problems. Just as Mendel used garden peas in the garden of the monastery at Brno and Morgan and his co-workers selected the fruit fly (*Drosophila melanogaster*) for the solution of particular problems in genetics, so in the last ten to fifteen years significant advances particularly related to genetic coding have been made with microbial genetics.

There are good reasons for such a choice of experimental material. In the first place it is relatively easy to handle large numbers of micro-organisms, numbers which would be physically impossible with plants or animals. Because of the ease with which selective environments can be imposed on micro-organisms, it is commonplace to be able to isolate a single variant bacterium (for example an antibiotic resistant form) from amongst a thousand million other non-variant individuals. Most micro-organisms have very short generation times, thirty minutes or so in the case of bacteria, so that in a few weeks of bacterial growth it is possible to simulate evolutionary experiments which approximate all the generations of man's development on this planet. Finally, some bacteria show sexual differences so that it is possible to do hybridization experiments.

Another group of micro-organisms which have already made significant contributions to general genetic knowledge are the viruses, a group of creatures which can only multiply inside a living cell, be it either animal, plant or bacterial. The bacterial viruses, called bacteriophage (colloquially phage, to rhyme with age), while superficially giving the appearance of parasites, are better thought of as examples of "infective heredity". They are very much smaller than bacteria, and generally shaped like a tadpole with a head and a tail (see figure). In interacting with a bacterium they first attach themselves by their tail to the bacterium and inject the DNA from their head through the tail into the interior of the bacterium. All the rest of the phage particle stays outside. This infection with DNA can then result in a variety of genetic events ranging in different circumstances from destruction of the bacterium with the production of a hundred or so new phage particles, to the survival of the bacterial cell with additional genetic capabilities which may even include acquired infectious sexual potency!

Genetic studies on bacteria and phage have not only contributed to many details of the code of DNA, but to other general genetic problems including that of the control mechanisms for reading the code. It is one thing to have the information in the cell but deciding when and how it is to be read is an entirely different problem. For example, most of the cells of the human body are controlled in their rate of division. It is believed that loss of this control from one mechanism or another leads to the initiation of some forms of cancer in which cells are dividing without regard to the rate of division of neighbouring cells.

The important general point which has come out of these studies is that not only are the basic genetic principles which operate in such simple creatures as bacteria and viruses the same as those in higher plants, animals and man, but the genetic code by which information is stored in DNA is the same in all types of life, fungi or ferns, viruses or vipers, bacteria or baboons.

It is easy to see how knowledge of this type is useful to the theoretical understanding of genetics, but how can one equate a study of this type with the exhortation of Francis Bacon that "The real and legitimate goal of the sciences is the endowment of human life with new inventions and riches"? There is an increasing and justifiable demand from the man in the street (who provides the money) and the politicians (who decide how to spend it) that scientists can no longer claim that "research for research's sake" is sufficient logic to justify their continued and expensive support.

However, it seems to geneticists that to "know thyself" is an instruction as important today as when first made centuries ago, and that the basis of knowledge of what man is, and the most valuable of his existing riches, lies in the DNA carried in his own forty-six chromosomes. This represents his entire potential not only for the present but for every human being in the future. Just as a nation must explore its natural wealth in minerals and natural products, so it is necessary for man to know and understand his own genetic wealth. Just as mineral wealth must be husbanded and protected, so must the genetic potential of man be guarded. While man's instinct is to preserve life at any cost, to do so may lead

to progressive genetic devaluation.

For example we know of many diseases which are inherited. These arise through genes directing particular bodily functions which have mutated to a form causing modified metabolic function and hence disease. Included in this group are haemophilia, diabetes, phenylketonuria, rheumatoid arthritis and perhaps schizophrenia. Research into these conditions has in many cases led to treatment which has allowed sufferers to live near normal lives, have children and hence increase the frequency of the gene for that disease in the population at large. This means that we could be decreasing the fitness of the population (the fit being defined by J. M. Thoday as "those who fit their existing environment and whose descendants will fit future environments").

A further way in which fitness of the world population can be decreased is by increased frequency of mutation rates due to increased levels of radiation from nuclear weapons testing. Mutations are chemical changes in the DNA resulting from certain chemical and radiation treatments, the changes causing variations in the code of the DNA which result in permanent alteration of genetic traits. The danger of such radiation-caused mutations is that, in a population like man, almost all would result in changes that would decrease the level of fitness.

What then can we do about this? The solution to obtain decreased levels of atmospheric radiation is clear enough and most nations have undertaken the necessary steps. The other dangers are less easily solved. Two suggestions can be made. There might have to be some control of the freedom that individuals now possess to breed with other individuals of their choice, a notion clearly repugnant to current ideas of social freedom. Secondly, it may be possible to devise some form of "genetic engineering" to repair regions of the genome which are deleterious for the individual possessing them. Current ideas of how genetic engineering might be accomplished are based on genetic phenomena which have been studied in micro-organisms, and microbial genetics will no doubt supply the experimental models for this type of work.

I think it unlikely that either of these procedures will be initiated in the near future. However it is important for people to realize that our knowledge of genetics is increasing to the point where it will almost certainly be possible to impose significant genetic alterations on the human race. We must be prepared to decide whether this should be done and not to leave such a decision entirely to scientists.

Some of the unexpected complexities of any direction of human heredity are easily seen in a few cases which

An electron micrograph of two bacteriophage particles clearly showing the head and tail structure. The head contains the DNA which appears as light-coloured material. The tail is a complex structure which functions very much like a hypodermic syringe. The particle on the right clearly shows the fibres on the tail, which are used to attach the phage to the bacterial surface. The sheath of the tail has contracted (it is intact in the particle on the left) and clearly reveals the core of the tail, which is injected into the bacterial cell and through which the DNA passes on its way to the interior of the bacterial cell. If 100,000 phage particles were placed end to end they would extend over 1 inch (electron micrograph by Dr. H. S. Slater)

have been carefully analysed. For example there is an hereditary disease common in some tropical regions known as sickle cell anaemia, in which the red blood cells show a characteristic crescent shape. Children who inherit the gene for sickle cell anaemia from both parents die of severe anaemia at an early age, generally before they have produced any children. Why then does this genetic characteristic persist? It is found that people who inherit the sickle cell gene from only one parent show little general health effects except that they are more resistant to malaria, the malaria parasite not being able to multiply as well in the altered haemoglobin of the sickle red cells as in normal haemoglobin. Thus, here a deleterious gene proves to have a definite selective advantage.

It was Francis Galton who worked out why so many of the peerages of England lapsed because of lack of heirs. He deduced that it was common for peers to marry heiresses, and these girls were heiresses because they came from small families — at a time when families of this social class were generally quite large. In other words, there was a strong genetic selection for infertility which resulted in the end of these noble families.

With regard to Bacon's "new inventions and riches" in the material sense, it must be admitted that microbial genetics has yet to achieve as much as some other branches of genetics such as those which have contributed to plant and animal breeding with their remarkable effects on yields in agriculture, without which the current global food shortage would be even more pronounced. The reason for this may lie firstly in the relative scarcity of trained microbial geneticists and secondly in the failure of the industries concerned to realize the potential value of genetic techniques in increasing yields. A notable exception has been Japan, which has many departments and institutes of microbial genetics and a vast industry based on fermentation and by-products of microbiological growth, with an active co-operation between academic and industrial groups.

In setting out to establish the discipline of genetics at Monash I have been influenced by some of the above considerations, by my own general training and experience and also by the almost day-to-day excitement which characterizes current research in microbial and molecular genetics, in deciding to limit our research interests to this general area, at least so long as we remain a small department. The present plans are that we shall reach an academic staff level of about five by the end of the next triennium.

This will not mean that our teaching interests will remain this narrow — far from it. In teaching genetics, it must be remembered that very few people who take university courses in genetics end up being practising geneticists. To cover the needs of most students, a genetics department must predominantly provide service courses which will be taken as part of more intensive courses in botany, zoology, biochemistry, microbiology and perhaps anthropology. A number of science students will combine a third year course in genetics with another third year course in some of the above subjects and a few will go on to an honours year and graduate work in our department. Even obtaining a Ph.D. in genetics does not necessarily mean that the final destination will be a university genetics department. Many university biological science departments usually, and should, have at least one member with formal training in genetics, and CSIRO has a number of research groups in different aspects of genetics.

Another aspect of the practising geneticist is that he only rarely does genetics. More often than not he is either a botanist, zoologist, microbiologist, biochemist, or so on, the reason being not only that genetic techniques are important as analytical tools in these disciplines, but that geneticists use material from all these disciplines to solve genetic problems. In short, genetics functions best where it can interact fully with other branches of science both at the research level and at the teaching level. It is intended to implement this principle as far as possible in our teaching of genetics at Monash, and already we have been fortunate enough to have the active and friendly co-operation of a number of departments. In 1968 we are already providing service courses to the departments of Botany, Zoology, and Biochemistry. Next year (1969) in the faculty of Science, an honours course in genetics will be introduced and in 1970 a third year course which can be taken in conjunction with botany, zoology, biochemistry or microbiology. If the demand exists, courses will be provided in other faculties. We are looking forward to the active challenge that all these courses will provide.

THE FLIGHT CREW OFFICERS' INDUSTRIAL TRIBUNAL

On 2 February 1968 the Minister for Labour and National Service, Mr. Bury, announced the appointment of Professor J. E. Isaac of the Economics department as The Flight Crew Officers' Industrial Tribunal for a period of three years. The office is a part-time one and Professor Isaac is to act only from time to time as the occasion arises. In the performance of his duties, he will have the same protection and immunity as a judge of the Commonwealth Industrial Court.

Legislation for the constitution of this Tribunal to deal with industrial disputes involving pilots, navigators and flight engineers in the airlines industry was passed by the Commonwealth Parliament at the end of 1967 following protracted disputes between pilots and the airline companies. The Tribunal provides for the first time in Australia special machinery to deal in a co-ordinated way with the complex industrial problems of the three classes of aircrew. Prior to the setting up of the Tribunal, flight engineers worked under the award of the Commonwealth Conciliation and Arbitration Commission, while pilots and navigators conducted their negotiations directly with the companies.

Professor Isaac has had previous experience in dealing with industrial issues in the airlines industry. Early in 1966 he was appointed to conduct an enquiry on claims made by the Australian Federation of Air Pilots concerning salaries and other conditions of employment of pilots employed by the internal airline operators. Later in the same year, acting as an intermediary, he assisted the Federation and the companies to reach agreement on a new contract of employment for pilots. Subsequently the parties invited him to serve as chairman of the Grievance Board provided in the new contract.

FOUR HONORARY DEGREES CONFERRED

Four honorary degrees were conferred by the University at the four graduation ceremonies held on 5 and 19 April 1968. During the ceremonies 754 degrees and 256 diplomas were conferred on students from all faculties.

Citation delivered by Professor J. D. Legge on the occasion of the conferring of the degree of Doctor of Letters honoris causa upon Lady Bassett.

Lady Bassett

The study of history, Mr. Chancellor, is an exacting discipline. It calls for patience in the pursuit of evidence, care and honesty in the handling of it, imagination, wit and craftsmanship in its presentation.

Marnie Bassett began to develop these skills at an early age. It might be indelicate for me to give the precise date of her first publication — an article entitled "The Foundation of the University of Melbourne" which appeared in the *University Review*. Enough to say that it appeared when she was barely in her twenties. It showed her capacity to use newly discovered documents — and perhaps it also foreshadowed her later interest in the foundation of new universities.

Lady Bassett sprang from a solidly academic background. Daughter of Sir David Orme Masson, professor of Chemistry in the University of Melbourne, she lived at the University in one of those old professors' houses of which only two survivors remain to testify to the more spacious professorial way of life of a bygone age. Her brother, also a chemist, became, as his father had been, a Fellow of the Royal Society, and also served as Vice-Chancellor of Sheffield. Her sister, an authoress in her own right, married the distinguished pioneer of social anthropology, Malinowski. Marnie Bassett herself had an interest in anthropological matters which drew her, shortly after the first world war, to make an extended visit to New Guinea. I hesitate to compare her with that indomitable nineteenth century lady traveller, Mary Kingsley, who in bonnet, button-up boots, and trailing skirts, penetrated to the darker corners of Africa. But in wanting to see things at first hand and in sharpening her gifts of observation in New Guinea she does belong in some degree to that tradition.

From her youth up she thus moved in scholarly circles where things are not taken at second hand. As an historian in the making, she was sensitive to a variety of ways of looking at the world — a variety which was further extended by her marriage in 1923 to an engineer.

Marriage and the bringing up of a family postponed for a time her development as a professional historian. I use the word "professional" advisedly, Mr. Chancellor. Lady Bassett modestly describes her interest in Australian history as a recreation, but in 1940 the publication of *The Governor's Lady*, a study of Mrs. Philip Gidley King, was the beginning of a series of important contributions to our knowledge of Australian history. In 1954 her masterpiece, *The Hentys*, appeared. This was a landmark in Australian biography and in many ways a pioneering work in Victorian social history. It was followed by *Realms and Islands: The World Voyage of Rose de Freycinet* and *Behind the Picture*, a study of the cruise of the *Rattlesnake* to Australia and New Guinea.

In speaking of Marnie Bassett's gifts as an historian it is not only the care of her scholarship, her eye for vivid detail, and the subtlety of her insight — a "penetrating feminine insight" as one reviewer has called it — which command admiration. Also to be admired is her elegance of style. If history is a social science, as some have claimed, it is also an art. Or it should be. I think it was Lord Macaulay who said that he wanted to write in such a way that his *History of England* would be found in every lady's drawing room. For today's readers, male and female, Marnie Bassett writes as attractively as Macaulay did for his readers. Unlike so many of the works which pour from the presses these days her books can be read — and read for pleasure. She falls within the tradition of history as a "velvet study" with her interest in persons, her sensitivity to the subtleties of individuals' relations with each other, and her ability to create a tapestry, to recapture the flavour of the society within which they moved.

This is one of those happy occasions, Mr. Chancellor, when the particular honorary degree to be conferred is indeed appropriate to the work of the person who receives it. This is our first D.Litt. I think it is also the first occasion in which a D.Litt. has been conferred on a lady in Victoria.

Citation delivered by the Vice-Chancellor on the occasion of the conferring of the degree of Doctor of Laws honoris causa upon Sir Osborn McCutcheon.

Sir Osborn McCutcheon

When you cast your mind back, Mr. Chancellor, almost exactly ten years, to the early days of your chairmanship of the Interim Council of this University, you will recall that the main planning, academic as well as physical, was done by the Buildings Committee. The broad policy that was to be followed — that "the University shall have regard to the urgent need for the establishment of courses in applied science and technology, and for the training of more engineers and scientists for industry and agriculture, and for the relief of those faculties in the University of Melbourne . . . at which limitation of the number of students is . . . necessary" — had been laid down in the Act but there was much to be done to translate this policy into a functioning university. As the planning consultant Sir Osborn McCutcheon, as he now is, played a tremendously important part at this stage first by assembling a great mass of information, about student population trends for example, from which the Committee could distil a policy; and then by devising the

master plan which enabled that policy to be turned into reality.

This was all done, in a much shorter time than many people thought possible, by the intelligent deployment of the considerable resources of his firm: academics were interviewed; statistics were analysed; consulting engineers were briefed and set to work; the site, once obtained, was surveyed and a start made with the working out of a development plan.

At the centre of all this activity was today's honorary graduand whom a colleague at the University of Melbourne described as "acting like a vice-chancellor". No doubt this was intended as a compliment; it certainly described one of a vice-chancellor's main functions: the recognition of a problem, the assembly of the relevant information, the development therefrom of a policy and, finally, the attempt to persuade the University's appropriate committee that the policy should be adopted.

Certainly he did all this: from the statistics and the academic opinions he had listened to came the size and disposition of the buildings that would be required; from the survey came the possibilities that the site offered; from his own imagination came the concept that has now been largely realized. Finally the advocacy. No one who has heard him expound his ideas to a committee can doubt that, great as has been his success as an architect, as a barrister he would have been incomparable; not only are his schemes invariably accepted but his clients are persuaded that they thought of them themselves.

But schemes are one thing; reality is often another — but not in our case. We are still following the McCutcheon plan and it has stood the test of experience. It will see us through to our full size, and beyond, for it allows for expansion; even the car-parking problem could be solved if we could only pay for it.

Mr. Chancellor, I have spoken so far only of his contribution to our own University, for which tonight we chiefly honour him; but he has many other achievements. The I.C.I.A.N.Z. building was the first to break the height limit which hampered Melbourne's development for so long. History does not reveal whether it was the ingenuity of the architect or the persuasiveness of the advocate that finally overcame the City Council, but one or the other or both made possible the Melbourne that is now being built.

He is the architect of the new Australian Embassy in Washington, a city whose fathers are so deaf to persuasion that even he has had to bow to orthodoxy — or so he says; but behind the Doric columns and the Palladian facade we can be certain to find examples of the good taste and ingenious design that characterize all his buildings on either side of the Pacific.

