

# MONASH UNIVERSITY GAZETTE

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## POLLUTION OF LAKES AND RIVERS

By W. D. Williams, Senior Lecturer,  
Department of Zoology

*This is the way the world ends*

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*Not with a bang but a whimper.*

A few years ago there were many who would have questioned Eliot's view, and, indeed, for a time it really did look as though the final proof of  $e = mc^2$  would eventuate. Whilst that problem seems to have become less ominous of late, fresh, perhaps even more ominous, and certainly more insidious ones now loom; the whimper to end all whimpers may yet occur. The problems referred to, of course, are those resulting from man's geometrically increasing population, and from his spiralling and profligate abuse of the natural environment. In short, overpopulation and pollution: too many effusing too much. They fall within that class of ecological problems referred to by Hardin (1968) as 'no technical solution problems'; the solution to them requires a fundamental extension of our morality.

This article explores in a general way one of these problems—pollution, and, more specifically, the pollution of inland waters. The definition of pollution adopted here is an arbitrarily broad one: water pollution is any change in the natural character of a water resulting from human activity. Three questions are examined: why *not* pollute; what is the nature of inland water pollution; what are we doing about water pollution?

### WHY NOT POLLUTE?

Water can carry a large number of pathogenic organisms. Included are those causing typhoid fever, cholera and dysentery, as well as over seventy enteric viruses such as those giving rise to hepatitis and gastroenteritis. A cogent reason, therefore, for not polluting inland waters is that pollution from human populations, and especially faecal pollution, can give rise to hazardous health situations. Indeed, it was largely the deplorable state of community health and

the prevalence of 'colonial fever' that brought about late last century the sewerage schemes now in operation in Melbourne (which prior to about 1890 was referred to satirically as 'marvellous Smelbourne').

Conditions in Melbourne have improved since 1890, but perhaps, in the opinion of some, by not enough. Moreover, because of our current rate of urban expansion, the improvements may now be taking a turn for the worse; the number of cases of infectious hepatitis in Victoria, for example, doubled during the decade 1958-1968, whereas the population certainly did not. Further, there remain tens of thousands of homes in the newer suburban areas of Melbourne that are quite unsewered. Many of these have septic tanks. The numbers of faecal bacteria in the effluents (sullage) from fifty-six such tanks in New South Wales (we assume no significant differences between Victorian and New South Wales septic tanks) were estimated recently by Brown (1963); he found between 0 and  $14 \times 10^8$  individuals of *Escherichia coli* I (a common non-pathogenic human intestinal bacterium) per 100 ml., with forty-nine effluents having more than 10,000 individuals/100 ml. Sullage waters, purified to a greater or less extent, ultimately find their way into the local river.

What, therefore, are values in local rivers? Little information has been published but some recent examinations of the River Yarra and the Dandenong and Maribyrnong Creeks have produced values of 150-150,000 individuals of *E. coli* I/100 ml. How do these values compare with accepted standards? In Australian streams, subject to occasional bathing by a relatively small population, a limit of 1,000 coliform organisms/100 ml. has been proposed by the Commonwealth Department of Works (1961). Ibsen's Dr Stockmann would find fault.

Conditions directly hazardous to life within lakes and rivers (and, perhaps, indirectly

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to man) may result from the discharge of inorganic and organic poisons into inland waters. Figuring prominently amongst the organic poisons are pesticides, weedicides, herbicides and related compounds. The toxicity of some of these is overwhelming; endrin, for example, will kill fifty per cent of fish exposed to concentrations of it of 0.0006 parts per million. Most organic poisons are not generally added directly to inland waters, but spray contamination, run-off, natural biological exchange processes, and so on, soon extend their effect to the aquatic environment. A number of countries have now banned the use of certain insecticides, or are planning to do so, because of the undesirable side-effects upon the natural environment—inclusive of inland waters. Australia, we note, in the year 1967-1968, imported 1,700 tons of pesticides (including DDT and lindane but not dieldrin and aldrin).

Apart from creating health hazards, or destroying the life within rivers and lakes, there are many materials discharged into inland waters that bring about a significant decrease in the quality of the water as a whole. Noxious smells, excessive and unwanted plant growth, murkiness, unsightly appearance, and undesirable physical and other characteristics may result. Whilst these may, at the least, simply be unaesthetic (see photographs), the effects may be more direct, and the use of water for domestic, agricultural, industrial, recreational and other purposes may be impaired or prevented.

#### NATURE OF POLLUTION

There are a number of less tangible reasons why we should not pollute lakes and rivers. Perhaps the least tangible, but ultimately most important, is that by so doing we destroy a natural part of the biotic diversity of this planet, and extensive biotic diversity, it is suggested by authoritative ecologists, may be a necessity for the long life of the total complex comprising man and nature. It is becoming increasingly clear, at all events, that the biosphere (that part of the earth inhabited by life) functions as a complicated cybernetic mechanism made up of a vast array of sub-units, *ecosystems*, each of which consists of inseparably related and interacting parts of the non-living environment and living organisms. The relationships within ecosystems are incredibly complicated, and we are still a long way from fully understanding them.<sup>1</sup> We are, nevertheless, headlong, undertaking vast modifications to the natural world! It is quite feasible that we will find that the homeostatic mechanisms that have operated to maintain balanced ecosystems these past 3,000 million years or so break down in the face of man's continued assaults. For the first time, part of the biosphere, man, is operating beyond the ecological laws which evolved over aeons to govern the maintenance of the biosphere.

The most obvious form of water pollution is that involving the discharge of waste

material and heat. Pollutant materials are of many types, but some broad categories can be recognized. Organic wastes are discharged particularly by the food industries, but laundries, textile manufacturers and other sources may contribute. Domestic wastes, mainly sewage and detergents, are also mainly organic. Irrespective of source, in rivers, the principal effect of all organic wastes is to decrease oxygen concentrations because of ensuing bacterial action. Depending upon the extent of deoxygenation, the natural biota thereby decreases in diversity and abundance and is replaced by a more tolerant and less diverse biota. This replacement biota characteristically comprises 'sewage fungus', certain algae, some few invertebrates, and many bacteria.

In lakes, on the other hand, where dilution is more effective, the usual and most obvious manifestation following the addition particularly of domestic organic wastes is an excessive increase in plant growth. This frequently has its own unwanted side-effects. The total process in lakes is generally referred to as cultural (!) eutrophication. The public reaction to this phenomenon so far has mainly been to maintain a child-like belief in the efficacy of poisons, and a de-

linquent's disbelief in prophylaxis. If too much organic waste is added to a lake, deoxygenation may still be the principal result, culminating eventually in the virtual death of the lake as a natural entity. R.I.P. Lake Erie (9,600 square miles).

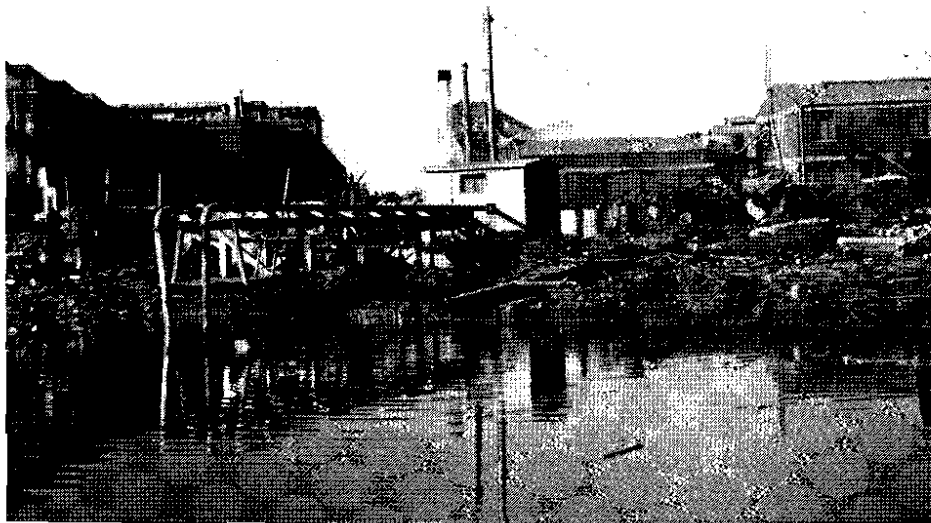
Other main types of pollutant include inert materials, inorganic trade wastes, radioactive wastes (particularly outside Australia), and heat.

#### FUNDAMENTAL ALTERATIONS

Within our broad definition of pollution, a number of human activities must also be considered which, whilst not directly adding anything to waters, have profound repercussions upon the inland aquatic environment. The construction of reservoirs, the conversion of lakes to storage impoundments, the artificial control of lake levels and river flows, the creation of unnaturally reticulated drainage systems, river 'improvement' schemes, drainage programmes, land-clearing, over-grazing, the introduction of exotic biota, and so on, are all activities which result, to a larger or smaller degree, in fundamental alterations to the limnological environment.