He seeks respite from clients and builders on the sea and if, as a yachtsman, he is not the current Australian Flying Fifteen champion this is only because the handicappers pay insufficient attention to weight and age.

Citation delivered by Professor K. H. Hunt on the occasion of the conferring of the degree of Doctor of Engineering honoris causa upon Sir William Hudson.

Mr. Vice-Chancellor, you recently described engineering as "the art of directing the great resources of nature for the use and convenience of man", these words in fact closely following a definition nearly a century and a half old. But I cannot help regretting that it is impersonal; it refers only to the art of *engineering* and not specifically to the artistry or genius of *the engineer*. Yet this afternoon, Mr. Vice-Chancellor, we have with us a fine example of a rare species, a great practitioner of the art of engineering in the true context of the definition, Sir William Hudson.

Sir William Hudson

Last year Sir William retired from the office of Commissioner of the Snowy Mountains Hydro-Electric Authority, a position he held for the best part of twenty years since the Authority was established soon after the second world war. All of us in Australia, and particularly those of us who are engineers, are proud of this great endeavour in the Australian Alps, and in admiring the scheme we are proud, too, of the man who has held the position of major responsibility for it.

Sir William was born and educated in New Zealand. He served in France during the first world war, with distinction, as a subaltern with the London Regiment. He took his Bachelor's degree at the University of London. From then on he became closely involved in hydro-electric schemes in Scotland and in New Zealand, later holding senior positions in New South Wales where he was responsible for the design and construction of several large dams. This factual background leads naturally to the Snowy Mountains Authority, the vital technological statistics of which I can easily quote. But details about a mass of technical achievement do little to help us in the much harder task of judging the quality of the man who, though he occupied the key position, has never sought the limelight.

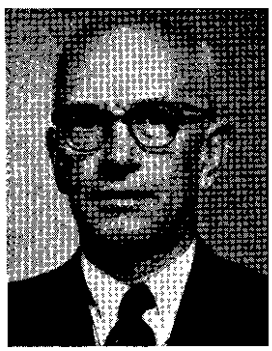
For I believe Sir William has always quietly displayed a remarkable spirit of humility and dedication in all his professional tasks. Through this he has been admired and deeply respected by all those who worked with him or for him. In the Snowy Mountains he has always been personally concerned with the welfare and morale of all the thousands working on the project. He has given us a fine example of engineering as an art by insisting that the technological requirements in his structures should be properly balanced by their architectural and aesthetic design. He has been a master of public relations, and has succeeded in making a technological marvel serve also as a means of bringing bushland, lakes and snows into the lives of many ordinary citizens.

It would be wrong to think that his "retirement" allows him simply to relax in his garden in Canberra, or to recapture on Lake Burley Griffin his expertise as a yachtsman, or to enjoy the Australian bush which he has always liked exploring. It is hard to see how he can devote any time to these pursuits in amongst his varied professional responsibilities with three companies in positions ranging from chairman of directors to consultant. But this is not all. His long interest in industrial safety has led to his accepting the chairmanship of the Road Safety Council of New South Wales. Moreover he cannot be held back from devoting much of his time and energy to expressing to audiences all over the

country his concern and anxiety about the proper utilization of the water resources of this the driest of all continents.

In short, Mr. Vice-Chancellor, I believe that all of us here today — and in particular those who have just graduated in engineering — are privileged to have such an outstanding engineer as Sir William with us and to assist in welcoming him to membership of this University.

Citation delivered by Professor W. A. G. Scott on the occasion of the conferring of the degree of Doctor of Laws honoris causa upon Sir George Paton.



Sir George Paton

When Sir George Paton retired recently as Vice-Chancellor of the University of Melbourne he had spent nearly forty years in its service. His association with this University is by necessity of considerably shorter duration. But it has covered the whole of our history — conception, embryonic growth before 1961 and then development from birth to what I hope may already be recognized as maturity. In the early months of 1958 he was one of the small group of people, including our present Chancellor, who helped to work out the terms of the Act by which Monash University was established, and he became a member of the Interim Council which first met in June of that year. When the permanent Council was formed three years later, he was the representative of the University of Melbourne on that body and served as such until early this year. So we welcome him this evening as one of our founding fathers. As a member of Council he was, under the terms of our Act, a member of the University. In inviting him to accept an honorary degree, we are inviting him to continue — as a graduate — to be one of us.

George Paton was Rhodes Scholar for Victoria in 1926 and only a few years later, while still in his twenties, was appointed professor of Jurisprudence in the University of Melbourne. In 1951 he became its Vice-Chancellor. This is not the occasion to speak at any length about his distinction as a scholar and administrator, nor about his public service. I have to confess — though I do so with some hesitation in this gathering — that I have not read a single word of his scholarly publications in the field of law. But even as an outsider, I do know that *Paton's Jurisprudence* has long been a household name throughout a large part of the English-speaking legal world. The familiar abbreviated reference, in which author and short title are combined, is in itself some indication of the reputation of the work. In recent years Sir George Paton has been honoured by numbers of universities in this country, in the United Kingdom and in North America, in recognition of his outstanding achievements. Tonight, however, not only do we have in mind those achievements, which are matters of public knowledge, but we wish also more particularly to express our recognition of the interest Professor Paton has shown in this University and the help he has so willingly given us.

In his younger days George Paton was a long-distance runner, a champion miler, and a University Blue. For many years now, as I discovered by diligent research, he has listed walking as one of his recreations. There are, of course, athletic contests in walking, but to most of us the word suggests something friendly and non-competitive. It is the friendly and non-competitive side of himself that Professor Paton has so generously displayed in his relations with Monash University. It has been fortunate for us here — and fortunate indeed for the State of Victoria — that a new university has been able to grow up, not far from a much older university to which it has owed a great deal, with a minimum of friction and a large measure of (may I say) mutual toleration. Sir George Paton is one of the chief of those who have contributed to this happy and civilized state of affairs. At a recent meeting of the Council of Monash University a minute of appreciation was recorded, which reads in part: "He has brought to the deliberations of this University the experience and wisdom of many years as a scholar and administrator at our sister University. His advice was never forced upon us but was always freely available whenever it was sought and, on those occasions, invariably proved most valuable".

CHIEF COMMISSIONER OF THE BOY SCOUTS ASSOCIATION

Mr. J. D. Butchart, who has had a long association with the Boy Scouts Association, was appointed Chief Commissioner in Victoria in March of this year. He had been Deputy Chief Commissioner since May 1967.

In both New South Wales and Victoria he has occupied a number of important positions within the Movement. More recently he was one of the five assistant Jamboree Camp Chiefs at the seventh Australian Jamboree at Dandenong, and was responsible for the administration branch. He was contingent leader for the Victorian contingent which attended the eighth Australian Jamboree in Queensland.

In recognition of his notable service he was awarded the Long Service decoration in 1960, and the Medal of Merit in 1965.

Mr. Butchart joined the staff of Monash University in 1960, and in 1966 was appointed Academic Registrar.

MONASH RESEARCH TO HELP FARMERS

Monash University's Zoology department has leased some land in the Colac area from which to launch a study of the lakes of the Western District.

Aims of the research are to help farmers make more use of the lake water and to try to explain the ancestry of both vertebrate and invertebrate fauna in the area.

The department plans to put up a small building on the leased land at Alvie which will house microscopes, data recording apparatus, nets and a boat. It will also have sleeping quarters for a small group of Zoology department staff members and students working for higher degrees.

THE MONASH LIBRARY AND THE COMPUTER

By P. R. Snoxall, Library Systems Analyst and Programmer

Much attention has been paid since the late 1940's to the general theory of automation in libraries. Early experiments designed to adapt electronic accounting machines and punched cards were exemplified in the U.S.A. by the work of H. P. Luhn, and subsequently numerous applications have developed around the now ubiquitous computer. These as yet fall rather short of the total systems concept so dear to many librarians and analysts alike. Nonetheless, the underlying concept for libraries at Florida Atlantic University, the University of the Ruhr at Bochum, and the Intrex Scheme at the Massachusetts Institute of Technology, emphasizes the computer record as the basis for processing and service facilities in library operations.

Major studies at the University of Illinois, Chicago, and at the Library of Congress in Washington have been concerned with the fusion of the technical possibilities of automation with the practical demands and expectations of librarianship; and project work continues at a growing rate in schools of library science, and in research and public libraries alike. It was, therefore, perhaps with a sense of some despondency, that librarians noted the remarks of Harrison Bryan, librarian of the University of Sydney, who, writing in the Australian Library Journal in August 1966, reported that his personal examination of actual developments in the U.S.A. had revealed that "projects which have all the recorded confidence of operating schemes turn out to be projects indeed: systems . . . abandoned or modified out of recognition . . ."

Nevertheless, there have been some experiments involving the use of computers in library work which have yielded promising results and which have encouraged an extension of this type of research. A recent study of indexes held in the Hargrave and bio-medical libraries on this campus showed that more than twenty of them had been compiled or produced with some mechanical or computer assistance.

In the humanities, terminological and linguistic difficulties have contributed to the maintenance of barriers against the sort of codification which computer developments tend to demand. Judged however by the growing interest in computers as analytical tools in the study of literature, their application to the control and arrangement of literary reference is a fairly probable area of further exploitation.

However, the preparation of machined indexes and the conduct of library processes by computer are not necessarily one and the same thing. Libraries, moreover, are not factories, and it has often been said that because of the intellectual content of much library work it is not possible to simulate production-line techniques or to introduce large-scale mechanization. This, at any rate, is a contention which librarians examine to their greater or lesser satisfaction each time a new generation of "automatic" systems equipment is announced. The relevance to the Monash library of computer-based systems will increase, moreover, as more and more organizations ranging from professional societies and publishers to booksellers and library groups concentrate upon the capture and provision of machine-readable bibliographic records. The view is now widely accepted that any form of mechanization which can meet the needs of both libraries and clients is relevant, provided that it enhances information services in general, and provided also that the expense involved is justified in the local situation.

Early studies in the acquisitions and cataloguing areas at Monash, which were reported by D. V. A. Campbell and T. B. Southwell in the *Australian Library Journal* in October 1966, indicated that the library might usefully consider utilizing some of the University's computing facilities is assisting the conduct of its "back-room" tasks, and directed attention initially towards cataloguing. There were three major reasons for not choosing the more obvious task of acquisitions for initial study: the acquisitions department makes heavy use of the catalogue; catalogue records are of longer-term value than order records (and typically differ substantially from them); and the use of a computer in the task of matching books with orders seemed particularly complex (especially when books may arrive by donation, under a standing order contract, in answer to an individual order, in parts, or sometimes under an apparent different identity).

Early in 1966, however, growing student numbers and a basic shortage of teaching materials in the main library's undergraduate reading sector strained the existing procedures for the control and issue of books and periodical articles in heavy demand, and created a management problem which required an early solution. This was tackled (student reading programme) on the basis that short titles of items coming within the general definition of "recommended undergraduate reading materials", including set texts, items on reserve, and items available only on restricted loan periods (e.g., overnight) would be encompassed within a computer-processed system. This supplies frequent, easy to use, comprehensive reference documentation for the majority (about 3,500) of the main library's users over a dynamic sector of library stock, and relieves pressure on the main catalogue. The production of "instant catalogues" of materials similar to these has been an important part of the New University Libraries Project in Ontario and has assisted both in the setting up of new basic collections and in the provision of immediate reference lists to those already existing. At Monash, numerous by-products have resulted from the implementation of the student reading programme, including the facility to list economically a file now approaching 18,000 citations to over 40,000 books and articles. Listings by classification, by teaching course, by type of material (e.g., photocopy), or by control category (e.g., reserve), for library users' and departmental requirements are now produced on a schedule. It can be seen that there are possibilities within the system for a ready supply of information from the library to teaching departments, which can have a significant influence on the planned utilization of library materials (typically multiple-copy holdings), particularly where a conflict of demand for basic authoritative works occurs between related courses at certain times of the year. Analysis by computer of student

reading reference files has already yielded data of considerable value for this purpose. The system is, furthermore, currently undergoing expansion to permit the incorporation of communications terminals providing direct access to the library's computer files at the University computer centre.

Comparison of computer processes introduced so far in the student reading area with those existing before "computerization" indicates that there are marginal cost economies. Where the computer systems appear to have a decided advantage, however, is in their capacity for a considerable increase in data intake and range of products without a consequent increase in cost in the same linear relationship as earlier systems exhibited.

No staff retrenchment is likely in the present context, but there are some grounds for hope that use of the computer in library process work will facilitate the provision of services to meet the increasing demands being made on the library.

From the student reading programme it was a short step to the development of a computer file of titles for periodicals currently received. A previous edition of this list at Monash in 1964 utilized the comparatively expensive but very presentable Fotolist (Sequential) Camera technique. The regular presentation of this sort of documentation is always difficult, however, since the basic file requires considerable staff attention and revision for each production cycle, and it was decided that the importance of this list, from the current awareness viewpoint, coupled with the need for regular and rapid up-dating and economical listing schedules, made a computer application eminently desirable.

This development must naturally be regarded as a first measure only in the provision of machine access to the control and entry of periodicals information. Using the University computer facilities, and those of the office services section, new editions of "periodicals currently received" can be processed and printed relatively cheaply, and the first such edition was distributed in the latter part of 1967. As with student reading, the basic file has been used for several special-purpose listings, including selections for French, German and mathematics, and is used regularly for the provision of information necessary for the management of library processes.

A similar technique has been applied to the recording of titles held in departmental libraries, many of which do not at present occur in the main catalogue. This list is an essential prerequisite to the establishment of a proper control mechanism for the cataloguing of this considerable bulk of "unadvertised" material (over 11,000 titles). Once again the adoption of this programme was facilitated by the use of the short-title technique applied in the student reading programme. The result of the exercise has been for the first time consolidated information about departmental collections relevant both on the Monash campus and elsewhere (e.g., city hospitals) which provides the necessary foundation for a thorough examination of the relationship between these holdings and those in main and branch libraries on the campus.

The use of short title entries in the work described above has proved quite adequate for the purposes for which they were designed, but to suggest that this type of entry can answer all the problems encountered in accessioning, cataloguing and referencing library materials would be a major over-simplification.

The main project is and has always been the development of computer-readable catalogue entries. While these can be produced locally, the commercial availability in punched paper tape form of catalogue entries which resemble the products of another and larger computer system (at the U.S. Library of Congress) has raised the question of how many such records need actually to be made locally. It is, therefore, appropriate that programmes should be developed to take advantage of this new source of information, and an exercise is now being undertaken which is already yielding technical data (compiled through the good offices of four research libraries in Victoria) of a kind not previously available in Australia.

So far we have been concerned mainly with the technicalities of using computers as tools in cataloguing work; we are now assessing the wider implications from a library systems viewpoint — the possibilities, for example, of extracting a substantial number of the basic records we need from a centrally supplied "data bank", and of augmenting and enriching that supply to fit our needs, and possibly also those of some other libraries in the Melbourne area. This amounts to a fresh experiment in central cataloguing: an idea often explored but seldom successfully achieved. Recent analysis of the current collecting patterns in Victorian universities reveals a relatively low rate of duplication, in marked distinction to the prevailing pattern in some American state universities for example; and it has hitherto been generally accepted that without a large measure of simultaneity in separate cataloguing processes centralization must be unprofitable. But current emphasis in Britain, the U.S.A. and Australia points to the re-emergence of some form of central cataloguing as a serious possibility, perhaps the more so in the light of the new technology associated with computer utilization, and if this possibility is to be regarded seriously it must be examined in the local context.

Australian libraries are increasingly involving themselves with automation in various forms: some forty-five such projects were listed in March 1967. Much work has been done to formalize existing library procedures, which must be done before any computer systems are implemented, and some fairly interesting computer processes have been placed on a regular operational basis. Some programming and system analysis positions have been created in Australian libraries to relieve librarians of the need to make outside arrangements for this sort of work. In concert with this trend, the acceptance of data processing as an ingredient in professional training for intending librarians is now winning official recognition. The whole development of applied computer systems in libraries must, to a large extent therefore, depend upon the integration and familiarization of personnel with new ways, and the continued recognition of the importance of research in the field of library science.

The impact of computers will affect not only the way in which libraries conduct the business of collecting, registering and displaying their material resources but also the whole library/patron relationship. It is important, therefore, to foster a "feedback" mechanism which will supply libraries with much-needed information from users about their particular requirements of library ser-

vice so that suggestions as to how these might best be met may be explored. We are fortunate, on this campus, in having good computer facilities and these have promoted an increasing tempo of usage, but it is characteristic of computer applications in general that they engender change and experimentation which sometimes over-indulge the appetite. There is always the danger, therefore, that we could exceed our mechanical capacity to handle a growing work load.