Logically the first course of action to deal

*Maribyrnong Creek, Flemington, April 1970*



with water pollution is to document its causes, extent and precise nature, and this is exactly what almost all countries claiming any degree of scientific sophistication are now doing. Britain has its Water Pollution Laboratory of the Department of Scientific Research. America has its Federal Water Pollution Control Administration, Sweden its Air and Water Pollution Research Laboratory. Australia, sad to relate, so far has no State or Federal body specifically charged with investigating water pollution. CSIRO seems uninterested. Universities generally seem to regard the subject as of insufficient intellectual depth. Most water supply and sewerage authorities do not even have a single biologist on their staff.

Yet, until we have an adequate body of research on water pollution in Australia, we cannot be in any meaningful position to provide suggestions for its control and mitigation, or assess its importance. Tighter controls, more legislation, government coercion, more sewerage (but fewer schools, roads, F111s?) are suggestions with the ring of being rational, but can only truly be so if founded upon a thoroughgoing evaluation of the problem and its relation to a society regarded as both populations of human beings and ecological units.

How to bring about such an evaluation, apolitical, with no ground axes, remains the question. It is one thing for Sir Macfarlane Burnet to speak of the social responsibility in scholarly research for detecting and dealing with environmental change; it is quite another for scholarly researchers to discharge this responsibility. The need to answer Philip Henderson's question becomes ever more pressing:

*How can we live, how, being citizens,  
collective ants  
Feverishly undermining our own content,  
Daily perverted by malicious print,  
Blindly diverted with amusements that  
no longer amuse,  
Smoke-confused, din-deafened, speed-  
blunted,  
How can we, citizens, assert our right  
to live—  
Offal of a system that must destroy us  
or decay?*

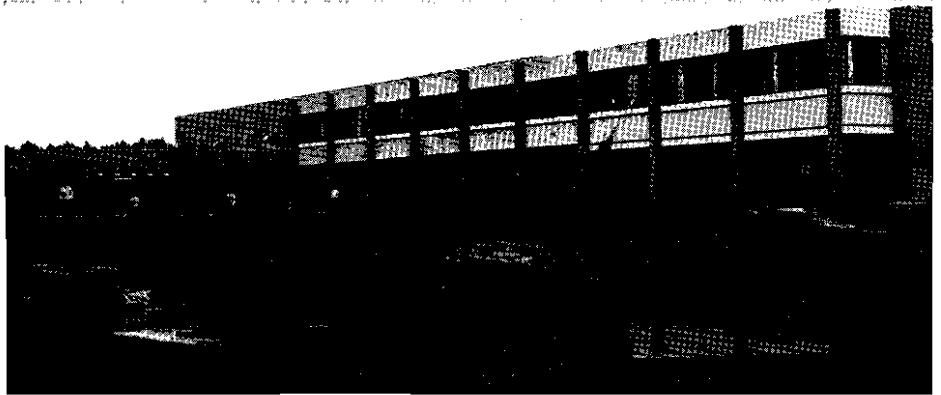
<sup>1</sup> The complexity of most ecosystems is one of the principal reasons why the author and others in the department of Zoology are interested in the ecology of salt lakes. These in general represent simplified ecosystems and are therefore less difficult to study *in toto*.

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## FURTHER STAGE IN UNION DEVELOPMENT

By G. P. T. Sweeney, Warden



*The Union*

The original plan was to design a large Union building of a size appropriate for a university of 12,000 undergraduates, and then to build it in stages. The implementation of this plan would have meant, for example, building the catering areas first, but making temporary use of such areas for administration until the next stage could be built.

However, the Australian Universities Commission thought otherwise and gave the University a mandate to produce a Union building which was complete in itself, but with provision being made for later extensions.

The Union building was occupied in mid-1964. Its location at the focal centre of the University, within easy distance of all of the academic buildings, has been well justified by its extensive patronage in the years that have followed. However, one outcome of this patronage was an early demand for increased areas of various kinds. Areas for activities, catering, commercial enterprises, offices, and student services were all provided for in the original building but, of course, with limited space.

The grant of \$340,000 by the Australian Universities Commission for an extension of catering facilities to be constructed during the 1967/69 triennium led to the decision to build at the same time other extensions to the Union, with the finance being provided by the Union Development Fund. In all, these extensions add approximately 50 per cent to the area of the Union.

A particularly pleasing feature of the enlarged Union is the additional space for a number of student activities. In the basement of the northern extensions there are eight music practice rooms in which tuition from qualified instructors is provided, and where students are able to practise in their spare time. For the first time ever the Union now has an area devoted wholly to table tennis, with space for six tables. The popularity of billiards is always high in

university unions, and Monash has proved no exception. The previous three large tables were increased to four full-size tables and four small tables. Also in the basement there is a large area eminently suitable for dancing, whether it be ballroom, Scottish or modern dancing.

As the University has expanded the need for student services has become more apparent. The student services occupy most of the first floor of the eastern extension of the Union. The layout of the rooms has been designed to maintain a maximum degree of privacy whilst, at the same time, being close to the centre of Union movement. As a result of areas becoming free within the existing Union building, after student services have shifted into their new quarters, additional space is available for the Clubs and Societies Council and the Sports Association.

The extended John Medley Library will have two new features. Of particular interest will be the establishment of a bank of music-listening chairs, complete with ear-phones and individual controls. Music will come to the chairs from a music library. The John Medley Library will also be the centre for club libraries.

The extensions have considerably increased the space available to the University bookshop, the Commercial Bank of Australia and the State Savings Bank, as well as the Union shop, post office and the Union agencies. A pharmacy has been established, and there is room for a ladies' hairdressing salon.

Important extensions have also been made to the sports centre. These consist of three new squash courts, a weightlifting area, change rooms, a centre for sports medicine, a meeting room and a large area for grounds staff and equipment.

The Union exists to facilitate students and staff entering into any one of a wide range of activities. These extensions to the Union and to the sports centre will assist materially in the achievement of the Union's goals.



## 1970 AND ALL THAT: FAMILY COURTS AND DIVORCE

By H. A. Finlay, Senior Lecturer, Faculty of Law

If the modern law of divorce in England and Australia is traced back to 1857, when a wife's simple adultery and a husband's aggravated adultery first provided grounds for the dissolution of a marriage, it will be seen to have been characterized over the years by a slowly increasing liberalization and widening availability. Of the many changes that have gone to make up this process one above all can be singled out: the emergence of the concept of the broken marriage as being of itself sufficient ground for dissolution, without continuing reliance upon the principle of matrimonial fault, upon which divorce was at first exclusively based. The interesting position we have reached today is that we are in the midst of a process of transition from fault to breakdown, both principles being presently available to furnish separate grounds for divorce. In this situation the advocates of further reform are becoming increasingly vocal and there is every sign that the debate will continue. Indeed it has never really been silent. The century began with the Gorell Royal Commission on Divorce and Matrimonial Causes which reported in 1912 but whose recommendations in favour of extension of grounds were largely ignored for the next twenty-five years. In 1937 further changes were made in England, and in 1969 an altogether new Divorce Reform Act was passed in that country, the impact of which is yet to make itself felt when it comes into effect next January. In Australia, meanwhile, the most significant recent development has been the entry of the Commonwealth into the legislative areas of marriage and divorce, and the passing of the Matrimonial Causes Act 1959 which has been in force since 1961 and which has unified the law of divorce throughout Australia.

The background against which these developments must be seen, indeed with which they may be said to be interwoven, can here only be hinted at. The period under review saw the emancipation of women and the suffragette movement, with powerful assistance from two world wars and their resultant man-power shortages. The tail-end of the Industrial Revolution, soon to erupt into the great ecological debate of today, was followed by the 'dictatorship of the proletariat' in one-half of the ideological world and by an age of unparalleled over-production and consumer domination in the other. The restrictions of the chastity belt, the corset and the crinoline have been replaced by the freedom of the bikini, the mini-skirt and the pill.

An increasingly secular society has become increasingly permissive, and can afford to be so in the absence of the religious taboos and the social and economic sanctions that

used to keep it on the rails of nineteenth-century non-conformist conformity. Youth, which attains an early maturity, has been given political and economic powers rivaling those of the middle-aged, yet in its exasperation with the pathetic mismanagement to which it feels its elders have subjected the world, has become increasingly radical. No longer is the villein tied to the manor, nor the factory labourer to his factory, but they have joined the ranks of the ubiquitous middle class in whose prime attributes of mobility and affluence they share. The Dickensian clerk in his counting house and the Wellsian counter-jumper in his drapery shop have become the slick business executives of today, racy young mods in their home lives, driving hard bargains and fast cars. Perhaps they feel so emancipated that they even go to wife-swapping parties. Prostitution, the great scourge, has all but disappeared, and alcoholism has been replaced by addiction to marihuana, pot and stronger stuff. The waning stigma of illegitimate birth and of the *de facto* union has made the disgrace of divorce pale into complete insignificance. In such an age, where almost anything goes, what is the relevance of our present law of divorce?