Thus, it is important that the library (in common with other computer users on the campus) examine commitments from time to time with a view to balancing demands for machine time, and in consequence a flexible approach to system design and a strict control of developmental applications must be maintained. This precludes, for example, some of the more sophisticated applications of information retrieval. Interest is, and must remain, firmly in the data processing area at present. What we quite certainly cannot afford is an early and possibly ill-advised adventure into the expensive experimental field of information retrieval, from which we could so easily emerge having accomplished "de-trieval" on a massive scale.

THE LENINGRAD–MONASH EXCHANGE SCHEME

By G. Ettershank, Senior Lecturer, Faculty of Science

In June 1966 the Rector of Leningrad State University and the Vice-Chancellor of Monash University signed an agreement under which, each year, one academic and one graduate student from each university would visit the other for periods of one to two months and ten months respectively.

In November 1967 I found myself winging overseas as the first exchange lecturer under the scheme, heading for a month's stay in the department of Entomology at Leningrad armed with lots of literature about Australia and a Russian phrase book. I planned to lecture on techniques for studying the ecology of soil-dwelling invertebrates, a subject sufficiently esoteric from the viewpoint of the general reader that it will not be mentioned further except to say that the lectures were a great success.

I travelled in the relative luxury of modern flight to Delhi where I transferred to a Russian aircraft which was technologically very impressive but not very comfortable. My first discovery was that there was no seat allocation — first come, best seated! After finding a seat at the back, I investigated the literature supply in the pocket in front of me — one airsick bag and a booklet on aerial agriculture in the U.S.S.R.

After some delay we took off and climbed steeply over the foothills of the Himalayas, finally settling down to cruise at 36,000 feet and 540 m.p.h. This hungry traveller saw hostesses active further up the plane and assumed breakfast was on the way, but no, they were selling souvenirs and vodka to the passengers. Breakfast did materialize later — an incredibly heterogeneous meal with caviar and a white starched napkin as particularly noteworthy memories.

Six hours later we landed at Moscow through heavy overcast to a temperature of −3°C, a rather abrupt change from the Australian summer I had left some thirty hours before. With over two hundred passengers to process, clearance through health, passport control and Customs was a protracted but uneventful process — I was not even asked to open my bags, though I did have to declare all currency and traveller's cheques I was carrying.

I had arranged, before leaving Australia, to borrow films from the Information Service and from C.S.I.R.O.; these, together with a parcel of booklets on a variety of aspects of Australiana, were to be waiting for me at the Australian Embassy, so I enquired how to get to the city. I settled myself on the bus indicated, and we set off.

Later a lady fare-collector boarded the bus, and I received my first insight into the basic friendliness of the ordinary Russian. I could not understand the collector, but the lady sitting next to me spoke a little German, and with the help of my Russian dictionary we sorted out the fare. Although this was holding up the bus, everybody saw it as a great joke and we were most comradely!

Next day I flew on to Leningrad where I was met at the airport by Professor Yuri Kovalev, my correspondent at the department of Entomolgy, Victor Petrovitch Tyshchenko, and two representatives of the University's Foreign Department. After welcoming me, the first two took me to my hotel, checked me in, and then took me to dinner where I was initiated into the drinking of vodka, Russian style. A happy biologist settled in for his stay!

When I went on a trip of exploration next morning I found that my hotel, the Oktiabrskaya, was enormous. The ground floor was occupied by dining-rooms and administration, a post-office, beauty shop, barber shop, and a branch of the "Beriozka", a chain of shops dealing only in foreign currency where the tourist can buy a range of imported goods, but more interestingly, many items of Soviet origin often at one third to one half their price in ordinary shops. On the ground floor too was the only bar in Leningrad (as opposed to beer-shops) which served hard liquor, either straight or in mixtures, and espresso coffee. A very useful assemblage! On the four floors above were endless corridors of rooms leading off from a central stair well, each corridor guarded by a stern lady at a desk who handed out keys and kept (one felt) a strict eye on comings and goings.

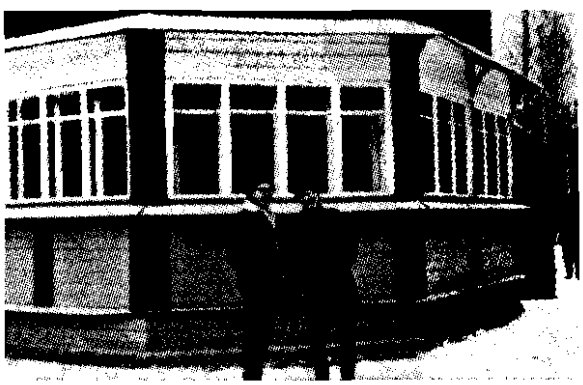
My own room was unimaginative but satisfactory, with a bathroom *ensuite*, a desk, four straight-backed chairs, a wardrobe and a bed, two reading lamps, a telephone and a small loudspeaker which broadcast a local radio programme day and night. It was possible to turn the latter off, but unfortunately not the telephone, as I was soon to find out. Leningrad has an extensive phone system but no phone books, so every-

body compiles a notebook of numbers, which they often neglect to carry, and then seemingly tries numbers at random!

The morning after my arrival I went out to the University which is on the northern side of the city on an island facing the main stream of the Neva River. The buildings were constructed between 1722 and 1742, and were originally built by Domenico Trezzini to house the "Twelve Colleges" of Czar Peter I. The present University's charter was granted in 1819. Many famous men of science and letters were students and staff members here — the chemists Mendeleyev and Butlerov, the physiologists Pavlov and Sechenov, and the writers Chernyshevsky and Turgenev among others. In 1891, a twenty-one-year-old student passed his final exams and went on to become the University's most famous graduate — Vladamir Ilyich Lenin.

At the present time the University has some 20,000 students in fourteen faculties (with over 3,000 professors and teachers) occupying the twelve original buildings and a clutter of smaller buildings packed in between the main ones. In addition, the University utilizes other buildings in other parts of the city and many laboratories are situated in old country houses outside the city. In spite of this, the University is incredibly overcrowded, but nothing can be done on the present campus to alleviate this. A new university is to be built on a new site — when there is finance available. This statement had a somewhat familiar ring.

So intense is the crowding that few academics come into the University unless they are lecturing, most preferring to work at home or out at one of the laboratories. It was consequently very difficult to meet staff members except by prior appointment which often had to be made a week or more in advance to coincide with the next time that person would be on campus. Nor is there any place where the staff meet socially, such as coffee rooms or faculty club, although there are small "cafés" scattered around the various buildings, some restricted to staff, the rest for both staff and students. Near the University is a large cafeteria where staff and students often eat, and where the meals are cheap and substantial. There is no student union, but students are often members of youth clubs in various parts of the city. On campus there is also a medical facility, the



Author (left) with his interpreter, Sasha Dolinini, a third year English student at Leningrad University, outside the house of the artist Repin, 60 km. north of Leningrad

Faculty of Science and Administration building, University of Leningrad. The building in the background is the faculty of Philology

Polyclinic, where staff and students can obtain medical advice and treatment, and limited pharmaceutical service.

The University library is quite a large one, with over three million volumes, parts of the collection going back to the foundation of the school. Hence it contains much of considerable historical interest, although within the scientific field it was very short on many standard texts and journals. This is apparently due to the shortage of foreign exchange that can be diverted to such "non-essential" purchases. The librarian was very interested in exchanging books and journals originating in the University for subscriptions to Western journals and for books.

On this first visit to the University I was greeted by the Vice Pro-Rector with a long speech of welcome, and then I was taken to meet the members of the department of Entomolgy. To reach it, we went up to the first floor of the building and turned into a corridor that ran right down one side of it. The corridor was fully twenty-five feet wide and two hundred and fifty yards long, and lined with busts, paintings and statues of Leningrad's famous men. Bookcases spilled over from the library at the opposite end of the corridor, and superimposed on all were student posters protesting causes such as the Vietnam war, or featuring highlights of vacation field trips. Shades of the Union lobby!

I was introduced to the staff and students of the Entomology department, and received a major shock. I had been told that nearly everybody at the University spoke English, but now I found that in fact only two of the staff did so. This, I thought, will make lecturing interesting. That particular problem was some way off, as it turned out, for my lecture notes and books were in my unaccompanied luggage, still somewhere between Melbourne and Leningrad. Until my luggage (which also contained most of my warm clothes) arrived, I decided to be a tourist.

As well as receiving a daily living allowance, I was entitled to use a chauffered car for six hours per day, so on any day that the weather looked at all reasonable I went out into the country around Leningrad, and when the weather was poor, which was most of the time, I went the tourist round of museums and art galleries. The University had provided me with a guide and interpreter, an enthusiastic young third year English student, Sasha Dolinin. And Leningrad is a marvellous

place for the tourist — apart from the historical interest of many of the buildings, it is one of the great treasure-houses of art of the world.

It would be impossible to describe all the places that one should visit there, but some are particularly noteworthy. First and foremost is the Hermitage, the winter palace of the czars, a baroque style building erected by Rastrelli in 1754-62 and the largest and most splendid in Leningrad. The outside is intricately ornamented with white pillars, cornices and mouldings contrasting with the green colour of the walls. In addition there are cupids' heads, lions' faces and scrolls over the walls, and the roof edge bears 176 statues interspersed with ornate vases. Inside there are over a thousand rooms and halls with a total floor area of 495,000 square feet; for the statistically minded, there are also 1,945 windows, 1,786 doors and 117 staircases. Now consider that this space is packed with art works from all over the world, largely collected by a succession of czars, and also contains a museum of archaeological and historical materials, and you will appreciate the magnitude of the task in "visiting the Hermitage". Despite several visits, I did not see all of it!

Nearby, on the same side of the river, are many other historical places. The Smolny Institute, originally a school for young ladies of noble birth, was taken over by the early revolutionary government in 1917 and was the home of the Soviets until the government moved to Moscow in 1918. It is now a museum of the revolution. There is also the Museum of Russian Art which contains a beautiful collection of old icons, as well as works representing nearly all the major Russian artists.

Across the river from the Hermitage is the magnificent and impressive Peter and Paul Fortress. This is really the foundation stone of the city, for here in 1703, on an island commanding the navigable stream of the river, Peter the Great commenced the construction of a fort to hold the lands he had conquered. Within the walls were barracks and, later, cells for political prisoners, the lists of whom read like a Who's Who of Russian revolutionary history from 1790 to 1917. Also within the walls were the Mint and the beautiful Peter and Paul Cathedral which contains the sarcophagi of all the czars of Russia except two. The cathedral spire, clad in gold leaf, is the highest structure in Leningrad — 400 feet with the exception of a new 1,000 foot television tower.

There are many more places worth visiting in the city. Interestingly, there are no tall buildings in Leningrad. To emphasize the lowly stature of his subjects Nicholas I decreed that all building in St. Petersburg must be seven feet lower than the Winter Palace; only churches might be higher, a realistic appraisal of the hierarchy. Outside the city are the Summer Palace at Petrodvorets with its incredible fountains (frozen solid at the time I visited), the Ekatereninsky Palace at Pushkin (formerly Tzarskoye Selo), the country residence of Czar Paul at Pavlovsk, and to the north the home of the artist Repin. All are within a few hours' drive of the city.

But all good things must end. The cold weather and my long-lost suitcases arrived at the same time, and I settled down to giving my lectures. This involved a session of several hours with my interpreter, going over the material for the day's lecture, followed by a two-hour lecture with a five-minute break in the middle. In addition I gave a number of "slide shows" to various groups about Monash and about Australia and two film shows to capacity audiences. I also organized a book display with the materials I had brought with me, covering Australian geography, literature, painting, architecture, flora and fauna, which was very well received and attracted many visitors.

During my visit I was taken to several scientific institutions around the city where I met and talked with many fellow biologists. I was impressed with their friendliness and the open way in which they discussed their work and problems. I was very disappointed with the standard of scientific equipment; this seemed to be in short supply and of not very advanced design, though obviously I only saw a limited array. Many types of equipment that may be purchased "off the shelf" in the West have to be specially made up, and many modern developments in equipment technology have not been heard of by workers there. I have no doubts about the quality of the research being conducted in the University, but there was not the diversity that I was accustomed to seeing in universities in Australia and the United States, and investigation was restricted to a few major themes.

Training of students has recently been dealt with by M. A. Jaspan in *Vestes*, IX, 249-252. I was impressed with the depth of the undergraduate courses and the excellent text books supporting all courses; on the other hand, neither visual aids nor printed notes are used in teaching. The first degree takes five years and graduate training is also more protracted than in Western universities. I am sure that this time could be reduced substantially with improved methods of teaching and examination, both of which rest too heavily on the old European tradition.

I count this visit as one of the great educational experiences of a lifetime, and I unreservedly support continuation of the scheme. I found that Australia is not well known in the Soviet Union and, in fact, is regarded as a somewhat exotic place of natives and kangaroo farms, but many of our own misunderstandings of the Soviet Union, the largest country in the world, are just as bizarre. Exchanges in both directions can do nothing but good.

FIRST DOCTOR OF MEDICINE

Dr. F. H. Hocking, who has been working in the department of Medicine at the Monash Medical Centre, Prince Henry's Hospital, has been awarded the degree of Doctor of Medicine.

He has written a thesis, "Human Reactions to Extreme Environmental Stress". His work began after interviews in Australia with people who had been victims of the Nazi concentration camps. From his studies he concluded that everyone has a breaking point, although for some this may come many years after the exposure to stress.

Dr. Hocking will receive his degree at a conferring ceremony in December. At the same ceremony Dr. Ch'ng-Tan K. Siew will receive her Doctorate of Philosophy. She is the first Asian woman to gain a Ph.D. from Monash. Her thesis concerned freshwater mussels found around Echuca.

DEDICATION OF THE RELIGIOUS CENTRE

The dedication of the Religious Centre and its presentation to the University by the Churches Committee for Tertiary Education took place on Sunday 9 June in the presence of over 1,000 people.

During the Service the congregation joined in prayers, hymns and the reading of Psalm 27. The lessons were read by two students. Music was under the direction of Mr. Michael Brimer with the Monash University Singers. The dedication was performed by the two University chaplains, the Rev. L. Hahn and the Rev. Father Knowles, and Rabbi H. M. Sanger. They were supported by the chairman of the Appeals Committee, Mr. J. O. Parker.

NOTE BY THE ARCHITECT, MR. JOHN MOCKRIDGE (MESSRS. MOCKRIDGE, STAHLE AND MITCHELL)

I have placed great emphasis on the main chapel. It is planned as a complete circle to symbolize unity and eternity, and rises high above the ambulatory and ancillary rooms which surround it, so that a dramatic release is experienced upon entering. The chapel is seventy-five feet in diameter and seats 420, no one being more than sixty feet from the Table. The twenty deeply-recessed windows are by the Melbourne artist Les Kossatz who has created exciting non-figurative designs using traditional methods. In contrast, the glass-in-concrete windows by Leonard French in the smaller chapel are of strictly twentieth century construction. It is interesting that both artists have designed such beautiful windows which do not depend upon any particular symbolism for their success.

The chairman of the Churches Committee for Tertiary Education (the Most Reverend Frank Woods) presented the key of the Centre to the Chancellor and referred to the long history of the project, which went back to January 1959. As the result of the generosity of a great many people in responding to the appeal launched by the Churches and the Jewish community, it had been possible to plan and build what must be regarded as a very fine building.

The Chancellor, in receiving the key, expressed the thanks of the University to the Churches for the building, to the many donors for their generosity and to the architects, designers and builders for their work.

The Vice-Chancellor spoke of the place of a religious centre in a secular university. He said:

The relations between universities and religion have undergone many changes over the centuries and, on such an occasion as this, it is pertinent to enquire just what is the place of a religious centre in a modern, secular university.

My friend and colleague, Dr. Murray Ross, spoke of this matter when he was installed as president of York University in Canada:

"But surely the process by which men discover values and beliefs — indeed, discover themselves — necessitates searching and striving for personal answers to the fundamental questions of life. There are few places where these fundamental questions can be pursued as effectively as in a university, if the university provides opportunities for, and assistance in, this search. It is not the task of the university, of course, to provide definite answers for, or ends to, the search. The function of the university is to help to clarify the questions, to show how great minds of the past have dealt with these questions, to introduce relevant data from contemporary life, to encourage individual students to work through these materials and to find their own answers and their own identity. York University is not a denominational university, but I hope it will be concerned always with religious and philosophical questions — indeed, that no student will graduate who has not been confronted, at least, with those questions without answers to which man is something less than man."

Murray Ross's words express much better than I could the thought that in a university, which exists for the purpose of discovering and disseminating the truth across the whole spectrum of knowledge, the influence of religion upon men's minds and actions cannot possibly be omitted. Certainly the study of history, literature, philosophy, psychology would be incomplete if the impact of religious beliefs upon men's behaviour was excluded.

Students of these and perhaps other subjects will, therefore, come to realize in an intellectual and detached

The Most Reverend Frank Woods presents the key of the Religious Centre to the Chancellor (centre). At right is Mr. J. Mockridge, the architect

kind of way what religion means and has meant to some men.

Nor would anyone quarrel with the proposition that the more direct study of comparative religions, for example, could form a perfectly acceptable component of, say, an Arts degree. Indeed, the Professorial Board of this University so resolved as long ago as 1961, although it added the normal academic rider that the appointments necessary to make this possible would have to be considered in competition with other developments.

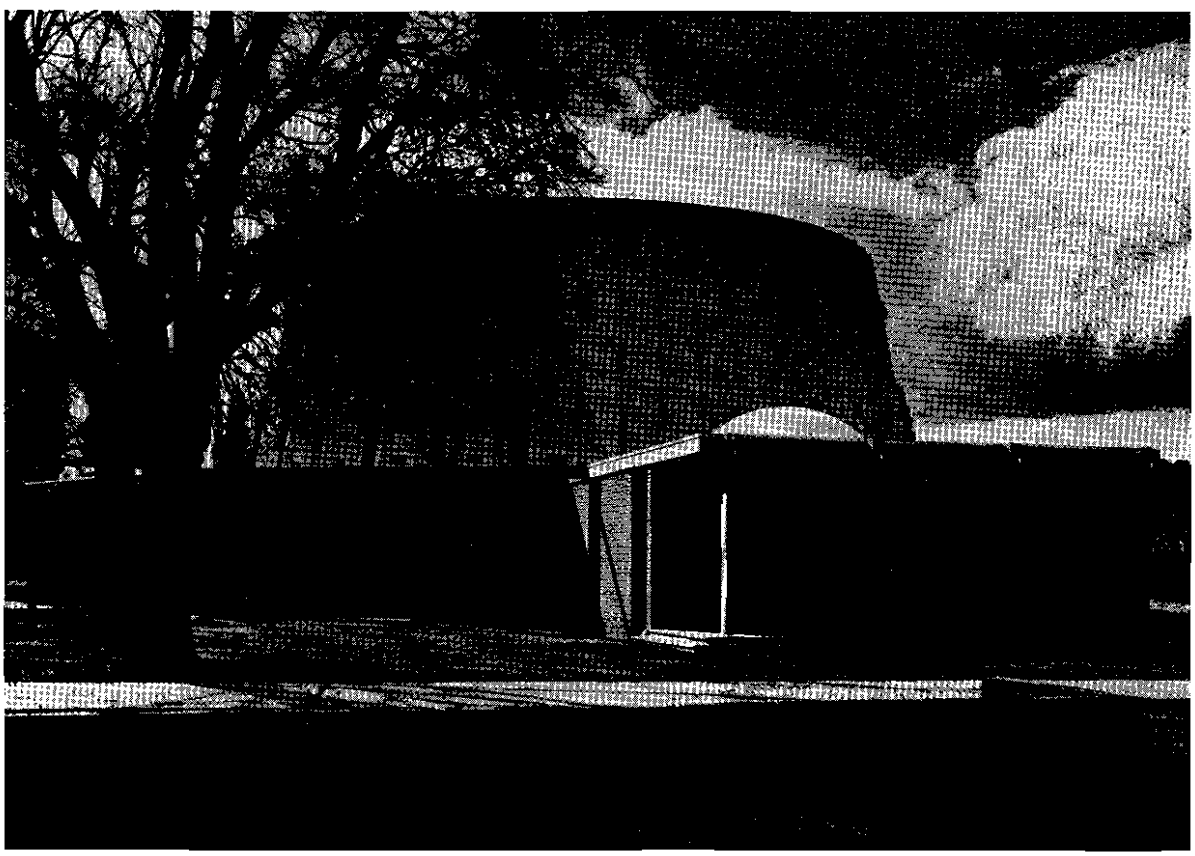
But the academic study of the effects of religion is quite different from the practice of religion by convinced adherents to a faith, from the acts of worship and prayer by involved and committed participants in the services of particular churches. Is this appropriate to a university? Less than a century ago the University of Oxford was quite clear on the answer and, because he was not a member of the Church of England, Samuel Alexander, the great philosopher, was denied a fellowship. The founders of the University of Melbourne took the opposite view and, to this day, there is no church or chapel in the University itself, a deficiency which led to the establishment of the denominational colleges.

Some members of this University would hold strongly to the view that practices which involve belief, as an act of faith, in phenomena or propositions that cannot be deduced by logical argument from known facts or demonstrated in a laboratory have no place in a university. I do not share this view and, with the help of an analogy, I want to explain why.

It is a respectable academic exercise to study harmony, counterpoint, the acoustics of musical instruments or the biography of composers but these things have very little to do with the actual experience of performing or listening to music oneself. Every Monday, during term time, the Alexander Theatre is crowded with five or six hundred young people listening to a lunch-time concert. They come and sit quietly, perhaps munching a sandwich, and then go back to an afternoon's work having enjoyed an experience which is really rather hard to explain by logic or experiment.

My mind goes back more than forty years to the day when, as a boy at school, I first heard "The Messiah" in York Minster; indeed I still never hear that marvellous opening phrase of the prophet —— "Comfort ye, comfort ye my people" without remembering the effect upon one small boy of the high, clear tenor voice ringing through the great cathedral. I find it hard to decide whether this was a musical or a religious experience but it was certainly almost overwhelming both at the time and in retrospect.

The population of this University is likely to include people with every shade of religious belief and unbelief although in unknown proportions. Some are undoubt-



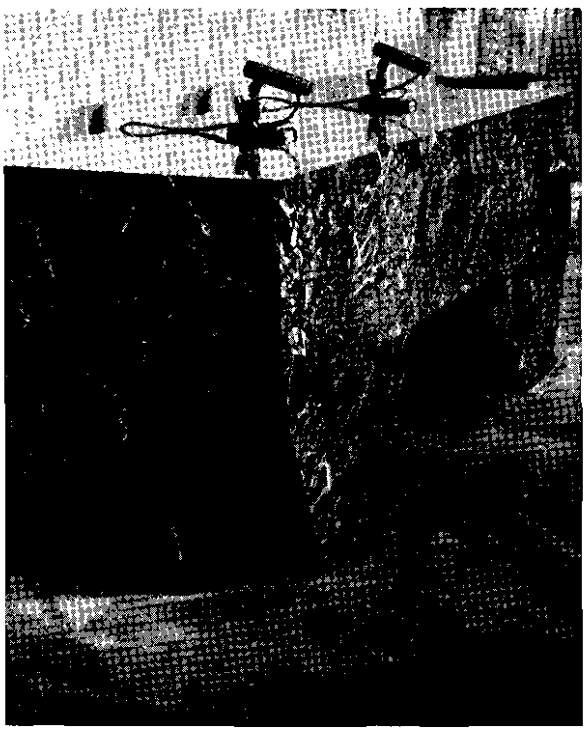
The Religious Centre

edly atheist, denying the existence of a deity; some are known to be practising Christians; but in all probability many would describe themselves as agnostics, neither adhering to the tenets of any particular religion nor quite ready to assert that there is no God. Some of these, acknowledging behaviour in man that is hard to explain in materialistic terms, might find it impossible to conceive of an independent, external God somewhere up there in the space-time continuum, but are able to see that from such metaphoric phrases as "God is Love" can be built an elementary but acceptable theology.

If any of these should wish to test the validity of religious experience for themselves there is no alternative to participating in religious experience by sharing in worship, just as one cannot appreciate the effect of music except by listening to it. This beautiful building, set in the middle of the University, will always be open to every reverent visitor who cares to enter, whether to pray, or to share in service, or just to sit in silent contemplation.

One final word: when the Council finally agreed to the construction of the Centre it emphasized that "the Centre should not be restricted to members of a particular faith". It is a matter for rejoicing that recent developments are such that people of so many different faiths have found it possible to join together to create this Centre.

Let the honesty, the determination and the tolerance that have been shown in the building of this Centre be an inspiration to Monash University for all time.



The Table in the Chapel

THE WILFRED FULLAGAR MEMORIAL LECTURE

A fund, The Wilfred Fullagar Memorial Fund, has been created for the purpose of establishing lectures to perpetuate the memory of Sir Wilfred Kelsham Fullagar, former Justice of the High Court of the Commonwealth of Australia.

Given by distinguished lawyers and members of professions concerned with legal matters, The Wilfred Fullagar Memorial Lecture is to be held at least biennially. It will be related to current trends in and developments of legal thought.

The inaugural lecture took place in the Alexander Theatre on 6 May 1968 at 8.15. Sir Robert Menzies introduced the lecture series and spoke of his personal memories of Sir Wilfred Fullagar.

The lecture itself, "Australia and the Judicial Committee of the Privy Council", was delivered by Sir Douglas Menzies, a Justice of the High Court of Australia. As an introduction to his lecture on Privy Court appeals Sir Douglas told of his own association with Sir Wilfred Fullagar of whom he said:

"His judgments have the quality of works of art in the Greek tradition of deep simplicity which so much informed his writing and his thinking. There is however, no record, save in the hearts and minds of his colleagues, of the influence he exercised upon the deliberations of the court and of the enrichment of judicial life that flowed from his gracious, good-humoured and encouraging presence. He was greatly loved".

LONDON APPOINTMENT FOR REV. J. HAWKES

The Reverend Job Hawkes, who was a vital and colourful personality around the campus, left Monash at the end of 1967 to spend a year in the United States and Canada before taking up an appointment in London.

A graduate of the University of Cambridge, Reverend Hawkes worked in the United Kingdom, Trinidad, King Island and Hobart. During his stay in Hobart, he also taught history part-time at the University of Tasmania. In 1962 he became a chaplain at Monash and in 1965 joined the department of History as a senior teaching fellow.

He will be remembered by students and staff for his friendly counsel, resourcefulness and generosity.

NEW DEPARTMENT OF SURGERY

A new department of Surgery, which is headed by Professor H. A. F. Dudley, has been established in the Monash Medical School at the Alfred Hospital.

On Friday 26 July Mr. B. K. Rank, former president of the Australasian College of Surgeons, opened the department which is on one of the three floors added to the original medical school building. The new building is wired for closed-circuit television and has a highly-instrumented animal operating theatre.

Three of the students in the new department are working for a Bachelor of Medical Science degree in combination with the usual medical degrees — a relatively new step in Australian teaching practice.

EVALUATION OF THE P.S.S.C. PHYSICS COURSE IN VICTORIAN SECONDARY SCHOOLS

By L. D. Mackay, Lecturer in Education

A principal concern of anyone involved in teaching students must be the continuing process of improving instruction in the course concerned. All too often, when students do not succeed in achieving the level of performance we would like, the group of students is said to be less capable than previous groups of students or insufficiently well selected. Equally tenable hypotheses are that the instruction given to these students is not as effective as it could be, or that the instruction is inappropriate to the particular group of students concerned, or that the examination used is inappropriate in content and/or difficulty. In order to distinguish between these possible reasons for inadequate performance, it is necessary to undertake some sort of evaluation of the learning experiences to which students have been subjected. Only in this way is it possible to decide if the learning experiences offered were appropriate and at the same time effective. Regardless of whether the performance of students is considered satisfactory or unsatisfactory, it is the responsibility of a competent teacher to attempt to discover ways in which the learning experiences could be changed to improve the learning of students.

STAGES IN THE EVALUATION OF COURSE MATERIALS

The process of evaluating course materials can be divided into three stages. These stages can be illustrated in the usual processes which accompany the adoption of a textbook for a course.

The initial step is to establish that the text covers the required topics and is at the right standard for the intended student group and appropriate to the background and attributes of this student group. This check on the basic feasibility of the text is normally accomplished by a critical appraisal of the text by the teacher who would normally teach the course. This stage can be described as the *feasibility* stage.

The second or *comparative* stage emerges when the results of the feasibility stage are sufficiently favourable to justify a serious consideration of the adoption of the text. In this stage the text is compared with other possible texts and a decision made about which text is to be adopted.

Once the text has been used in a course it is possible to consider the experiences of the teacher and of students in using the text during the course and to decide if the adoption of the text has been successful. The success of the text is gauged by comparing the teacher's experience of the text with his expectations, and by comparing the performance achieved by students using the text and the teacher's expectations of student achievement. This *comparison with expectations* stage results in the identification of strengths and weaknesses of the text, and ultimately a decision is made on whether the text will be adopted in future years or not.

These same stages are appropriate in the evaluation of any element of a course, such as a textbook, an approach to a topic or a particular teaching technique, or to the evaluation of a complete course which includes a whole range of materials such as a text, laboratory guide, apparatus and films.

In Victoria several new courses have been adopted for use in secondary schools. One such course is the P.S.S.C. physics course which was adopted as the course of physics in Victorian secondary schools at the leaving level in 1965, and at the matriculation level in 1966. This course was developed in the U.S.A. by the Physical Science Study Committee and is not just a textbook, but rather a set of co-ordinated resources for the teaching of physics including a text, laboratory guide, teachers' guides, films, laboratory apparatus and supplementary reading materials.

The decision to adopt the P.S.S.C. physics course as the leaving and matriculation physics course in Victorian schools in preference to other alternative courses has been made, and in implementing this decision considerable expenditure on apparatus, films and equipment has been incurred to an extent far in excess of half a million dollars. In this situation it is unrealistic to think in terms of replacing the P.S.S.C. physics course with an alternative course in the immediate future. But in view of the investment in terms of both money and time that Victoria has made in the P.S.S.C. physics course, it is important that every effort should be made to maximize the effectiveness of this course in Victorian schools.

At present the author is working on a systematic evaluation of the P.S.S.C. physics course in Victorian secondary schools. This evaluation consists of a number of separate projects, among which is a project titled "Development and Testing of Procedures for the Evaluation of Physics Curricula in Secondary Schools", which is being supported by a grant from the Australian Research Grants Committee. In many respects the studies concerned in this evaluation of the P.S.S.C. physics course are methodological studies, in that the experience gained and the methodological problems in course evaluation solved in the course of these investigations have implications for other courses and course materials at the secondary and tertiary levels in all subject areas.

The techniques being employed in the evaluation of the P.S.S.C. physics course in Victorian secondary schools are described below under the following headings related to the three stages in course evaluation: (1) feasibility studies, (2) comparative studies, and (3) comparison with expectations studies.

(1) FEASIBILITY STUDIES

An important source of information on the feasibility of a course is the opinion of people who are to teach the course. A teacher questionnaire survey has been undertaken by the author in Victoria in relation to the P.S.S.C. physics course. The opinions of all teachers of physics at the leaving and matriculation levels in Victorian secondary schools were sought in November 1966, which was the first year in which P.S.S.C. physics had been taught at the matriculation level in Victoria. Completed questionnaires were received from about eighty-seven per cent of schools teaching leaving and

matriculation physics in Victoria in 1966.

The survey yielded information on a number of areas including comments and opinions of teachers on the appropriateness and effectiveness of the course; conditions for teaching physics in Victorian secondary schools; teaching practices being used in the teaching of physics in schools and the qualifications and experience of physics teachers. A full report of the results of this survey is published elsewhere.[1]

(2) COMPARATIVE STUDIES

The major justification given for a change in any of the materials in a course is that it will lead to improvement in the quality of instruction. Once materials have been shown to be feasible, it is nearly always considered necessary to demonstrate that pupil learning under the new course is superior to that under the older "more traditional" course.

Comparisons such as this can yield valuable information on the relative merits and weaknesses of courses. A study of this type has been completed by the author in which the A.C.E.R. pre-matriculation physics examination was used to compare the performance of students at the end of the P.S.S.C. physics course and the previous physics course in Victorian secondary schools.[2] In this study the performance of a sample of 484 matriculation physics students who had studied the P.S.S.C. physics course in 1966 was tested with this examination and their performance compared with that of the students of the previous physics course who took the examination in 1961 and 1964.

In another study a comparison is being made of the performance of Queensland students studying the P.S.S.C. course and students studying the traditional physics course in Queensland during 1967 and 1968. Hopefully, this will provide evidence on areas in which P.S.S.C. physics is being less successful relative to the previous Queensland physics course than we would like.

The value of any comparative study should be to identify the relative strengths and weaknesses of the courses concerned. It is all too easy to use such a restricted test battery that one course will appear superior to the other when, in fact, if students had been tested on all relevant areas it would be more realistic to expect relative strengths of one course to be offset by weaknesses in other areas.

Another extremely important difficulty in using comparative studies is the selection of the comparison group or comparison course. It is all too easy to line a course up against a wooden-legged competitor and conclude that this course is a far superior course to any other.

(3) COMPARISON WITH EXPECTATIONS STUDIES

Because of the difficulties in comparing one course with another, it is usually more acceptable to compare the achievements of a course with the teacher's expectations of the course. This involves measurement of the change in students that occur as they study the course and a comparison of the observed student achievement and the desired changes in pupil behaviour implied by the objectives of the course. For some purposes it is sufficient to note the performance of students at the end of the course and compare this with our expectations. In other situations we are more concerned with identifying the particular changes of behaviour or achievement that occur as the student studies a course.