Without going into tedious details it is assumed that sufficient is generally known about the provisions of that law. It is trite to say that as it stands it reflects a set of social and moral values which no longer command universal support, apart from the customary lip service that ultimately degenerates into a conditioned reflex. The philosophy underlying the law is the belief that divorce should be restricted and that, if it is, the sanctity of marriage will somehow be greatly enhanced. This notion received its death blow in 1943 when the House of Lords decided that in the interests of the community the advantages of dissolving a marriage which had utterly broken down in fact though not in name may greatly outweigh its continued enforcement. It came to be realized that, if people are compelled to stay legally married in spite of themselves, they will in fact make other arrangements. The result will be that many who are married do not live together, and many who live together are not married. To talk of marriage in such a situation is a farcical mockery, and the interests of marriage as a social institution are in no way served by a society in which it has become no more than a fictitious arrangement. But still it is thought that we must not make divorce too easy, lest it encourage the light-headed young to rush into a serious relationship to which much thought ought to be given, in the knowledge that if they get quickly tired of it they can quickly be rid of it.

It is at this stage in the discussion that someone will start talking about family courts. But what are they? A rigid definition is not possible. Family courts have been created in many countries and there is a great deal of difference between them.

Perhaps we should first analyse the concept under two headings: (a) the procedure by which courts administer the law, and (b) the kind of law which they administer. Procedurally our courts function under the so-called adversary system. This pre-supposes a genuine conflict between two parties and a submission of that conflict to the court. In such a typical situation the judge is confronted by two opponents, each of whom will be concerned to put forward his own case and to destroy that of his adversary. Their interests are diametrically opposed.

It is from the realization that the typical undefended divorce case—and about 95 per cent of divorces are undefended—does not fit into this picture of adversary litigation that one of the strongest arguments in favour of taking divorce out of the ordinary courts and creating special family courts is derived. The first and best reason probably is that the interests of parties to an undefended divorce suit are not usually diametrically opposed to one another—at least not in the matter of the divorce itself, as distinct from such ancillary problems as questions of property, maintenance, or custody of children. On the contrary, they are at one in their desire for a divorce. In extreme cases they may even conspire in bringing collusive evidence, or in faking evidence to get a decree. More typically, perhaps, one party will lead evidence to establish the ground for a divorce, and the other party will be content simply to do nothing. The onus of proving such an uncontested case is therefore fairly slight. However, unless something makes the court suspicious, the judge has no option but to accept the evidence which is placed before him, and on that basis to grant a decree. Without asserting that this kind of situation necessarily results in a travesty of justice, yet it cannot be suggested that it produces a climate in which the law and its processes are invested with a great deal of respect. At the same time, since it is an open secret that both parties want a divorce, it seems a great pity that a process should have to be used which is both costly and wasteful and which relies upon a fiction of litigious animosity that serves no genuinely useful purpose whatever.

How can it be replaced? It is at present assumed by public opinion, and certainly by our legislators, that divorce by consent is still repugnant to the great majority of our community. If divorce by consent were to be introduced, it would undoubtedly be the

most expeditious way of dissolving dead marriages, whatever disadvantages it may produce otherwise. In the absence of divorce by consent we again come back to the family court as a way out of the dilemma. It may be assumed that a family court, while preserving some of the procedures of a court of law, will nevertheless be able to depart from such procedures sufficiently to assist in the solution of the peculiar social problems with which it is designed to deal. It is considered, by lawyers at any rate, that such a court should still be presided over by a lawyer, for the two-fold reason that lawyers are trained to sift evidence and ascertain facts, and because many of the ancillary problems arising on the dissolution of a marriage contain legal elements which require solution in accordance with the requirements of the law. Once having provided for such a legal element, however, there is then a great need to enlist the services of trained experts from other professions whose particular expertise will help in resolving the many problems that must be faced when a marriage is dissolved. Some of these problems relate to adjustments of property and no doubt the assistance of trained accountants will be of use to this end. A most important question will be how the children of the marriage are to be looked after and here experts from the medical and social sciences can help. There may be other social problems and again trained social workers will be able to offer much valuable advice as to problems which emerge. A similar kind of situation already exists in our criminal courts where probation officers are available to investigate the background of people with whom the courts are dealing in order to advise the judge concerning their past conduct, as well as the probable effects on them of action proposed by the court.

But there is another and much more important function which a family court can fulfil. This is in the prevention rather than the more drastic dissolution of broken marriages. Because experienced social workers may be of genuine help to a couple in trouble with their marriage, the function that many would like to see family courts exercise is primarily in marriage guidance and conciliation. This function, desirable though it is, is subject at once to a great difficulty and to a considerable limitation. The difficulty is how to get the couple in need of help to seek that help? Many are the inducements that have been devised. Our own Matrimonial Causes Act contains some provisions designed to assist in this work of marriage guidance and reconciliation. Any solicitor taking instructions to act in a divorce is under a statutory obligation to point out to his client the reconciliation provisions of the Act and to furnish him with the addresses of marriage guidance organizations. The Act provides for such organizations to be officially recognized and supported with government monies. Valuable work has been and continues to be done



*Superior Court of the County of Los Angeles, which houses a family conciliation court*

by marriage guidance organizations, much of it on a voluntary basis, while the Commonwealth Government assists with the continued training and supervision of individual counsellors. Nor is this work in vain, for the figures suggest that increasing numbers of people are seeking marriage guidance. Nevertheless, and this is the limitation of marriage guidance, compared with the overall figures of divorce, the number of marriages that can be saved remains small. This is probably inevitable in view of the fact that the time at which parties come into contact with the provisions of the Matrimonial Causes Act is usually a time when their marriage has broken down beyond recall. This comment applies even more strongly to the stage at which parties to a marriage find themselves before a judge.

In Los Angeles, a jurisdiction which has for years been well known for its family conciliation court, similar methods are used to try to get couples to reconcile, but there, too, the parties do not come forward much before they are ready to enter the litigious arena. That court has available the services of marriage conciliators who function as court officers. The service they provide is undoubtedly of great value, but limitation of numbers and of funds preclude them from giving prolonged guidance. If a reconciliation cannot be effected within three interviews, the parties are referred to outside counselling agencies, most of which charge fees. It is difficult to assess the real impact which this service is able to make in the community in which it operates, which is notoriously divorce prone.

Nevertheless, one conclusion can be drawn from the Los Angeles experience. The court in that jurisdiction has, during the fifteen years of its existence, been most outgoing in its proselytizing activities. If the jurisdiction is divorce prone, it may equally be said now to be conciliation conscious. Even if some of the claims made by the conciliation court be discounted it seems clear that

considerable success can be achieved once the community is made aware of the possibility of marriage conciliation and the benefits which it can bring.

It is in this aspect that our own efforts at marriage guidance and conciliation are still lagging behind. Many members of the public, and even members of the legal profession, are ignorant of or indifferent to the work of marriage guidance. A certain suspicion of what is often regarded as manipulation is fairly widespread. These attitudes must be changed. They can probably be overcome only with education. Pre-marital guidance, in schools, universities and adult education and social service organizations would be a very important means of reaching large numbers of people, particularly in the age groups in which it matters most. At the other end of the scale, a suggestion by Mr Justice Toose, a member of the Supreme Court of New South Wales, seems well worth implementing. That suggestion would seek the setting up of graduate university courses for members of the legal profession, designed to impart an awareness and a knowledge of such matters as the psychological, physiological and social aspects of marriage, the causes of marriage breakdown and the attempted remedies by way of marriage guidance. Certainly legal education at present does not adequately fill this gap.

The two aspects which have been canvassed in the above comments have dealt with two separate but intimately related matters: liberalization of divorce on the one hand, marriage guidance and reconciliation on the other. Ideally, the two should be complementary. We should ask ourselves: are we, as a community, doing all we can to save broken marriages? The answer, sadly, is 'No'. Once we can, with a clear conscience, say 'Yes', it is suggested that we can then with an equally clear conscience afford to grant a free dispensation from the bonds of marriage, where those bonds have become intolerably irksome.

## VICE-CHANCELLOR'S FIRST TEN YEARS CELEBRATED



*Dr Matheson, Mrs V. G. Brownie (wife of an original staff member) and Mrs Matheson at the cocktail party*

A cocktail party held at his residence on 30 January celebrated the tenth anniversary of Dr J. A. L. Matheson's Vice-Chancellorship of Monash.

All original members of academic and non-academic staff who still retained some connection with the University were invited.

The Chancellor, Sir Douglas Menzies, proposed a toast to Dr Matheson in the course of which he said:

'Today we celebrate Dr Matheson's coming to Monash as Vice-Chancellor just ten years ago. Ten years can seem a long or a short time. Generally it is short in retrospect and long in prospect and I imagine that is how the Vice-Chancellor finds it today, for I have no doubt that he is looking before as well as after.

'Looking back he can see a splendid achievement of which he can be proud and upon which we congratulate him. We also thank him, and, in saying this, I speak for the University as a whole. Ten years ago there was nothing here but open country. Today there are not only buildings to house a university community of about twelve thousand, but these buildings are set in surroundings of which we can be very proud. Our collection of native trees and shrubs, which lend grace to the campus, has taken the newness from torn earth and off the

masonry. So much has been done of which the Vice-Chancellor has been architect and engineer.