A serious difficulty which arises in any attempt to measure changes is in attributing the changes to the course of study concerned. An individual, in the course of a year, undergoes so many different and varied learning experiences outside the course of study that it is extremely difficult, if not impossible, to conclude that any observed change in the individual is a direct result of the course concerned. However, if the gains are not up to expectation it is perfectly reasonable to accept this as evidence of a deficiency in the course, because if the course were successful the students as a group should be expected to achieve the objectives of the course. Thus this type of comparison of the actual outcomes with the expectations of a course is a more powerful tool in identifying weaknesses in a course than in identifying specific strengths of a course. Whereas it might be intellectually satisfying to know that students are achieving the objectives of a course directly as a result of that course, it is sufficient in the educational sense to know that the objectives are being achieved by the students, without being able to say with any certainty that the course can take the credit.

In the P.S.S.C. evaluation projects being conducted by the author, both the technique of considering only the performance achieved by students at the end of a course and the technique of observing the gains made by students as they study a course are being employed in separate studies.

The performance of students at the end of each of the two years of the P.S.S.C. physics course has been used in detailed analysis of scripts for the matriculation and leaving physics examinations conducted by the V.U.S.E.B. in 1966 and 1967. These analyses[3] have yielded valuable information on topics which were proving of difficulty to students studying the P.S.S.C. course and topics or areas of the course in which the teaching was being less successful than desired.

In the project being conducted with the assistance of a grant from the Australian Research Grants Committee, it is intended to obtain information on the changes that occur in students in a random sample of sixty Victorian secondary schools as they study the leaving and matriculation physics courses during 1967 and 1968. In this study an attempt has been made to define precisely the objectives of the P.S.S.C. physics course. This has been achieved by a survey of the literature and by consultation with physics teachers in schools and universities. The difficulty was not in finding possible objectives for the course but in deciding which objectives are the important ones.

A battery of tests has been developed to measure the changes in knowledge, intellectual skills, attitudes and cognitive preferences in students and has been used in February 1967 to test some 1500 leaving physics students at the commencement of their study of the P.S.S.C.

[1] *L. D. Mackay.—"Physics teaching in Victoria", Australian Journal of Education, 12, No. 2, in press.*

[2] *L. D. Mackay.—"A comparative study of the performance of P.S.S.C. physics students (1966) and students of the previous physics course (1964), using the A.C.E.R. Pre-Matriculation Physics Examination", Australian Science Teachers' Journal, 14, No. 1, in press.*

[3] *L. D. Mackay. — Physics Supplement to V.U.S.E.B. Circulars to Schools, Nos. 17 and 20.*

physics course. The same battery will be used to test those of this sample of students who completed leaving physics studies in November 1967 and also to test those who remain of this initial sample at the end of their matriculation physics studies in 1968. In this way it will be possible to observe the changes which have occurred in physics students studying this course on a large number of objectives, and it should be possible to identify areas in which the P.S.S.C. physics course is not as effective as we would desire.

A teacher questionnaire will be used in this study in an attempt to correlate teaching approaches with the performance of students. It is hoped that it will be possible to identify teaching approaches that appear to be inappropriate to the achievement of the objectives of the course.

CONCLUSION

This article has described research being done to evaluate the effectiveness of the P.S.S.C. physics course in Victorian secondary schools. Each of the studies described will make a contribution to answering the question of the extent to which this course is achieving its objectives. There are many similarities between the problems encountered in this research and the problems that every teacher encounters in selecting and improving the learning experiences being given to his students. It would be unrealistic to suggest that detailed research be undertaken before any change be made in a course or in the materials used in a course. However, wherever possible, empirical data should be sought in order that decisions concerning changes in courses or course materials can be made on other than purely subjective grounds. The purpose of course evaluation is not to select the one course or approach in any subject which is clearly superior to all others because there are no criteria on which to make such a decision. Its purpose is to provide information so that a teacher may select from all possible courses the one in which the objectives being achieved are most consistent with the objectives he has in mind for the course.

RESEARCH DIRECTOR FOR SOUTHEAST ASIAN STUDIES

The appointment of Mr. J. A. C. Mackie to the position of research director of the Centre of Southeast Asian Studies indicates the University's awareness of the increasing importance of the study of Southeast Asia. Mr. Mackie's work has been primarily concerned with this area and, in particular, Indonesia.

A graduate of the University of Melbourne where he was reader-in-charge in the department of Indonesian and Malayan Studies before his appointment to Monash on 1 January 1968, he studied also at Oxford, in Holland and in Indonesia. While working in the State Planning Bureau, Djakarta, as an economist he lectured part-time at Gadjah Mada University.

He has published many articles, a monograph "Problems of the Indonesian Inflation" and has been working on a book for the Australian Institute of International Affairs which is titled "Confrontation; the Indonesian-Malaysia Conflict 1963-66".

BOOK BY CHANCELLOR

A book written by the Chancellor, Sir Robert Blackwood, was published in November to mark the occasion of the first decade of the University.

In the course of his foreword the author states:

"This book is not an erudite exposition of university practice. It is in the main a factual record, though necessarily condensed and therefore somewhat incomplete, of the creation and development of Monash University, which has been rapid and spectacular. In only ten years it has grown from its grass roots to a major Australian university with an enviable reputation for scholarship and achievement. A substantial modern campus of high quality, efficient design and attractive appearance has been created, though it is as yet incomplete, and landscaping is not yet fully established. The undergraduate schools are approaching their ultimate capacity and the postgraduate schools are developing rapidly in strength and quality. Its high standard and reputation are widely recognized overseas. It seems appropriate therefore to record the history of its initial years of establishment at the end of the first decade".

CHAIR AT ADELAIDE FOR MONASH STAFF MEMBER

Dr. Graeme Campbell Duncan has been appointed professor of Politics at the University of Adelaide. He will be, at thirty-two, the youngest professor of Politics in Australia.

He has had a brilliant academic career at both the University of Melbourne and the University of Oxford. In 1957 he graduated Bachelor of Arts from Melbourne University with first-class honours in history. In 1959 he was Rhodes Scholar for Victoria. Distinguished work in political theory gained him his Bachelor of Philosophy at the University of Oxford, and this year the University awarded him a Doctorate of Philosophy for a critical comparison of the theories of Karl Marx and J. S. Mill.

Dr. Duncan, at present senior lecturer in the department of Politics at Monash, is well known for news commentaries on the A.B.C. Early this year he was given a grant by the Ford Foundation for a study of the Viet Cong.

SPACE CONSULTANT FOR MONASH

A consultant to America's Space Technology Laboratories, Professor Yuan-Cheng B. Fung, will come to Monash in 1969. He is professor of Bio-engineering and Applied Mechanics at the University of California.

He is regarded as a world leader in the fields of biomechanics and aeroelasticity and is consultant to a number of leading aviation firms in the United States. He took out his Master of Science degree at Central University, Chungking, in 1943 and obtained his Doctorate of Philosophy at the Californian Institute of Technology in 1948.

The University Council has decided to confer on him the title of Visiting Professor.

OPENING OF THE LAW SCHOOL

The law school, named the David Derham School of Law, was opened on Wednesday 10 July by Professor David Derham, C.M.G., M.B.E., B.A., LL.M., Vice-Chancellor of the University of Melbourne and first dean of Law at Monash. At the ceremony the Chancellor conferred the degree of Doctor of Laws *honoris causa* upon Professor Derham.

The building is four storeys high and is faced in manganese bricks to match adjoining buildings. On the ground floor is a broad, brick-paved concourse which serves as an area for examinations, assemblies and student discussion. Around this concourse or forum are grouped the teaching rooms: eleven tutorial rooms and two seminar rooms with specially-designed tables, the moot court and two lecture theatres shaped like horse-shoes so that students and teacher can easily see and hear each other.

The moot court seats 103 people. It is a fully equipped courtroom, having a raised bench with chairs for three judges, a bar-table, desks for a judge's associate and a shorthand writer, and a witness stand.

The greater part of the building is, as it should be, devoted to the law library. This extends over much of the first, second and third floors and its facilities are designed to meet the special needs of law students.

In his address the Chancellor welcomed guests and, in particular, the deans of law schools in other States who had come to Monash for the official opening of the law school.

Speaking of the difficulties which had faced the faculty of Law before the completion of the law school, Sir Robert Blackwood said:

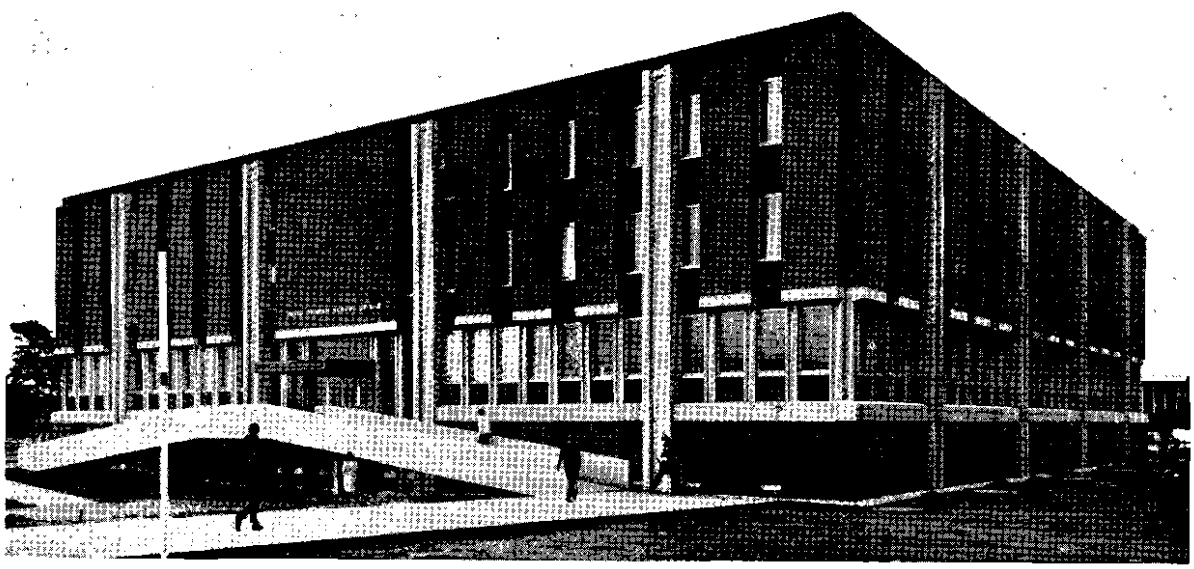
"When the law classes began in 1964 they had to be held in temporary quarters in the Hargrave Library, and after a while the space was added to by allowing them to infiltrate portions of the science buildings and the engineering school. Nevertheless, they were considerably cramped and hampered in their work, and the work of the faculty was certainly difficult under those circumstances. But relief was in sight when the Universities Commission approved the construction of a permanent building for the faculty, a permanent law school, in the 1967-69 triennium, and Professor Derham and his team had already prepared the plans for this building that you are in today. We were therefore able to complete the details of it quite quickly and we were able to let a contract for its construction in October 1966. Building went on all through last year, and it was completed just in time for the opening of the present academic year."

The Chancellor went on to contrast the new conditions with the old. He congratulated the law school staff who, with Professor Derham, were responsible for the general planning, the architects, Messrs. Eggleston, Macdonald and Secomb, and the builders, A. R. P. Crow and Sons, on the admirable design and construction of the new law school.

Of Professor Derham he said:

"The Council of this University was indeed fortunate to be able to obtain the services of Professor Derham when it was decided back in 1963 to create a faculty of Law and to institute degree courses in law. That he was able to stay with us only for a period of about four years is a matter of great regret as far as we are concerned, but it is tinged with pride that he was appointed to his present position as Vice-Chancellor of the University of Melbourne. In the time that he was with us, even though it was short, he was responsible as the dean of Law for the development of law courses in this University, somewhat unique in character, and also for the design of the law school that we are now opening".

In the address in which he presented Professor Derham for admission to the degree of Doctor of Laws *honoris causa*, Professor Peter Louis Waller, acting dean



The David Derham School of Law

of the faculty of Law, told of Professor Derham's great contribution to the Monash law school and to university teaching of law in Australia generally.

He spoke of the changes which had taken place in Australian law schools since the end of the second world war, the most conspicuous of which had been the increase in the numbers of full-time students of law, the large and still growing faculties of full-time teachers, and the differences in the organization of degree courses, in the curriculum and in the modes of teaching law.

He described the lively concern that Professor Derham has shown for the development of university law teaching, for the relations between university studies in law and the demands and standards of the legal profession, for the relation between the study of law and that of other disciplines and for the development of law as part of a liberal education for those interested in man and his social relations and behaviour.

Professor Derham had encouraged his colleagues to consider and reconsider their approaches to the teaching of law and to the stereotyped practices of another time. He also encouraged them to pursue their own research and to maintain strong links with law schools throughout Australia and in England and the United States.

Despite the heavy responsibilities of his teaching and his office as dean, he undertook many important tasks in the community. He was a part-time Commissioner of the Australian Universities Commission; a member of the Commonwealth Committee on the Future of Tertiary Education in Australia; a member of the Chief Justice's Reform Committee; a member of the Victorian Council of Legal Education; and a member of the Legal Education Committee of the Council of Legal Education, responsible for the courses for articled clerks given at the Royal Melbourne Institute of Technology.

Continuing his address, Professor Waller said:

"David Derham was appointed as the first dean of Law on 13 October 1963. It was an appointment which was generally acclaimed because of his reputation as a legal scholar, as a law teacher and as a scholar and teacher deeply concerned in the development of law teaching was already established. He accepted the responsibility of instituting teaching in law as quickly as possible, and the first classes were held in March 1964. He early expressed the view that law students at Monash University must be given the opportunity, and be placed under the obligation, to pursue studies in disciplines outside the law. He did not want law students to be without history or literature, philosophy or economics, to be, in Scott's phrase, 'mechanics, or mere working masons'. In possession of some knowledge of these disciplines, they might venture to call themselves architects. Accordingly, he formulated plans which provided for a first degree in law — Bachelor of Jurisprudence with its basic core or legal subjects together with studies in the humanities, economics or the natural sciences. This was to be followed by further study for the Bachelor of Laws, requiring the mastery of a wider range of legal subjects and serving as a qualification for professional practice. His plan was accepted by the University and then brought to life under his careful and imaginative direction".

In responding to Professor Waller's citation, Professor Derham said:

"I want to thank this great University for the honour it has done me today — I could, I think, say — 'for the honours it has heaped upon me today'. I am a little embarrassed to be addressing you here on this occasion because I know that these honours are more than I deserve. But if I were to demonstrate that, I would be criticizing the judgement of men I respect and admire and of a University for which I have the highest regard and admiration.

"Perhaps I should say little more on that matter than thank you — and I do say thank you most sincerely.

"This day and this ceremony mark the firm establishment of something which I believe to be of very great importance indeed. When a great law school is seen for the first time to be firmly established, as this law school now is, only the beginning of a great achievement has been completed. The full recognition of the nature of the achievement will not come until long afterwards when the next generation sees what the men and women who pass through the school have done for the nation and for the world. But the successful establishment of the school in the beginning is itself an achievement, and I see my place in today's ceremonies really as a symbol of that achievement and not more.

"For these things are not done by one man, nor by two or three men. They are brought about by many men contributing their talents, their work and their enthusiasms to the attainment of a common objective. There are now too many whose diligence and devotion have brought this law school to its present place for all of them to be named and thanked on an occasion such as this. It should be remembered, however, that it is not only the small group of lawyers who, with quaking faith, took responsibility for the original venture, nor only the fifty or so imaginative lawyers who have been concerned with nurturing the school since those early days; it is not only those who made the present achievements possible. It is also the leaders of the other faculties in this University and the senior members of the University's administrative staff who made success certain, for without the co-operative and imaginative work of all of them success in the time given would have been impossible.

"It is a remarkable thing that a University presided over by an engineer Chancellor, and an engineer Vice-Chancellor, neither of whom, I suspect, has any special reason to love the law, should have established this law school with its special characteristics in a mere four and a half years. I do not believe that there is another university in the United Kingdom or in Australasia, perhaps not in the common law world, which could have done so well in so short a time. But when law teaching began here a mere three years after the first students were enrolled to read in other faculties, Monash was already accustomed to doing things quickly, and with enthusiasm".

Professor Derham went on to consider the fundamental place of law and of legal systems in all human communities. Then, turning to the fashioning of the law courses at Monash, he said:

"A learned and perceptive critic once said of the greatest of our common lawyers, Sir Owen Dixon, that throughout his judicial career he struggled with a dilemma produced by his belief in the need to maintain the authority of the law, on the one hand, and by his desire to eradicate error, on the other.

"I do not believe that is a true dilemma. What may be true is that to resolve the apparent dilemma is the lawyers' primary task; and that the secret of success is to be found in the dimension of time. It is certain that success is not possible without looking outside the limits of the formal rules of law to the interaction between law and life.