'When I speak in this way, however, I have in mind more than material achievement. The great feat is to have formed a fellowship of scholars; staff of distinguished academic reputation, students of promise, all knit into an intellectual community, young and vigorous.

'Of course there have been difficult times—we had one such last year. Too much should not be made of incidents—the only way to judge what has been done is to look at the University as a whole. So looked at, Monash is already a great achievement and for his part in it, Dr Matheson can take heart and go forward.

'Looking ahead we can regard the past, with foundations well and truly laid, as the best guarantee for the future. Progress does not proceed in a straight, ascending line. There will be ups and downs but we are sure that the line will ascend. In meeting our difficulties our watchwords must be tolerance, firmness in the face of force, and commitment to intellectual values.

'We hope, Vice-Chancellor, that, at the end of the next ten years, you will be able to look back with the kind of satisfaction that you must feel today.'

## MONASH PROFESSOR APPOINTED TO A.R.G.C.

Professor R. Street, chairman of the department of Physics, has been appointed a member of the Australian Research Grants Committee.

This committee was established in April/May 1965, under the chairmanship of Professor R. N. Robertson. It is entrusted with the task of advising the Commonwealth Government on distribution of funds for the stimulation of high level research, in the natural sciences, humanities and social sciences, to be carried out by individuals or research teams. For the year 1970, the committee approved grants exceeding four million dollars.

The members of the committee are appointed, normally for three to five years, by the Minister for Education and Science, and the present chairman is Emeritus Professor W. M. O'Neil, Deputy Vice-Chancellor, University of Sydney. Professor D. Cochran, dean of the faculty of Economics and Politics at Monash, has served on the committee and is now a consulting member; Professor A. K. McIntyre, chairman, department of Physiology, was appointed to the committee in 1968.



*Professor R. Street*

## NEW LINK

Broadcasting stations throughout the world now have the facility for direct connection to the University campus and for staff interviews. This is the result of the installation of permanent two-way high quality speech telephone lines which have been connected to the PMG programme room via two local telephone exchanges. Interviews are conducted from the audio-visual aids studio.

The scientific world did not have occasion to pay much attention to Australian universities until 1915. This was the year in which the father-and-son team of William and Lawrence Bragg at Adelaide won the Nobel prize for physics, for a pioneering use of X-rays for determining crystal structure. Sir Lawrence went on to a distinguished career as professor of Physics in Manchester, and later to the pinnacle of the profession, the Cavendish professorship at Cambridge.

Besides his achievements as a scientist, Sir Lawrence Bragg also developed some forceful ideas about the organization of universities, and of research. He expressed these ideas and uttered some warnings, which Australia has almost totally neglected, in a remarkable address to the Royal Institution in London on 26 March 1942.

Sir Lawrence began with a statistical generalization. One really good physicist, he said, appeared to be generated per year per million of population. Manchester University, in his day, served a population of about four million: and per year he expected four really able students. This led on to his pointing out (not many professors have been candid enough to admit this) how much a professor owes to his more able students, whose capacity for asking awkward questions serves to keep alert and up-to-date a mind which is in danger of stagnating.

But his central theme was expression of his suspicion of research institutes, and his proposal that all scientific research funds and resources should be channelled through universities. 'Centralization of research in institutions devoted to some one special branch', he said, 'is attractive because it is often a spectacular success at first. Men who have ideas which they wish to develop, and are irritated by the demand made upon their time by teaching and administration, are naturally attracted by the prospect of devoting their unhampered energies to research. But they are not created. They are merely moved from one place to another.' Indeed, he rudely compared research institutes to beds of tulips in parks. Anyone with any knowledge of horticulture knows that they have been bred elsewhere, and brought here to flower: 'In contrast with the flow of keen young research students through a university, a central research institution has a comparatively static staff, and there is considerable danger of fossilization. As would be expected, this tendency is much more noticeable in the later stages; it is hardly likely to appear within the first decade of an institution's existence . . . It is doubtful, to say the least of it, whether the advancement of pure science is fostered by taking men from universities and setting them to work in central research institutions devoted to some

special branch, however fine its building and equipment. The necessary stimulus appears somehow to be lost. A curious fatality attends the conscious planning of science . . . A far richer return has been reaped from the money which has been judiciously spent in aiding promising researchers and researches at universities, than that spent in building, equipping and staffing institutions devoted to some special field of investigation.

'Ideas for research spring from contact with everyday scientific life, just as a poet's ideas spring from contacts with men and women and nature. It is only very exceptional people who can make a career of research and nothing but research.'

Have Bragg's ideas even been brought to the attention of CSIRO, or of those who distribute the Commonwealth funds for education and science? It may be that the admittedly great achievements of CSIRO have been, as Bragg suggested, the fruit to be expected from its earlier decades, and that it will be difficult to keep up the same pace in the future.

This question also has its economic and administrative aspects. If it is true that only a few exceptional men can successfully devote their whole lives to research, while the majority of scientists have a more limited creative period (perhaps when young, perhaps in middle age) does it not stand to reason that we need an organization of great flexibility, in which men can divert some of their energies from research into teaching or administration, or in the opposite direction, as changing circumstances may require?

Universities, with all their faults, approach this objective much more closely than do large organizations of scientists established for purposes of research only. There is a real danger that such organizations will become loaded up with 'passengers' whose capacity for original research work has, through no fault of their own, receded and for whom no alternative occupation is available.

Conversely, teaching suffers when divorced from research. If substantially more research is done in university laboratories, this will undoubtedly inspire university scientists to become better teachers.

Bragg made it clear that he did not wish to imply that all was well with university administration—and things have got a good deal worse since he wrote. He spoke trenchantly of the paper plague. 'We cannot command the attentions of the Muse, who chooses the strangest times and places in which to visit us and to breathe her inspiring message'. But we can ensure that her message will remain unheard, he went on to say, by submerging ourselves in a flood of papers

dealing with trivial matters. It had become too easy to communicate and to duplicate papers. 'The two most dangerous inventions of the modern world are the aeroplane and the typewriter.' The traditional type of professor, now become rather a rare bird, with his vagueness and absent-mindedness, was in fact putting up a good psychological defence-mechanism against the distractions by trivialities, which pre-occupy his more bureaucratic successors. University men, he went on to add, are usually very bad at administrative work, and allow it to occupy far more time and energy than it should.

How is research to be financed? A great deal of *applied* research can and should be financed by the businesses which stand to benefit from it, research in pharmaceuticals for instance. Or to take a less well-known example, the very important work in applied genetics, which has made a great increase in egg and poultry meat production possible was all carried out at commercial breeding stations, not in universities or government departments.

It is true that any new scientific discovery becomes, before long, the property of the whole world. Patents and licences do not provide much protection. But the opportunity of exploiting a new technique just for the first few years, before your competitors catch up, is sufficient inducement to businesses to finance some very expensive research. However, even the most dogmatic advocates of free-market economies agree that research in pure science is one of the things which the free market cannot be expected to provide. Cavendish, Lavoisier and Rayleigh were men of substantial personal fortunes, Faraday was financed by private benefactors. But in these days, with the need for much more expensive equipment on the one hand, and with much higher taxation of private incomes on the other, research in pure science, which is the ultimate basis on which all applied science must stand, needs to be financed almost entirely by public funds.

The word 'research' is here used in the context of the natural sciences. To talk about 'research' in philosophy or literature is a bad joke. This misuse of the word 'research' is a comparatively recent phenomenon, and may be due to arts men's jealousy of the intellectual prestige of the natural sciences. This is not to imply that arts professors and lecturers should be required to devote their whole time and energies to teaching. They should be given adequate time for profound and critical study of past and present writings in their fields. But it is a misnomer to call this research.

Economics and sociology occupy a position intermediate between the sciences and arts.

Here genuine additions to knowledge are possible; but research effort on the scale required in the natural sciences is not called for. However, research in sociology which mostly has to be conducted by interview, may prove very costly in manpower. One would welcome the opinion of teachers of sociology as to whether it is safe to rely on the results of interviews conducted by students. History, law and politics more nearly resemble the arts, with some, but considerably more limited, opportunities for adding to knowledge.

The other functions of a university, besides pure and applied scientific research, are the training of students in vocational skills, and the preservation and transmission of culture. It does not necessarily follow that these should be financed from public funds.

In order to make a case for spending public funds on education (or any other object) it has to be shown that benefits to society will accrue greater than those which would have resulted from the voluntary spending of individuals. This makes a clear case for spending public funds on roads, justice, defence, lighthouses, etc. Regarding education, in the nineteenth century it was contended (though, as has been shown in Dr West's recent study, *Education and the State*, largely on falsified evidence) that parents did not recognize the value to their children even of a primary education, and were unwilling to spend on it; and that it was therefore necessary to make primary education compulsory, and paid for by public authorities.

But is this true any more, in the much wealthier and more educated community of today? It appears that all families are well aware, perhaps in some cases too well aware of the advantages of education, including university education. The community is undoubtedly enriched by more abundant university education. But most if not all of this social enrichment takes the form of higher incomes for the trained men themselves. It appears that the real value to society of a doctor or an engineer is not significantly greater, if at all, than is indicated by his earnings. There may be some comparatively lowly-paid professions, such as secondary school teaching, whose value to society is greater than is indicated by their earnings. But in these cases, the sensible remedy is to raise their salaries, rather than subsidizing their training, with all the concomitant fuss about bonding, etc. Universities, therefore, should rely on public funds and donations to pay for pure research, on business to pay for applied research, and on fees to pay the full cost of teaching, both of vocational and of cultural subjects. Many students would have to be financed by various forms of loans, to be repaid out of future earnings. If Sweden uses such a system, we can hardly complain that it is not democratic.

Courses which require a great deal of equipment, particularly engineering and medicine, should be charged substantially higher fees

than those which do not. Courses taken only by a very limited number of students would also be necessarily more costly, because of unavoidable overhead costs. The natural course of events should be to develop much more specialization between universities in the teaching of comparatively rarely studied subjects. At present there is a wasteful tendency, often arising out of each university's *amour propre*, to start too many small departments in such subjects.

And, while students should be free to choose their subjects, they should expect to pay more for 'tailor-made' courses than for standardized courses, with limited options, which could be organized more economically.

These proposals would have the revolutionary effect of giving the universities almost complete freedom from the government controls to which they are now subject in respect of salaries, buildings, etc. I suspect, however, that many university administrators do not really want freedom—and the responsibility which goes with it. They like the idea of being lesser functionaries in the State or Commonwealth administration—without having to face the heavy load of routine work and the hard discipline which are the lot of the regular public servant—better than that of having to design courses to meet the real needs of their students, and collect fees for them.

Except for newly-formed departments still in their running-in period, every department would be expected to live on the fees which it could earn, for teaching or for applied research. This would promptly cut out a great deal of avoidable waste in their staffing and administration. There should also be a great deal more competition between universities. It would be desirable (as in Germany) to allow students to move from one university to another, taking their credits with them. If such competition threatened to debase the standards of examination, responsibility for final degree examinations could be transferred to an independent, publicly-financed, inter-university organization.

Research should not be allowed to predominate, and university staff should be engaged principally on their ability to teach. A small number of highly-skilled lecturers, using the best modern teaching aids, should lecture to large audiences; and the rest of the staff should be engaged in tutoring small groups. Salaries should be higher but permanent tenure, in many cases, abolished. The present practice of giving lifetime tenure to young men has sometimes had beneficial results, but in many cases has subsidized incompetence and idleness. Lifetime permanency of tenure is desirable in the case of men carrying out duties of considerable responsibility, who if not given permanent tenure of their employment, might be subject to very severe pressures. Judges, police, soldiers, postmen, public servants are clear examples.

But university teachers ought not to object to limited-duration appointments, open to

renewal after a review of their work by a group of leading men in their field—especially if the good teachers obtained higher salaries as a consequence of the new system. In the academic profession the only real case for permanency of tenure appears to arise when it is necessary to protect men doing original work, developing unpopular ideas, and threatened with persecution by predominating academic cliques. As the number of universities and the degree of competition increase, both nationally and internationally, this danger and consequently the need for permanent tenure should become less.

Both research and teaching qualifications should be taken into account in appointing staff to science faculties. In the arts faculties, on the other hand, the requirement is capacity to teach the subject, and to make it understandable and appreciated by a wide audience, rather than to dazzle one's fellow specialists in recondite books and articles. Appointment of staff on their ability to teach will incidentally bring another considerable advantage. Unlike the journals in the natural sciences, which are edited with iron discipline, in which only genuinely new results are published, and those in the tersest possible style, learned journals in the arts and social sciences groan under the weight of a mass of turgid and inconclusive articles which were written only for the purpose of assisting the writer's advancement, when he applies to one of the university selection boards which promote on weight of publications.

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#### MONASH PARENTS DONATE \$8,000

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During the past four years the University has received donations totalling almost \$8,000 from the Monash University Parents' Group. A large proportion of this sum — \$3,700 — was allocated to the library for the purchase of books. As well, \$1,000 went to a students' welfare fund, \$800 to the religious centre, and \$500 to the Alexander Theatre for furnishings.

Among the smaller gifts, a sum of \$100 was given to a scholarship fund for a Czechoslovakian student.

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#### CIVIL ENGINEERING SURVEYING CAMP

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Part of the prescribed course for second year civil engineering students of surveying is a camp held during the second term vacation. This year it was held at Anglesea, a seaside town about eighty miles from Melbourne where, over a period of a fortnight in mid-August, eighty-four students attended. The purpose of the camp is to give students practical experience of their study of surveying.

Whilst at Anglesea, the students were given practical surveying exercises such as determining property boundaries.

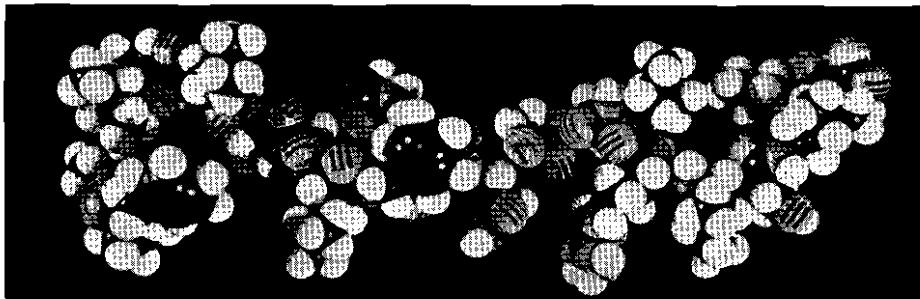


## PROGRESS ON DIABETES MELLITUS RESEARCH

Research since the previous report has established the chemical structure of the blood sugar lowering polypeptide derived from growth hormone (AcG), and, after preliminary studies on polypeptide synthesis, members of the team have begun a pilot synthesis of AcG.

Other work has established that the proposed model system is capable of accounting for the syndrome of diabetes mellitus, and most of the critical points in the model have been proved.

The model system is now being tested in the human diabetic patient and preliminary data indicate that the model applies to most



diabetic patients but, it is pointed out, extensive studies in this area are still required.

The photograph reproduced above shows the complex chemical structure of AcG.

## HIGHER EDUCATION RESEARCH UNIT

The Higher Education Research Unit began functioning in 1969 but its origins go back to 1966 when Dr J. Biggs was appointed as educational research officer.

In 1968 Professorial Board accepted a proposal to appoint a unit which incorporated the work of the educational research officer. The unit has several major functions:

(1) To assist faculties, departments and individual staff members with the solution of educational problems—curriculum development, teaching methods and assessment—by a co-operative approach to the problem. For

example, a major project has been started with the staff teaching Engineering 101 in the development and evaluation of that course.

(2) To conduct research on problems of concern to faculties or the University as a whole. At the request of the Professorial Board a study is currently being undertaken on student workloads. The prediction of academic success is a perennial problem. A report was prepared on the possible 'drift from science' in Victoria, in the light of the report by the Dainton Committee in Britain.

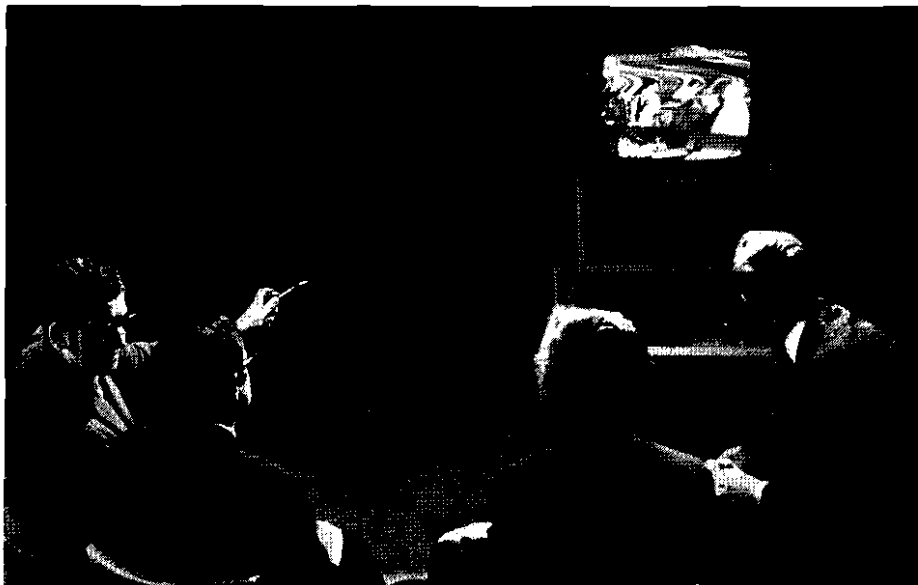
(3) To engage in studies of higher education as such. One member of staff has been concerned with a 'tertiary education choice' study.