"There were other reasons, it is true, but those were the fundamental reasons why, at Monash, a new kind of law course was devised for this University's law degrees.

"The course for the first degree was designed to provide a basic university education with almost equal required reading in non-legal subjects as in the law; and only the second concentrated upon legal subjects with the practice of law in view. That plan made a five- instead of a four-year course essential. But that was a small price to pay if the foundations were laid to build for a greater capacity to resolve the apparent dilemma I described earlier.

"One result of the establishment of those two degrees is that the Monash LL.B. degree as such is a mark of a more balanced and complete university attainment than any LL.B. degree I know in the United Kingdom or Australasia. In many universities of those regions the requirements of the Monash LL.B. degree would justify the conferring of the degree of Master of Laws.

"With the staff of this school and the physical advantages of this building also in mind, I have no hesitation in assuring the graduates of this school that the standards they satisfy here are as high as any in the common law world. They can be proud to be graduates of Monash University as I am proud to become an honorary graduate of Monash today.

"I am greatly honoured today to be asked to open this building and with much pleasure I do now declare this law school building open".

Professor D. P. Derham receives his honorary degree from the Chancellor (left). Seated, Professor P. L. Waller, acting dean of the faculty of Law

LEARNING EXPERIMENTS WITH FISH

By R. F. Mark, Senior Lecturer, Department of Physiology

During the last thirty years we have lived through a golden age in the experimental investigation of the brain. More than anything else, the advance has come through the ability to record in isolation the electrical activity of single cells amongst the millions that make up each brain. Properly done, this allows the piecing together of a mosaic of response patterns of individual neurones and gives a degree of understanding of the mechanism of the brain that was not possible before. The same techniques, pushing modern electronic methods to the very limits of resolution, have been applied to the biophysical mechanisms of the individual nerve cell, and now there seems no reason why the description of nerve cell signalling should not soon reach the level of single molecules and be described in the same terms as the chemical basis of life itself.

Yet the two aspects of brain function that have the greatest medical and scientific interest have been almost untouched by this advance. These are firstly the understanding of the detailed growth and development of the brain, with all the implications for knowledge of normal and abnormal mental development, and secondly the mechanism of the long-term changes in the brain that must underlie processes of perception and memory. The problems are so difficult that only as a result of recent knowledge has it been possible to put them in scientific terms in which they can be analysed by simple experiments. Even so the complexity of the human or mammalian brain makes the going very difficult. As so often in science one looks for a model, retaining the properties of interest but leaving out that which is confusing and probably irrelevant. It becomes of very great importance then to know whether lower animals and simpler forms of life see and feel and remember as we do. The more primitive the animal the simpler the brain and the easier in theory is the analysis of its physical mechanism. For this reason, in the Physiology department of the medical school, the visual and learning abilities of fishes are being studied in detail and the contribution of various parts of the brain to these abilities is being examined.

WAYS OF TEACHING FISH

There is a long history of experiments on training fishes to respond to various visual stimuli and it proves quite easy to teach even the common goldfish to recognize lights, colours and sounds or more complicated patterns such as printed letters of the alphabet. The art of doing so is to make it possible for the fish to reveal his choice by some clear change in behaviour. There are numerous methods. The illustrations show some ways, all of which are in use in our laboratory, in which this can be done. Fig. I is a diagram of an arrangement that can teach a fish to respond to a sudden increase in light level by leaving the lighted area and swimming to a darkened part of the tank.[1] A hurdle going almost to the surface of the water divides a tank into two iden-

[1] *Steiner, J. and Mark, R. F. — Are memories stored in the fish tectum? Aust. J. Exp. Biol. Med., 1968, (in press).*

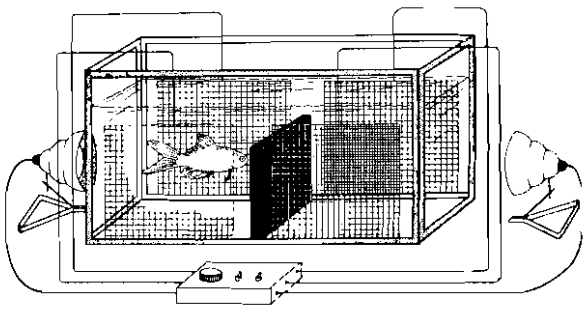


Fig. 1. Apparatus for avoidance conditioning of fish. Reproduced from Mark & Maxwell: Circle-size discrimination in cichlid fish, Animal Behaviour, Vol. XVII, 1969, in press

tical halves. At each end there is a light and in each compartment there is a pair of stainless steel grids between which a weak electric current may be passed. The light is turned on for a few seconds and then the current passed intermittently across the lighted compartment. Such currents do not shock or paralyze but, presumably because of direct stimulation of skin nerve endings that are sensitive to water pressure, fish will swim out of an electric field into quiet water. In this case it means crossing the barrier into the opposite compartment. After a rest period the pairing of light and electric current is repeated on this side and the fish escapes back the way he came. Repeated pairing of light and current soon leads to the fish leaving the compartment as soon as the light comes on. We have found that very slight damage to the optic lobes of the fish brain interferes with the ability to learn this task, quite out of proportion to the effect on visual recognition or on swimming ability. Further studies of the critical brain tissue may help to define structures necessary for perception and memory.

Before drawing strong conclusions from this or any other experiment it is necessary to check that the defect induced by brain damage is not specific to just one behavioural situation. In the experiments just described only the active avoidance of the electric current may be depressed while the fish's awareness of what is about to happen after the light goes on may be quite unimpaired. This difficulty can be overcome by using other learning situations designed to complement the first by employing different behavioural indices of learning. For example, if the light is made very bright or if it comes from below the tank a fish will naturally leave the brightly-lit compartment for the darker one. Passing current across the darker side will now deter fish from entering and they will soon learn to stay on the bright side. The situation now becomes one of passive rather than active avoidance, the brain mechanisms underlying which are not necessarily the same even if the process of visual perception is identical in both cases. Again, if the light is omitted altogether and the current periodically passed but is interrupted and delayed by, say, twenty seconds each time the fish crosses the barrier, he will begin to swap sides every so often and keep out of trouble by this alone, without any periodic visual cues.

TEACHING BY REWARD

An entirely different approach uses food as a reward for various kinds of behaviour. When paired consistently with other sensory stimuli, fish quickly show that they are capable of learning to discriminate most accurately. An early German investigator simply fed fish with bait on a two-pronged fork, one prong having a piece of food on it and the other a piece of inedible material that looked like the food. The double lure was presented in front of a pair of cards of different colour or brightness or which carried different stimulus patterns. Fish came to associate food with one of the patterns and would approach it in preference to the other. Such a simple system has many disadvantages, the most obvious being that the fish might smell the difference between the two baits and learn this rather than anything else. Fig. 2 shows a variant of the method that avoids this uncertainty by floating the bait above the water on cork floats.[1] The edible and dummy baits are stuck to the underside of a translucent plastic sheet and then both are concealed by a drop of opaque

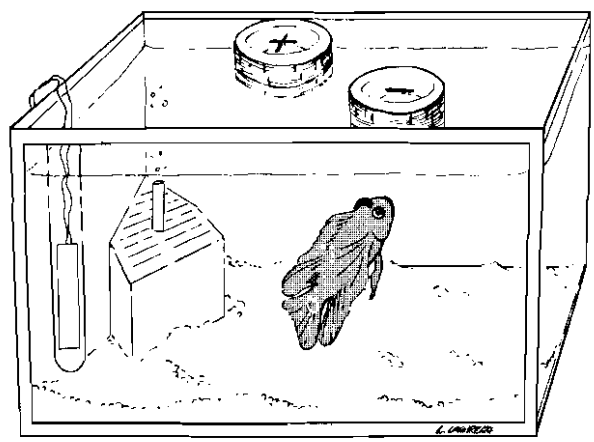


Fig. 2. Method for teaching fish to recognize patterns (courtesy of the Academic Press, New York)

blue liquid. The fish sees the stimulus patterns in silhouette and reaches the baits stuck beneath them by putting his head out of the water up through the middle of the ring. Although quite reliable and rapid, training each animal must be done by hand, which is instructive to begin with but quickly becomes boring, time consuming and inefficient. Like so much else nowadays this can be circumvented by automation.

It is not necessary to attach the bait directly to the target for fish will learn to perform quite arbitrary acts to obtain food if there is a constant relationship between the operation they carry out and the reward. An automatic food dispenser can be built to supply a small amount of food on receipt of an electrical signal and a switch can be rigged up which the fish himself can operate by nosing a paddle that dangles in the water.[2] Teaching must go through easy stages. First the fish are

[1] *Mark, R. F. — The tectal commissure and interocular transfer of pattern discrimination in cichlid fish. Exptl. Neurol., 16, 215-225, 1966.*

[2] *Mark, R. F. — A simple dry-food dispenser for automatic fish training. J. Exp. Anal. Behav., 10, 191-192, 1967.*

trained to eat the kind of food that is to be used. Then the automatic dispenser is placed over the tank and controlled by the experimenter who releases a few grains of food each time the fish swims near. Soon the fish comes over to the dispenser when hungry and waits for food to come out. The next step is to connect the dispenser to the paddle switch which is lowered into the water with a piece of the same food firmly stuck to it. The fish attacks the paddle to take the food and the dispenser automatically drops a few grains down from above. Before long he is pushing the paddle to operate the dispenser and once this stage is reached discrimination training can begin. The paddle is now placed near the side of the tank and a miniature slide projector mounted outside so that the slides are seen from inside the tank through the transparent paddle. One or two of these units can be used together (Fig. 3). Automatic equipment selects the stimulus pattern to be presented and switches connections between the paddle and the reward dispenser so that only one pattern is consistently

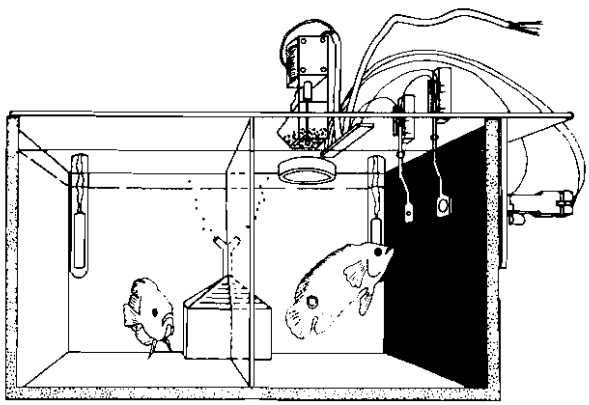


Fig. 3. Automatic apparatus for studying visual learning of fish (courtesy of Baillière Tindall and Cassell Ltd., London)

rewarded. In our laboratory a small fixed-programme computer does the job of displaying patterns, recording responses and dispensing food.[1] Given thirty minutes or so a day with this apparatus, some fish can learn to discriminate between a circle and a triangle, for example, in a matter of a few days. Thus even with only one set of equipment several fish can be trained at once and the results are free from any bias that might creep in when the training is done by hand.

WHAT CAN WE LEARN?

Research with this kind of equipment can branch out in three main directions. First, the limits of fish intelligence can be tested and compared with those of other animals placed in similar situations. Differences can then be correlated with differences in brain structure and so theories of the function of various parts of the brain can be put up for experimental test. Secondly, knowing the normal performance of fish, surgical operations may be made to remove parts of the brain or drugs may be administered and subsequent behaviour measured. Experiments like these have narrowed the search for brain mechanisms in visual learning in fish to certain well-defined anatomical regions of the mid-brain, and these regions are now being studied by the technique of recording the electrical activity of single cells that was mentioned earlier.[2,3] If analysis of this comparatively simple situation should be successful in leading to a physiological theory of learning or perception in fish, there is every likelihood that it will apply in principle to other vertebrates, including man.

Lastly, with accurate laboratory methods of measuring behaviour we can make use of the remarkable ability of fish brain to recover from injury by regeneration of the missing parts. Already much work has been done on the ability of severed optic nerves in fish to regrow into the brain and restore vision to the blinded eye. We believe that the mechanism of this patching-up process, which unfortunately does not occur in the higher vertebrates, is the same as that responsible for the initial organized growth of the brain. Many fundamental problems of brain development are laid open to easy laboratory analysis by controlled regeneration experiments correlated with behavioural testing. Once again we are looking for principles that will apply to all the vertebrates, but whereas in the higher mammals and man the complexity is overwhelming, here at least is a place to begin.

THE GREAT HALL UNDER CONSTRUCTION

The Great Hall, designed by Roy Grounds who was the architect for the Victorian Arts Centre, will be a significant contribution to Australian architecture.

The basic structure of the Hall will be a concrete frame, clad both internally and externally with brickwork. Floors, except for that of the stage, will be concrete.

The building will be of irregular shape to contrast with the regular buildings already lining the Forum. A twenty-four foot diameter stained-glass window designed by Leonard French will be set in the west wall which will emphasize the contrast with its strongly sculptured pre-cast concrete framework.

The main purpose of the Hall is to provide a suitable setting for academic ceremonies, conferences and conventions, lectures, musical performances and University examinations. There will be 1,003 seats on a sloping ground floor and 342 seats on a stepped balcony. The seven front rows of audience seating can be removed and the stage extended to accommodate a 100-piece orchestra and a choir.

Equipment in the Great Hall will include: mechanical ventilation, heating by warm air and hot water coils, projection booths, an amplifying system, variable lighting, and changing rooms below the stage.

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[1] *Mark, R. F. and Maxwell, A. — Circle size discrimination and transposition behaviour in cichlid fish. Animal Behaviour, 1968 (in press).*

[2] *Johnstone, J. R. and Mark, R. F. — Do efference copy neurones exist? Aust. J. Exp. Biol. Med., 1968 (in press).*

[3] *Mark, R. F. and Davidson, T. M. — Unit responses from commissural fibres of fish optic lobes. Science, 152, 797-799, 1966.*

SOCIAL VALUES AND OCCUPATION

By R. Parsler, Lecturer in Sociology

This is a short report on a sociological survey which is still in progress. It was planned by Professor Marwick and myself as a development of the "Newriding" community project which had been undertaken in 1965-66. "Social values" are defined as goals of social action, and occupationally we take the broad strata of blue-collar workers (semi-skilled and skilled), white-collar workers (the lower echelons of non-manual workers) and middle-class workers (non-manual workers usually requiring qualifications and education).

It was planned as a three-year project to cover Melbourne and Sydney and to provide a sufficiently large sample, by personal interviewing, to be able to generalize in a statistically valid way about the whole population of these cities. The actual grant obtained for this work, however, was so much smaller than the sum asked for that all thoughts of a survey covering Sydney had to be abandoned. It was also evident that personal interviewing, which is relatively expensive, would have to be drastically curtailed. Further, since we had no idea if the grant would be continued after the first year, the conception of the project as a coherent three-year plan was abandoned and a plan devised which was, we hoped, flexible enough to be able to contract to meet further financial stringencies or to expand if more money were made available.

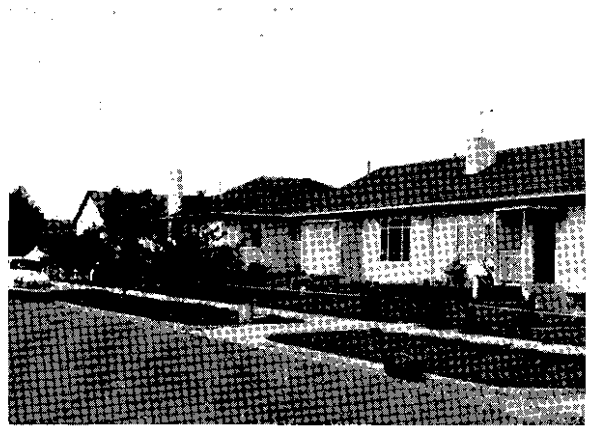
The plan is now in four parts: (1) a postal questionnaire survey of a sample of the people from three of the south-east suburbs of Melbourne; (2) personal interviewing of a sample of those already contacted by post in the south-east suburbs (these areas are convenient to Monash and therefore less expensive for personal interviews); (3) a postal questionnaire survey of a sample of people from three suburbs north of the Yarra; (4) personal interviewing of a sample of those already contacted by post in these suburbs; (5) personal interviewing of a sample of people from a country town.

There are two main sets of hypotheses used in this study. Firstly, a set of orienting hypotheses that state, in various ways, that social value differences exist between blue-collar and white-collar workers and the middle-class group of workers. Secondly, Lockwood's[1] "limiting" types or "ideal" typology of blue-collar workers are treated as sets of hypotheses.[2]

These "limiting" types are:

1. The traditional proletarian worker. This type is associated with industries that tend to concentrate workers together and to isolate them from the influence of wider society. Job involvement is high, work groups are strongly integrated and have considerable freedom from supervision. Feelings of fraternity and comradeship, which come from shared occupational experience, are expressed through an occupational culture. Work-mates are normally leisure-time companions; often, neighbours and kinsmen. Overall, the "traditional" working-class community is close-knit. It is an inward-looking society. Social consciousness is of the order of "us" and "them".

2. The traditional deferential worker. This type has as his model of society one of hierarchy rather than of power or the "us" and "them" dichotomy. He defers to his superiors socially as well as politically. His work role brings him into direct association with his employer and other middle-class people who influence him and hinder him from forming strong attachments to workers



Housing in a low-cost estate

Housing in an affluent suburb

[1] *David Lockwood — Sources of variation in working-class images of society. Sociological Review, November 1966.*

[2] *Percy S. Cohen — Modern Social Theory, Heinemann Educational Books, London, 220, 1968.*

in a similar market situation to his own. These conditions are most likely to be formed in small towns and rural areas, but also, of course, anywhere where the relationship between employer and worker is personal and particular.

3. The "privatised" worker. His model of society is pecuniary. Class divisions are seen mainly in differences in income and material possessions. He is likely to work in a large factory. His involvement in his job and his attachment to the enterprise and to his fellow workers are slight. He does not form cohesive groups with other workers either inside or outside the factory. Work is a necessary evil. His work situation (relative to the other two types) is socially isolating and socially meaningless. His community life is centred in the low-cost housing estates whose population has two things in common, residential mobility and a livelihood involving manual labour. His status order is based on conspicuous consumption.

Lockwood intended these types to apply to manual workers, but the variables involved seem sufficiently general in society to make it interesting to test them against the white-collar and middle-class strata as well.

The only part of this study that has been carried out so far is the postal survey of three of the south-eastern suburbs, and the analysis of the results of this has hardly started, so the rest of this note must be confined to a description of how this survey was carried out.

The three districts were selected according to the likelihood of each yielding a stratified random sample of almost 300 people from the electoral rolls who would belong to either the blue-collar group, the white-collar group or the middle-class group. There was nothing special about this approximate figure of 300 except that it was thought to be financially possible to send out about 900 or 1,000 questionnaires but not many more.

The lists used for sampling were the latest electoral rolls obtainable and the Sands and McDougall *Directory of Victoria 1967*.

Postal surveys are not usual where personal interviewing is possible since the response rates tend to be low and a thirty to forty per cent return would not be considered bad. There seemed to be four main factors which suggested that the response rate for our questionnaire could be very low. First was the length of the questionnaire; there were fifty questions, some short and easy to answer, and others more complex and rather long. Secondly, the sample was not any special part of the population (e.g., members of an association) but was, apart from the occupational groupings, entirely unselected — in fact the kind of sample which most studies suggested would yield a response rate so low as to be useless.[1] Thirdly, this survey could in no sense be called an "official" one, that is, it could obviously not rely on the sense of duty, compliance and self-interest which assist the response rates in, for example, a survey carried out by a government department. Fourthly, a third of our sample was from the blue-collar stratum and previous studies suggested that the lower the educational level, the lower the response rate.

[1] *W. G. Goode and P. K. Hatte — Methods in Social Research, McGraw-Hill, New York, 174, 1952.*

[2] *Stanley S. Robin — A procedure for securing returns to mail questionnaires. Sociology and Social Research, L, No. 1, October 1965.*

A careful search of the available literature on postal surveys was made and, of all the writers on this topic, only one seemed to have at least a partial answer to the difficulties.[2] None of the methods advocated was new but Robin's technique involved a careful blend of methods already tried separately in the past. The essence of this method was to present an interesting questionnaire after an introductory letter and to follow up with several carefully-phrased reminder letters. In every case the letters were made to look as "personal" as possible.

Our introductory letter was sent out to 900 heads of households on 29 November last year. The letter explained the purpose of the research and that the individual was requested to help by filling in a questionnaire which was to follow. It was emphasized that the individual's identity would remain confidential and that he was selected from a random sample. The respondent was thanked for his assumed co-operation.

Six days later the questionnaire and covering letter, together with a stamped, addressed envelope for the return of the questionnaire, were posted. The covering letter again emphasized the confidential aspect and repeated several more of the points from the introductory letter. On 12 December, if the individual had not already replied, the first reminder letter was posted. This reminded the individual of the importance of his contribution to the research and again thanked him in advance for his co-operation.

Three days later, if no reply had been received, a second reminder was sent together with a second questionnaire and another stamped, addressed envelope for the return of the questionnaire. This letter suggested that as we had not heard from the individual he might have mislaid the questionnaire and, in case he had, we were enclosing a second with another stamped, addressed envelope.

Six days after this a third reminder letter was sent if there was still no response. This time the individual was invited to get in touch with the department by phone or letter if he had lost both previous questionnaires and another would be sent. No intimation was given that this would, in fact, be the last reminder letter.

The actual final response achieved by using this kind of approach was as follows.

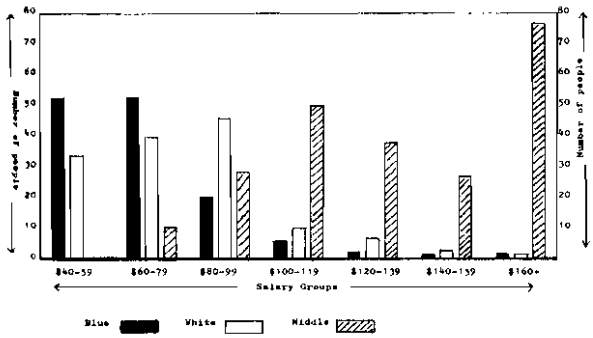
This represented a total response rate of sixty-nine per cent, which is amongst the best recorded for this kind of survey.

	Blue-collar	White-collar	Middle-class	Total
Questionnaires completed and returned	203	202	217	622
Not heard from at all	50	50	42	142
Moved from address	13	19	11	43
Deceased	3	2	4	9
Other non-responses for various reasons	31	27	26	84
	300	300	300	900

It is interesting to note that the response from the blue-collar group was almost equal to that of the white-collar group, and both were only a little below that of the middle-class. This is contrary to the response rates recorded from other studies where the blue-collar group, with the lowest level of education, has the lowest response rate.

The coding of this questionnaire, even though most of the questions asked were "closed" questions (that is, asked for a response from amongst a predetermined list of answers or for a simple "yes" or "no"), proved to be a more laborious task than expected and was not completed until July. The first preliminary frequency count is now available but the full statistical analysis of the data is not yet completed.

The histogram below gives the income break-down of the first sample from the south-eastern suburbs.



Income per week in dollars ($A) of heads of household from a sample from three south-eastern Melbourne suburbs

TELEVISION DEVELOPMENTS

One of the features of the University has been the use of television equipment on the campus, and progress in this field has been reported by the Audio-Visual Aids Officer, Mr. E. C. Snell.

The University television equipment, although situated in the medical school, is available for use anywhere on the campus. If a high quality signal is to be videotape-recorded from an area where no cables exist, a microwave link system is used to transmit signals from the mobile television unit to the roof of the medical school, then down to the videotape recorder.

There are a number of cables which connect the medical school to the Menzies building. These cables are designed to carry the picture, sound and intercommunication signals. Additional cabling was recently installed between the Menzies building, circular lecture theatres and the Alexander Theatre. The next cable installation will be to the law school and the main library has also been asked to consider the installation of permanent cabling.

It is therefore possible at the present moment to originate a telecast from any point on-campus, transmit it via the microwave link to the medical school and then to any of the existing outlets in the Menzies building, circular lecture theatres or Alexander Theatre. The cable is designed to operate in both directions.

DEVELOPMENT OF WATER RESOURCES AND RESEARCH

By T. A. McMahon, Lecturer, Department of Civil Engineering

Planning is stimulated by crisis. The recent droughts in Victoria and New South Wales are no exception in this regard, and considerable discussion has occurred in the national Press and elsewhere on how the effects of such occurrences can be minimized in the future. In Melbourne, many citizens have expressed their opinions concerning the crisis last summer. In view of this it seems appropriate to comment on several issues relating to the development of water resources.

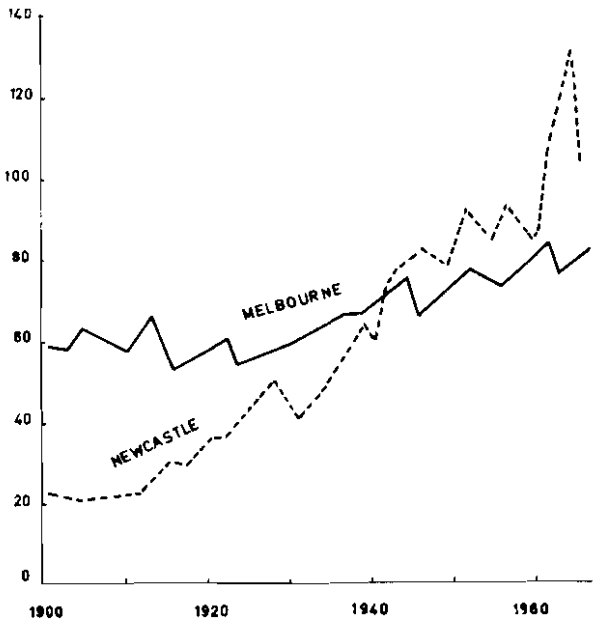
While within the Australian environment the vagaries of Nature are an ever-present problem, particularly in regard to variability of rainfall and streamflow, a more subtle problem which, in some regions, has already confronted planners and politicians, is competition among users for a limited water resource. In 1962, the Melbourne and Metropolitan Board of Works suggested diverting water from the Big River, north of the Divide, into the metropolitan system. Inevitably, agricultural interests opposed the scheme and — it would seem for political expediency — the MMBW was directed to seek additional supplies south of the Divide. In this context, it is worth noting that in Victoria we use annually more than 2,500,000 acre-feet of water. Eighty-five per cent of this is channelled to agriculture and the remainder is used for domestic and industrial purposes.

To-date, in Australia, political action has temporarily forestalled any crisis developing in the competition for water supplies and, consequently, research programmes in water resources allocation techniques are not receiving sufficient attention.

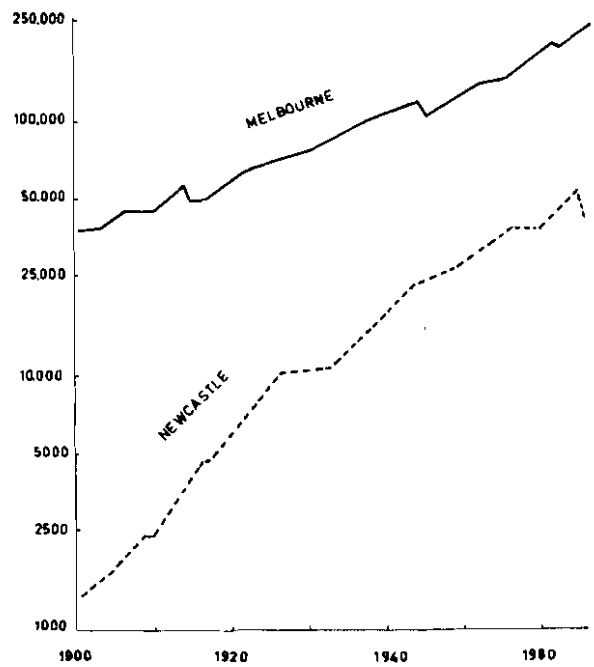
In the meantime, however, water authorities are developing, as funds become available, the supplies at their disposal and at the same time are making a continuing assessment of demand and supply for water in an attempt to rationalize distribution. For this to be successful, planning should be carried out at two levels. The first should be based on projections into the near future, say five to ten years, during which it can be confidently predicted that the present trends, adjusted for changes in technology, can be reliably extrapolated. On the other hand, in order that an overall objective or master-plan can be formulated, a longer planning period is also required. In our present circumstances, a period extending to the year 2000 seems appropriate.

On examining urban water needs, two general problems are evident. Firstly, there is one associated with growth. In most circumstances, not only do we find an increase in population and, hence, more water required, but also with increasing affluence an increase in per capita consumption. This feature is dramatically shown in the accompanying graph of Newcastle's water usage. Per capita consumption has increased from twenty gallons per day in 1900 to 130 in 1965. Nearly two thirds of this is used in and around the house. The significant reasons for this tremendous growth are not clear. In contrast, a similar analysis for Melbourne shows an entirely different picture; consumption from 1900 to 1965 increased from 55 gallons per day per capita to only 80. In view of these differing consumptive rates, and because

projections of water requirements are based on per capita estimates, a study has been initiated in the department of Civil Engineering at Monash University to determine the more important factors affecting domestic and industrial per capita water use.



Per capita domestic and industrial water consumption in gallons per day for Melbourne and Newcastle



Yearly domestic and industrial water consumption in acre-feet for Melbourne and Newcastle

The diagram showing Melbourne's water consumption points to a second difficulty associated with Australian urban water resources planning. Can water engineers continue to provide a relatively low-cost supply to metropolitan population centres which require increasingly greater volumes of water each year? By extrapolating the graph for Melbourne, we can estimate that the per capita daily consumption in the year 2000 will be around 105 gallons. Coupled with a population of, say, 5,000,000 people, this means that about 700,000 acre-feet of water will be required per year by the end of this century. (For present purposes, the assumptions associated with making this estimate can be ignored). Until now, Melbourne has relied upon the Yarra basin, which has a mean annual flow of approximately 1,000,000 acre-feet, to provide her water needs which are currently about 250,000 acre-feet per year. Firm proposals have been put forward by the MMBW to gain additional water from the Yarra and to extend the supply areas to the Thomson catchment in Gippsland which is a potential source of 500,000 acre-feet per year. Thus, within the next few decades adequate water can be made available for our garden city but, because the most economic dam sites have already been utilized, additional supplies will be more costly to the taxpayer. This factor could force the community into a more realistic approach towards accepting reclaimed waste water rather than developing high-cost 'pure-source' supplies.

In water-supply schemes, whether these be for domestic and industrial usage or for irrigation, the optimum size of the headwater storage is a critical factor. A second current project within the Civil Engineering department is concerned with theoretical and practical aspects of estimating required reservoir capacities to satisfy a given demand. An important consideration relating to this concerns the level of reliability associated with the specified demand. Unfortunately, critics of public projects often overlook this essential feature. It is important to keep in mind that a water resources system, whether it be constructed as a flood-mitigation scheme or as a conservation measure, will have some element of risk associated with the functions for which it is designed. Thus, in public works projects, and particularly in the case of water supply, reducing the risk of failure inevitably entails greater costs for the taxpayer.

A fundamental requirement in designing a water-resources system is a knowledge of the temporal and spatial streamflow patterns and their significance in the hydrologic cycle operating within the area. More often than not, streamflow information is not available at a given location, and hence the water-supply engineer is forced either to compute deterministically a sequence of data which approximate past records, or to generate by a stochastic (that is, probabilistic) procedure, a series of events which is assumed to represent the likely variations of future flow.

Modelling the rainfall-runoff process using a digital computer is the subject of a third research project. It is hoped that not only will the model be a means of computing streamflow records from rainfall information but also that it will allow a deeper insight into the hydrologic processes operating within a river basin.

OBITUARY

ASSOCIATE PROFESSOR ELWYN MOREY

Associate Professor Elwyn Aisne Morey died in a road accident near Sydney in January of this year while travelling between Melbourne and Sydney. She was fifty-three.

There would have been few people whose tragic and untimely death so profoundly affected a large and varied circle of friends, associates, colleagues and students, for although Elwyn Morey had occupied university posts in Australia and abroad since 1948, many of her professional interests and activities were outside the world of academic affairs. Among the institutions and groups with which she was closely involved were the Australian Pre-School Association, Victorian College of Speech Therapy, Australian Council for the Rehabilitation of Disabled, and the Society for the Scientific Study of Mental Deficiency. There were numerous other groups, societies and institutions which made frequent demands on her time. At the time of her death she was closely involved with the development of the Monash Child Study Centre in the faculty of Education, and with Rossbourne House, an independent school for slow-learning children.

Associate Prof. E. Morey

Elwyn Morey graduated in English language and literature from the University of Melbourne in 1935 and later successfully undertook her Diploma of Education (1936), Master of Arts (1939), and Bachelor of Education (1940) at that University. She began her working career as a secondary-school teacher, teaching in both Victoria and the United Kingdom. Her interests later turned to educational psychology and she took up a research assistantship with the Australian Council for Educational Research. When travel abroad was again possible after the war she completed her Ph.D. in educational and vocational psychology in the University of California at Berkeley, returning to Australia in 1948 to take up a lectureship in psychology in the University of Western Australia. She returned to the University of Melbourne in 1957 to a senior lectureship in psychology and in 1961 accepted a similar position in the department of Education at the University of Melbourne. She came to Monash in 1965 to establish courses in educational and clinical psychology in the faculty of Education.