The unit is located in and operates its budget through the faculty of Education and Professor Dunn acts as director on a half-time basis. At present there are two senior fellows, Mr John Clift and Dr Noel Ryan, and ancillary staff. The unit, however, has been established to provide a service to the whole University, and in policy it is guided by the Professorial Board's Standing Committee on Education, on which all faculties are represented.

The way the unit likes to operate on a teaching problem can be illustrated by a project being carried out within the faculty of Education. Staff taking seminars in History of Educational Thought (a Diploma in Education subject) felt they could improve their seminars. Discussions were held with Mr Clift in 1969 and a decision made to videotape some seminars. This was carried out and the tapes used as a basis for further discussion. The staff then decided to study the historical, philosophical and experimental literature on seminars, and is considering using material from the tapes to give students a better understanding of their role in seminars. The study is being extended this year, and the group concerned expects to publish a report which will systematize the findings of their experience and their wider reading on the topic.

H.E.R.U. also hopes to disseminate to staff information on innovations and research in higher education by means of seminars and leaflets.

*Aided by a video-tape recording of their seminars, a group of senior lecturers from the Education faculty discuss, with the help of a member of the H.E.R.U. staff, their differing techniques for running a seminar*  
Left to right: Dr D. Phillips, Dr J. Cleverley, Mr J. Fyfield, Mr J. Clift



## OPENING OF THE EDUCATION BUILDING



*The new school of education*

On Friday 20 February the new education building was officially opened. The four-storeyed structure comprises lecture theatres, tutorial rooms and staff offices, as well as a Child Study Centre which bears the name of the late Elwyn Morey, an associate professor in the faculty.

The chairman of the Australian Universities Commission, Sir Henry Basten, officially opened the building. He was welcomed by the Chancellor, Sir Douglas Menzies, and the dean of the faculty of Education, Professor R. Selby Smith.

Sir Henry spoke of some of the functions of an education faculty. In the course of his address he said:

'Education as a professional subject in universities has been a Cinderella everywhere. It did not make its first real advance in Britain until after the end of World War II, and Australia followed only later.

'Today no-one would deny the need for the best possible professional training of those who teach in our schools. University departments and faculties of education are at last recognized in Australia as having a professional skill to offer and a commitment to research into the process of learning. I would like to mention that Monash seems to me to have done particularly well in embarking on studies of the environmental problems of those who are to be taught. Those problems are quite fundamental to the process of learning. I hope that having accepted faculties of education into the bodies corporate of our universities, we shall use their special knowledge in examining some of the more general problems which university education now faces.

'I'd like to speak quite briefly about two such problems this afternoon, simply as examples of the kind of thing I have in mind.

The first is the fairly well-known problem of the new graduate in arts or science who doesn't want to engage in research and doesn't want to enter the profession of teaching. Until recently the studies proper to an arts degree, and to some extent to the B.Sc., gave a person qualifications which were deemed to be professionally desirable in an administrator.

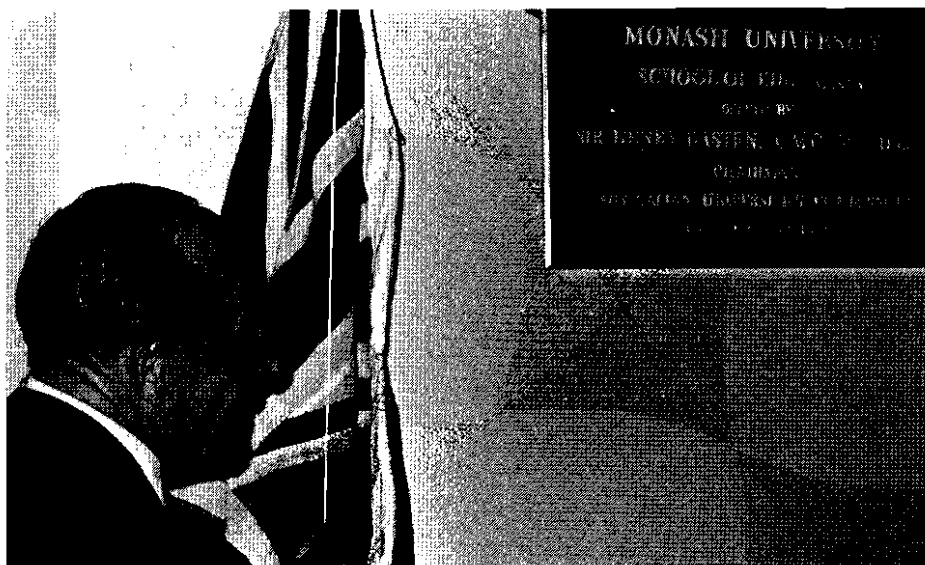
'That was when decisions were made substantially as the result of good general judgement. Now, both in the public service and in business, decisions rest much more on statistical analysis and projections; so the arts degree in particular has come to be less of a qualification than once it was for the various forms of employment open to the young graduate who doesn't want to teach.

He or she often meets difficulty in obtaining employment which is, initially, intellectually satisfying or even well paid.

'Now I don't for a moment suggest that the first degree in arts or in science should itself be given an element of a vocational nature built in solely for utility. Composite courses in which one part is not well related to the whole seldom, if ever, produce good educational results, and, in any event, the purpose of university education, and especially perhaps of the first degree, is to help a person to lead a rich and satisfying life both intellectually and culturally. But a satisfying life necessarily includes, I suggest, an ability to find a rewarding place for oneself in society.

'Now would it not be possible to make more

*The chairman of the A.U.C., Sir Henry Basten, performing the official opening*



widely available graduate courses of one or two years' duration, leading to a Master's degree or to a Diploma, in vocational subjects such as journalism, broadcasting—notably production for radio and television programmes—drama, data processing, business studies, public administration, and so on? 'For my part I see no reason why universities in particular should engage in that kind of teaching. A great deal of it might be successfully performed in Colleges of Advanced Education—they are already in that field.

'Mention of Colleges of Advanced Education leads me to my second, last, and most dangerous topic this afternoon. That is the relation of the Colleges of Advanced Education to the universities. Many calls have been publicly made in the past year or so for governments or committees to define the relations of the colleges and the universities. I am far from sure that any government or any committee could produce a definition of the kind sought, which would be broad enough for general application, and yet precise enough to be in the least illuminating. But, most of all, I am uneasy to hear educational institutions and academic people urging governments to produce such definitions at all.

'If the governments were purposefully to do some such thing, it would really amount to nothing less than telling the universities and the Colleges of Advanced Education what they should and what they should not teach. Surely our institutions of higher education—valuing as they rightly do, autonomy—ought to be defining for themselves their different roles, and they ought to be doing it in consultation with each other. It cannot be said that this task is impossible. 'At least ten years ago the University of Adelaide, acting in association with the neighbouring Institute of Technology, found this process perfectly practicable. The two set up first a joint committee, wholly composed of teachers in the two institutions, and from the work of the committee came the establishment of a permanent joint faculty board, again, a wholly academic body. Its function was to determine the content and supervise the standards of engineering and science courses to be offered at the Institute—courses which would be different from those offered in the University.

'From the deliberations of the joint faculty board there did emerge two genuinely alternative kinds of education in those subjects, both leading to professional recognition, and I think one is justified in saying that the result of that activity has been success for a larger proportion of young people seeking to enter the engineering profession and the professions associated with certain applied sciences than would have been the case had the university courses been the only ones available. I want to suggest to you that the opportunity for imaginative innovation in tertiary education exists, but it can only be well taken, in my judgement, at a practical level, and in the form of courses to be de-

signed by those who will be teaching them. 'Well, I've mentioned, purely as examples, two problems of a general nature facing higher education in Australia. I've drawn attention to them as examples of the kind of general problem into the examination of

which the experience and skill of university faculties of education might be fruitfully drawn.'

At the close of the ceremony the Vice-Chancellor, Dr J. A. L. Matheson, thanked Sir Henry on behalf of the University.

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## NEW COURSE IN MATERIALS ENGINEERING

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Traditionally, the teaching of materials science and engineering in universities has been carried out mainly by departments of metallurgy and, in 1969, some 540 students were enrolled for metallurgy courses in faculties of engineering, science, or applied science at Australian universities. This preoccupation with metals over the years has reflected their importance as engineering materials and has led to significant advances in the understanding of the science of metallurgy. Now, an expanding technology is placing increasing emphasis on a much wider range of materials, and developments in the plastics and electronics industries are examples of the spectacular growth that may follow the introduction of new materials. Because of changes such as these, the trend in many overseas universities has been to diversify activities in departments of metallurgy and to establish new departments of materials science and engineering. It is with these developments in mind, as well as to satisfy local demands, that a department of Materials Engineering has been established at Monash University. The chairman is Professor I. J. Polmear and the present staff comprises three senior lecturers, a senior teaching fellow and two research fellows supported by outside funds. Five graduate students are studying for higher degrees. Previously the staff had comprised the materials science group in the department of Civil Engineering.

The new department will expand to occupy 10,500 square feet of net laboratory space when a new building is completed in 1971-2. So far as equipment is concerned, the major items at present installed or on order include a 120 kv electron microscope (see photograph), X-ray diffractometer and fluorescence units, induction heater, Instron testing machine, plasma generator, instrumented rolling mill, deep drawing press and facilities for the processing of plastics and ceramics. Research interests include stress relaxation mechanisms in steels, surface phenomena associated with friction and abrasion of ceramics, deformation and yield in polymers, mechanics of rolling, lubrication in metal working processes, mechanisms of adhesion, stress-corrosion cracking in welded light alloy structures, trace element effects in age hardening alloys, fine oxides produced by plasma methods, and the



*High resolution electron microscope used in the department of Materials Engineering*

strength and fracture toughness of fibre-reinforced composites.

A second development is the introduction of a new undergraduate course leading to a B.E. degree in which attention will be concentrated on the secondary aspects of materials. The first, and parts of the second and third years, will include subjects which are taken by all engineering students, but the major part of the course will comprise an inter-disciplinary treatment of metals, plastics, rubbers and ceramics in which a central theme will be the study of the relationships between the structure and properties of materials with the aim of their economic utilization in a wide range of technology. It is believed that the course should appeal particularly to students interested in applied science and that it should be equally attractive to members of both sexes.

With regard to employment, a survey has shown that a need exists for materials engineers notably in local industrial or government research organizations; government instrumentalities such as those associated with power generation, communication and transport; and in a wide range of manufacturing industries including those concerned with the processing of metals, plastics, rubbers and ceramics; heavy engineering; paper-making; electronic device technology; and packaging.

## A VISIT TO SOME FAMOUS LIBRARIES

By Jacqueline Baillie, Librarian, Biomedical Library

Since returning from overseas I have been asked many times, 'Did you visit the XYZ library—that is a beautiful library, isn't it?' A librarian is apt to have different standards of beauty for libraries than do other people. Even on a tourist visit to the Bodleian, with head tipped back to view the famous painted ceilings, one finds oneself wondering, 'How does the place work without a subject catalogue?'

How they work, not how they look, is generally the professional librarian's touchstone.

During my leave I visited more than eighty libraries with this rather utilitarian criterion in mind. Most of them were in the medical or related fields. I took what opportunity offered, however, to look at the great and famous national collections, public libraries and the like.

As a librarian, I would enthuse, for example, over the service given at the University of Ireland, University College Library in Dublin. Here they have at least one (more often two) fully-qualified reference librarians on duty at all times, in addition to the normal desk staff. Yet to the casual visitor there is little of comfort or convenience in this crowded library, let alone anything of aesthetic delight.

Perhaps the most depressing exercise is a visit to the national collection in practically any capital city.

Compared to some, the British Museum is clean and attractive. But it is common knowledge that it has long since outgrown its historic home. As it becomes less and less able to meet the demands made upon it there is a rising tide of complaints. Still, to this visitor, it had a great attraction.

The same could not be said for the Kongelige Bibliotek in Copenhagen or the National Library of Ireland in Dublin. Old, dusty, neglected, but having this remarkable fact in common: every seat occupied. In Dublin, the entrance foyer was piled high with valuable newspaper files (recording, no doubt, within their neglected covers, Ireland's troubled history).

Public librarians I spoke to everywhere had the same story to tell as we might hear from our own State Library of Melbourne: indifference from the authorities in spite of the demonstrable public demand for library services.

We move into a different world when we enter the libraries of the learned societies. For instance, the opulence of the library of the Royal Society of Physicians is unequalled. The Society's new building is in itself something unusual in London for its striking modern architecture. Inside, quiet, hallowed, with nobody but ourselves walking the ceremonial rampways. Except for a small plaque



*Library at Guelph University, Ontario, Canada*

set into the footpath the building is not named; it is assumed that you know what it is or you should not be there.

Less rarefied, but still definitely a 'dignified establishment', is the library of the Royal College of Surgeons. The Wellcome Institute similarly provides a fit and graceful setting for the prime historical medical collection in England. The Royal Society of Medicine Library on the other hand is a hurly-burly of activity and service to its many members. This was one of the most interesting libraries I visited on my tour.

On the other side of the Atlantic, the medical libraries of Toronto and Montreal seem planned with a spaciousness that is positively sinful to anyone schooled in the penny-pinching norms of the AUC.

McGill University Medical School Library, for example, allows 400 square feet per staff member. A not unreasonable standard might be, say, 100 square feet. By comparison, in our biomedical library office we house six members of staff in approximately 400 square feet.

At Guelph University (Canada), where a former Agricultural College of the University of Toronto is being transformed into a full university by a multi-million dollar development programme, the library combines the best that modern planning can offer. With furniture designed (in conjunction with the librarians) for maximum utility and flexibility of spatial arrangements, it has a striking modern decoration and completely mechanized and computerized library systems—and all with due regard for value for

money spent. This is the true synthesis of form and function.

In the same class are some of the small branch libraries being built at Blindern for the University of Oslo. Scandinavian libraries, contrary to legend, are not all new and up-to-date; but when they are, one sees the elegant simplicity which has become the Scandinavian trademark.

How do our libraries in Australia compare? Even the new libraries like our own biomedical library at Monash or the Brownless Medical Library at Melbourne University, in comparison with Canadian and American libraries, are over-crowded with seating.

Compared with British and European libraries we are short on both tradition and on resources; but our students have much more going for them in the way of comfortable surroundings and good seating than do their unfortunate counterparts in other parts of the Old World. The Lenin Library in Moscow has 25,000,000 books but only 2,500 seats; public and students alike have to queue for them. Practically nothing at all is on open access in European libraries. But I still have to answer the question 'which was the most beautiful library you saw?' After all this I think I would say the Strahov Library of Philosophy and Theology in the old city of Prague. The building and collection constitute a great work of art beautifully preserved as a national treasure. The library is still used for historical reference, but it is beautiful precisely because its custodians have recognized the unity and integrity of the building and the collection.



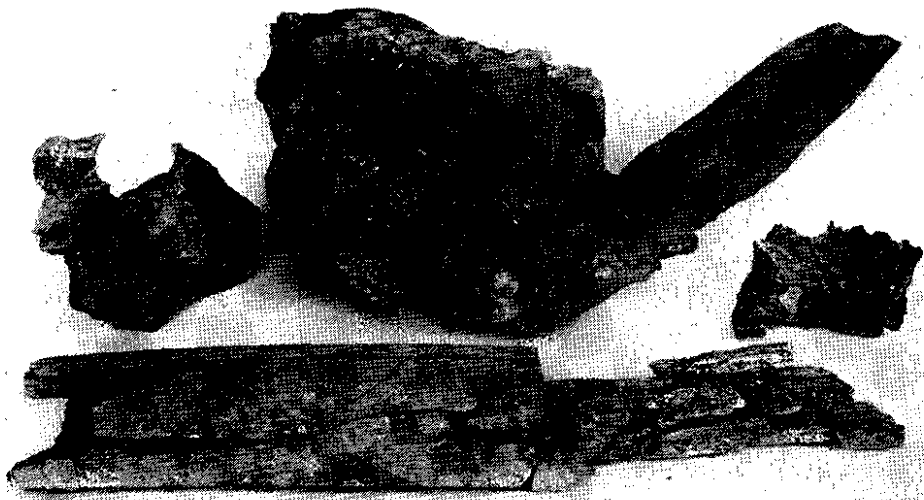
In October of 1969 the National Museum and our department of Zoology excavated a fossil whale from the quarry of the Australian Lime Company at Timboon, Western Victoria. A great deal of popular interest in the whale was engendered by new agencies and a report of it was even carried in *Pravda*. The degree of popular interest was out of perspective with the scientific value of the specimen, which has so far proven to be slight.

The whale was entombed in a layer of clay intercalated in limestone strata. It was discovered about twenty-five feet up an abandoned face of the quarry by one of the quarrymen, who reported it to the local mining inspector, and by this avenue it was brought to the attention of interested scientists. The quarry at Timboon contains many invertebrate fossils which have been well studied and whose nature suggests that the quarry is of late Oligocene age, that is 30,000,000 years old, and this must be the age of the whale.

The specimen consisted of a skull, some five feet long, and a series of vertebrae extending through the neck region and into the thorax. Abdominal and caudal vertebrae were missing, but from the undisturbed nature of what remained of the skeleton, it is clear that the entire animal, which I estimate to have been about thirty feet in length, must have been preserved. The posterior portion of the whale had been lost in earlier quarrying activities.

Although at first glance the specimen appeared to be very well preserved and worth the effort of excavation, the bone proved to be soft and friable and much of it crumbled while it was being removed. There are methods for reinforcing fossil bone in this condition to ensure that it will remain intact, but it was thought that the value of the specimen did not merit this as it would have extended the excavation time to at least a week.