DEEP INTERESTS IN THE HANDICAPPED

Although at first sight Dr. Morey's activities and many involvements appear to have been extraordinarily wide and diversified they were, in fact, closely linked by a common concern. Elwyn Morey was primarily interested in and deeply concerned with those who for reasons of birth, accident, illness, age, or psychological disturbance were handicapped in their adjustment to school, work, or other people. Her single-minded and passionate concern was to render help to such people. But in following this humanitarian interest she did not cast herself either as an interfering do-gooder or as a preacher. She was remarkably objective and pragmatic in her approach to social issues; to her the most enduring and effective ways of helping the handicapped were to foster community participation, to establish properly backed and supported centres and, above all, to train students in the practice of clinical and educational psychology.

In 1949 she began, in collaboration with Associate Professor Patrick Pentony, now at the Australian National University, the first graduate training course in clinical psychology in the University of Western Australia, a landmark in psychological training in Australia.

To Elwyn Morey her university position and work constituted a small part of her total activities and interests. She never pictured herself as a committed university don, as a devoted researcher or, for that matter, as a committed and devoted teacher in the narrow sense. The university, wherever it might be, provided her with a headquarters and base of operations as well as with a forum. More important, the university gave her an opportunity to draw the attention of students to the problems which concerned her and the means of solving them. She saw the principal solution in the study of human behaviour as an empirical science. For her psychology was not in itself of central interest; it was an effective way of coping with the problems of the physically, emotionally and intellectually handicapped. For this reason Elwyn Morey was not overly concerned with theory or methodology but only with putting into effective use the established facts of her science. She was a practical and often intuitive practitioner; not a deeply involved scholar in the narrow, donnish sense of that term.

CONCERN WITH HUMAN PROBLEMS

If these comments convey an impression of a humourless missionary so involved and committed as to be intolerant of other pursuits of a less "worthy" kind, then they are quite misleading. Elwyn Morey had a robust and delightful sense of humour which was triggered, more often than not, by the ridiculous and the pompous rather than by the merely comic and whimsical. She was a superb raconteur. She indulged a broad range of cultural interests and led a busy and active social life. One remembers Elwyn Morey's arrivals at home or in one's study as reminiscent of a minor typhoon — always with so much to do and plan, so many to argue with and convince, and so little time in which to do all these things.

The traditional pursuit of scholarship in a university often has the unfortunate effect of narrowing interests and restricting a view of the world outside. Elwyn Morey moved easily between the university and the rest of the community, broadening her view of each by contact with the other. She gave the lie to that popular impression of the university person as "way-out" and unrealistic. She conveyed her views with clarity, integrity and simplicity, never compromising her profession in the interests of popularization. For her there were

not two worlds, or three, or four, but one world with people who had problems which she saw it as her duty to help solve.

Monash University is fortunate indeed to have attracted, even for such a tragically brief period, the services of this remarkable woman. It is entirely fitting that the Monash Child Centre will in future bear her name. She would have liked that.

—R. H. Day

Dr. ALBERT LEONARD JONES

Dr. A. L. Jones

Dr. Albert Leonard Jones died on 21 July while on study leave with his family in England. Born in Newtown, Montgomeryshire, Wales on 14 May 1924, he received his undergraduate and graduate training at the University College of Wales, Aberystwyth (B.Sc. first-class honours, 1946; Ph.D., 1949). A period of national service as assistant research chemist in ICI preceded his Ph.D. training under C. W. Davies. He then joined the Royal Military College of Science at Shrivenham as a lecturer in the department of Chemistry and Metallurgy, being promoted to senior lecturer in 1951 and to principal lecturer in 1955. In 1964 he moved to Australia to take up a senior lectureship in the Chemistry department at Monash University.

On the research side his main interest was in the mechanisms of crystallization and dissolution of ionic crystals, an interest kindled in his Ph.D. studies of silver chloride. At Shrivenham, where research facilities in chemistry were very limited, he at first worked in collaboration with E. C. Baughan on problems relating to high-polymer solutions but subsequently recommenced studies of crystal growth. At Monash he actively pursued these studies. The research group that he had built up at the time of his study leave had been producing some interesting new results that could lead to a substantial revision of currently-held views of dissolution mechanisms but his untimely death may mean that this work will not be immediately exploited to the extent that it deserves.

Len Jones made many worthwhile contributions in his all-too-short period at Monash. Calling on his extensive previous experience of radiochemical techniques and facilities, he designed and supervised construction of a radiochemical laboratory, now named after him, for the Chemistry department. He willingly shouldered many administrative duties. He was a member of the V.U.S.E.B. standing committee for science, departmental representative on the engineering faculty board, a member of the University Safety Committee and chairman of the departmental safety committee. He shared responsibility for the running of the first year laboratory, made substantial contributions to the planning of some recently-completed extensions to the department and some further extensions that have currently been requested.

Len's personal qualities were outstanding. He had the highest standards of integrity and an attractive, warm personality that universally inspired respect and affection in his colleagues and students alike.

He had wide interests. His sporting interests were severely handicapped by the leg-iron that he wore as the result of polio in his youth.

He leaves a wife, Joan, and three young children.

We at Monash, and particularly the Chemistry department, will miss Len's loyalty, integrity and unfailing good humour. He was a man of rare distinction.

—R. D. Brown

UNIVERSITY STAFF

CHAIR OF ECONOMETRICS

The first chair of Econometrics in an Australian university is occupied by Dr. Alan Powell who has been reader in economics at Monash since 1965.

Before his appointment to Monash he lectured in economics at the University of Adelaide and in 1964 was post-doctoral fellow in political economy at the University of Chicago.

He graduated B.Sc.Agr., with honours in agricultural economics, from the University of Sydney. Later he was awarded the degree of Doctor of Philosophy by the same University for his thesis "A national fodder reserve for the wool industry — an economic and statistical analysis".

On his arrival at Monash he joined the team headed by Professor F. H. G. Gruen, which was concerned with long-term planning of Australian agricultural supply and demand.

Professor Powell is currently working on the further developments of econometric models of supply and demand. He is married and has three sons and a daughter.

NEW CHAIR OF ANTHROPOLOGY AND SOCIOLOGY

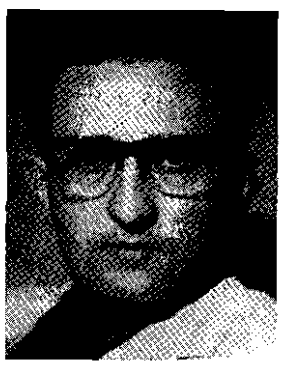
The second chair of Anthropology and Sociology established at Monash is held by Professor Michael Swift, recently senior lecturer in the department of Anthropology at the University of Sydney.

Professor Swift graduated from the London School of Economics as B.Sc. (Econ.) and Ph.D. in 1951 and

1961 respectively. He spent three years lecturing in the department of Malay Studies at the University of Malaya before taking up a position in 1961 as lecturer in the department of Anthropology at the University of Sydney. In 1967 he was visiting professor of Anthropology and a fellow of the Research Centre in Economic Development and Cultural Change at Chicago University. His current research is into a number of theoretical issues in economic anthropology broadly concerned with the status of the study of pre-industrial economic systems as a separate aspect of social anthropology, and the role of economic theory in such study.

His special interest is Southeast Asia, particularly Greater Malaysia.

He is married and has two children.



Professor A. A. L. Powell

Professor M. G. Swift

FOUNDATION CHAIR OF GENETICS

Dr. Bruce Holloway, former reader in microbial genetics at the University of Melbourne, has been appointed to the first chair of Genetics at Monash.

Before his appointment in 1957 as senior lecturer in bacteriology at Melbourne University, he was a research fellow in microbial genetics at the John Curtin School of Medical Research at the Australian National University. In 1962 he was appointed visiting lecturer in microbiology at the Massachusetts Institute of Technology and has on many occasions visited universities and laboratories in the United States, Canada, the United Kingdom and Europe. Last year he was invited to be visiting research associate in biology in the department of Molecular Biology at the University of California.

A science graduate with first-class honours in botany from the University of Adelaide, Professor Holloway was awarded the degree of Doctor of Philosophy by the California Institute of Technology in 1953 and his Doctorate of Science by the University of Melbourne in 1965.

He is president of the Victorian branch of the Australian Radiation Society and for some years has given the annual graduate lecture course in microbial genetics at Monash. His main research activity since 1953 has been a genetic study of the bacterium Pseudomonus aeruginosa.

Dr. Holloway is married and has two children.

CHAIR OF MICROBIOLOGY

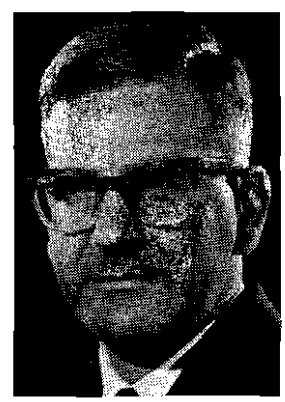
Professor Solomon Faine, whose work has received recognition from the World Health Organization, is interested in operational research to improve methods of routine bacteriological diagnosis. His main contributions however have been made in the study of Leptospira.

He obtained the degrees of Bachelor of Medical Science, Doctor of Medicine, and Bachelor of Chemistry from the University of Otago in New Zealand. In 1955 he was awarded the degree of Doctor of Philosophy at the University of Oxford and, in 1965, while at the University of Sydney, he received the Peter Bancroft Prize for research in the faculty of Medicine. He has had extensive teaching experience at the Otago, Oxford and Sydney Universities.

Previously associate professor in the department of Bacteriology at the University of Sydney, he now occupies the chair of Microbiology. He is the successor of Professor B. P. Marmion who was the foundation professor of Microbiology and who has taken up the chair of Bacteriology at the University of Edinburgh.

Professor Faine is married with three children.

Professor B. W. Holloway



Professor S. Faine

SECOND CHAIR OF SURGERY

The second chair of Surgery at Prince Henry's Hospital is held by Professor James McKinnon Watts, formerly a senior lecturer in the department of Surgery.

He has worked in university teaching hospitals since graduation. From 1962 to 1964 he was the Edward Lumley Surgical Research Fellow and a lecturer in surgery at the University of Leeds. Before coming to Monash in 1965 he was a research surgeon in the department of Surgery, University of California School of Medicine. His research activities involved the liver and extra-hepatic biliary tract.

In 1956 Professor Watts graduated M.B., B.S. from the University of Melbourne and in 1962 became a Fellow of the Royal Australasian College of Surgeons.

In 1960 he received the Australian Orthopaedic Association Essay Prize and in 1962 the Moynihan Prize which is awarded by the Association of Surgeons of Great Britain and Ireland.

FIRST PART-TIME PROFESSOR

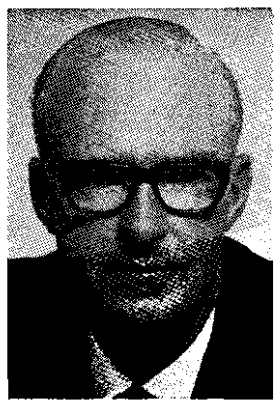
Dr. Harry William Garlick has been appointed part-time professor in the Monash department of Medicine at Prince Henry's Hospital. This is the first part-time professional appointment to be made at Monash. Such appointments allow distinguished men in the community to become closely associated with the University and its work.

Born at Cranbourne, Victoria, Professor Garlick went to the University of Melbourne where he graduated Bachelor of Medicine and Bachelor of Surgery in 1941 and Doctor of Medicine in 1949. From 1950-51 he did postgraduate work at London Hospital. During the war he served in New Guinea and New Britain as a captain in the Australian Army Medical Corps.

He has been Honorary Physician to In-Patients at Prince Henry's Hospital since 1962. From 1954-61 he was sub-dean of the hospital's clinical school and in 1965 was appointed dean.

Professor Garlick is married and has three daughters.

Professor J. McK. Watts



Professor H. W. Garlick

CHAIR OF ZOOLOGY

Under Dr. J. W. Warren, who has been appointed to the chair of Zoology, Monash became the only Australian university to carry out research in paleontology.

Professor Warren graduated as Master of Arts from the University of California and in 1961 received the degree of Doctor of Philosophy from the same University. After he left the United States he became a lecturer in the department of Zoology at Monash and early in 1967 was made acting chairman of the department when the late Professor A. J. Marshall was appointed to a personal chair.

He is primarily interested in the origins of higher vertebrate groups and their early radiation and has carried out work on fish remains in eastern Victoria, which represent the earliest known vertebrates in Australia. He has also recently rediscovered a valuable fossil location in northern Victoria. He was mammalogist with an ecological survey in the arctic regions of Alaska, and in 1961 the Society of Sigma XI allowed him a travel grant to work with the major paleontological collections in the United States.

Professor Warren spent the early part of this year studying the northern hemisphere collections in Britain and the United States.

FIRST CHAIR OF ECONOMIC HISTORY

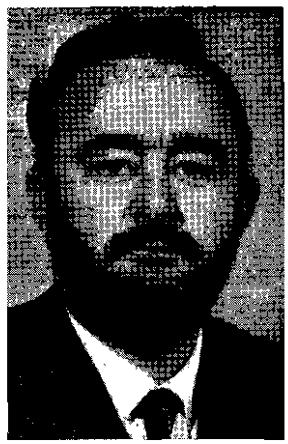
The foundation chair of Economic History in the University is held by Professor John McCarty who lectured in economics at the University of New South Wales and who, since 1961, had been senior lecturer in economic history at the University of Sydney.

A graduate in commerce of the University of Melbourne, he obtained the degree of Doctor of Philosophy from the University of Cambridge in 1961.

In 1962 he became editor of the *Australian Economic Review* and has been co-editor since 1966.

At present Professor McCarty is working on two books, one of which is based on his Ph.D. thesis "British investment in overseas mining 1880-1914". He is also, in conjunction with Dr. Hughes of the Australian National University, writing on the economic history of Australia.

Professor J. W. Warren



Professor J. W. McCarty

FOURTH CHAIR OF EDUCATION

The fourth chair of Education has been filled by Professor Ronald Taft.

He is the permanent Australian delegate to the Assembly of the International Union on Psychology, and a fellow of both the British Psychological Society and the American Psychological Association. He is also a member of the Social Science Research Council of Australia and New Zealand and of the Indian Psychological Association.

From 1942 to 1948 he was employed as an industrial and personnel adviser in the Department of Aircraft Production and the Australian Institute of Management. In 1950 he became a research assistant and foundation staff member of the Institute of Personality Assessment and Research in the University of California. He has held appointments as senior lecturer and as reader in psychology at the University of Western Australia, and since 1966 he has been reader in psychology at Melbourne University.

Professor Taft graduated as Bachelor of Arts from the University of Melbourne and went on to graduate as Master of Arts from Columbia University in 1941. In 1950 he received his Ph.D. from the University of California where his fields of work were personality and social psychology.

The editor of the Australian Journal of Psychology, he has also had several works published, including papers on the assimilation of migrants, on personality and personality assessment and on social values, attitudes, and ways of life.

Professor Taft, who is married with three children, took up his appointment in June when he returned from the United States.

CHAIR OF SOCIAL AND PREVENTIVE MEDICINE

A former Fulbright Research Scholar, Dr. Basil Hetzel has been appointed to the foundation chair of Social and Preventive Medicine at the Monash Medical School, Alfred Hospital. Since 1964 he has been the Michell Professor of Medicine at the University of Adelaide.

Professor R. Taft

Professor B. S. Hetzel

After graduating from the University of Adelaide, he spent three years as a Fulbright Research Scholar in the department of Medicine, Cornell-New York Hospital Medical Centre. He was reader in medicine at Adelaide University from 1958 to 1963 and on five different occasions has been an overseas visiting professor. Since 1965 he has been a member of the Interim Council of the University of Papua and New Guinea.

He has made a notable contribution to preventive medicine, particularly in regard to goitre in New Guinea and Tasmania. In 1964 he was awarded the Eric Susman Prize for medical research by the Royal Australian College of Physicians for work published in this field.

Professor Hetzel is married and has five children.

CHAIR OF INFORMATION SCIENCE

Dr. Christopher Wallace, a former senior lecturer in the Basser Computing Department at the University of Sydney, has been appointed to the foundation chair of Information Science. His first experience with electronic data processing was during his years as a Ph.D. student when he designed and constructed an automatic data recording system for a large cosmic shower array. In 1960, with the cooperation of Dr. M. Rathgeber, he designed and built a considerably larger and more sophisticated data recording system which is still in use. At the University of Illinois, where he was a research associate in the digital computer laboratory from 1960-1962, Professor Wallace designed and commissioned the input-output control section of the Illiac 2 computer and contributed to the design of other sections.

Professor C. S. Wallace

In 1955 he obtained the degree of Bachelor of Science, with first-class honours in theoretical physics, from the University of Melbourne and in 1960 was awarded the degree of Doctor of Philosophy.

Since his return to Sydney he has devoted much of his time to various extensions and improvements of the KDF9 computer. These have included the redesign of its input-output control to allow a greater variety of peripheral equipment to be used simultaneously, a graphic input, and data links between KDF9 and two other computers.

He is also the joint author of fourteen papers published since 1956 and the sole author of another five.

Professor Wallace is married with two children.