The fossil whale belongs to a peculiar family of cetaceans, the *Ziphiidae* or beaked whales, which is still extant today though it is extremely rare. The beaked whales are unique in that they possess neither baleen plates in the mouth for filtration of planktonic organisms for food nor, with the exception of only two of the males, do they possess teeth. Male beaked whales have these two large teeth placed near the tip of the long lower jaw. How these animals feed is a mystery. What the function of the sole two protruding teeth in the males might be is also a mystery, though it affords amusing speculation. This specimen, by the way, was a female.



The fossil

Because the specimen was undistorted most of the morphological features considered significant in understanding adaptations and evolutionary changes in whales are well preserved and can be studied. A portion of the braincase had eroded away revealing that the internal chambers of the skull were filled with a limestone matrix. This filling, or internal mold, is of interest as it partly represents the shape of the brain, and also will allow reconstruction of the many air spaces that are characteristic of the skulls of whales. In contemporary whales these air spaces play an important part in insulating regions of the skull from the high frequency sounds that are emitted by these animals and that seem to provide an echo location mechanism for the detection of objects in the environment. Some biologists suggest that they may also serve in communication, though this has not yet been demonstrated. For these reasons it would be interesting to calculate some of the acoustical properties of early, possibly more primitive, whale skulls and this fossil may provide some opportunity to do this.

The earliest known fossil whales occurred some 60,000,000 years ago and hold a great deal of interest to students of evolution because the transition from the terrestrial environment, which was occupied by ancestral mammals, to an aquatic existence must have represented a major ecological and physiological shift. Unlike the transitions from primitive fishes to amphibians, amphibians to reptiles, reptiles to birds, and reptiles to mammals, all of which are represented by perfectly intermediate fossil animals, the ancestral cetaceans that were invading the oceans and which must have retained primi-

tive, terrestrial features in conjunction with the more advanced ones that fitted them for an aquatic existence, are unknown to us.

The Timboon whale, being 30,000,000 years old, is much too young to be of help in understanding this critical transitional phase in mammalian evolution and this I feel reduces its scientific value. However, it may ultimately be of interest to biologists concerned with the phylogeny of the very strange beaked whales or with previous stages in the development of the acoustical apparatus of whales. Even so, it will only gain this significance after sufficiently more fossil specimens of different ages have been discovered, to afford a more complete, sequential picture.

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#### EAST-WEST CENTER SENIOR SPECIALIST

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In June this year the University of Hawaii Board of Regents appointed Professor R. Taft, professor of Social Psychology in the faculty of Education, as an East-West Center senior specialist. He is one of six professors, research specialists and administrators thus to be appointed. They will be associated either with the new East-West Culture Learning Institute or a special culture and mental health programme.

Professor Taft himself will work with the Institute and will be at the Center from November 1970 to March 1971. He will be involved in planning an international seminar in culture learning and will also engage in research on bio-culturality and cognitive growth.

## SEVEN HONORARY DEGREES

Since publication of the last issue of the *Gazette* seven further honorary degrees have been conferred by the University.

*Citation delivered by Dr J. A. L. Matheson on the occasion of the conferring of the degree of Doctor of Medicine honoris causa upon Sir Hugh Ennor:*

It could be thought that to invite a distinguished biochemist and educational administrator to accept the degree of Doctor of Medicine was to be rather inconsistent. But not a bit of it. The faculty of Medicine,



Sir Hugh Ennor

for which I am privileged to speak, is anxious not only to recognize Sir Hugh Ennor's valuable contributions to biochemistry and education but also to legitimize his long association with medical science.

He started his academic career by graduating in biochemistry from Melbourne University, and he then worked as a biochemist at the Baker Institute until 1942. From then until the end of the war he was with the Ministry of Munitions. In 1946 he went to Oxford with a Wellcome Fellowship and in 1948 was elected to the chair of Biochemistry at the newly-founded Australian National University.

This was a time of great importance to Australian universities for the Australian National University was an experiment along lines that were new to this country; it was essential both that it should succeed and that it should do so without damage to the existing State universities. At that time the graduate side of even the long-established places like Melbourne and Sydney was pitifully undeveloped, while the post-war undergraduate numbers were almost overwhelming.

I was then at Melbourne and I recall that we learned about the establishment of the

Australian National University with some alarm, thinking that this new creation of the Federal Government might make things very difficult for us. But the early professors in Canberra, while concerned to establish work at the highest academic level, were equally concerned to do so to the advantage and not to the detriment of their perhaps less fortunate colleagues elsewhere. The result, as we can now see, has been a great accession of strength to the Australian academic community, and it is good that on this occasion we can express our appreciation to one who was in a key position at the Australian National University throughout the formative period.

Hugh Ennor occupied his chair there, in the John Curtin School of Medical Research, for nineteen years; for fourteen of those years he was dean of the school and for the last three Deputy Vice-Chancellor of the University. He is thus thoroughly experienced in academic matters and it was a cause of great satisfaction to all university people when he was appointed secretary to the Commonwealth Department of Education and Science. In this important position he has great influence over government policy in many matters of vital concern to universities and we were correspondingly pleased that one of the family, so to speak, had taken this job. It is true that on occasion he has spoken of the deficiencies of universities with brotherly frankness but we, while marvelling at the legerdemain with which he juggles with statistics, must admit that his strictures have to be listened to.

He is a Fellow of the Australian Academy and was knighted in 1965 partly, it is understood, in recognition of his long service to the National Heart Foundation. But, in spite of his having directed the affairs of the John Curtin School of Medical Research for many years he has no medical qualification. This we propose now to rectify, but with the reservation that the doctorate is an honorary one conferring neither the right to practise nor to prescribe.

*Citation delivered by Professor J. E. Isaac on the occasion of the conferring of the degree of Doctor of Laws honoris causa upon Mr Albert Edward Monk:*

I should like to read from a document which allegedly was posted on the Staff Notice Board of a firm of ships' chandlers in 1852:

*Copy of Official Rules Issued by a Sydney Firm of Merchants and Ships' Chandlers, 1852.\**

#### RULES FOR THE CLERICAL STAFF

1. Godliness, Cleanliness and Punctuality are the necessities of a good business.
2. On the recommendation of the Governor of this Colony, this firm has reduced the

\* Taken from the State Electricity Commission Officers' Association News, December 1961.

hours of work, and the Clerical Staff will now only have to be present between the hours of 7 a.m. and 6 p.m. on week-days. The Sabbath is for Worship, but should any Man-of-War or other vessel require victualing, the Clerical Staff will work on the Sabbath.

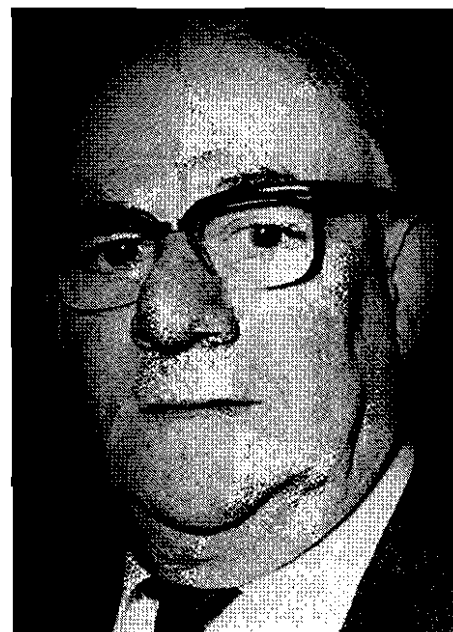
3. Daily Prayers will be held each morning in the Main Office. The Clerical Staff will be present.

4. Clothing must be of sober nature. The Clerical Staff will not disport Themselves in raiment of bright colours, nor will they wear hose, unless in good repair.

5. Overshoes and Top-Coats may not be worn in the Office but Neck Scarves and Headwear may be worn in inclement weather.

6. A stove is provided for the benefit of the Clerical Staff. Coal and wood must be kept in the locker. It is recommended that each member of the Clerical Staff bring 4 pounds of coal, each day, during the cold weather.

7. No member of the Clerical Staff may leave the room without permission from Mr Ryder. The calls of nature are permitted, and the Clerical Staff may use the



Mr Albert Monk

garden below the second gate. This area must be kept in good order.

8. No talking is allowed during business hours.

9. The craving for tobacco, wines or spirits is a human weakness, and, as such, is forbidden to all members of the Clerical Staff.

10. Now that the hours of business have been drastically reduced, the partaking of food is allowed between 11.30 a.m. and noon, but work will not, on any account, cease.

11. Members of the Clerical Staff will pro-

vide their own pens. A new sharpener is available; on application, to Mr Ryder.

12. Mr Ryder will nominate a Senior Clerk to be responsible for the cleanliness of the Main Office and the Private Office, and all Boys and Juniors will report to him 40 minutes before Prayers, and will remain after closing hours for similar work. Brushes, Brooms, Scrubbers and Soap are provided by the Owners.

13. The New Increased Weekly Wages are as hereunder detailed:

Junior Boys (to 11 years) 1/4d;

Boys (to 14 years) 2/1d;

Juniors 4/8d;

Junior Clerks 8/7d;

Clerks 10/9d;

Senior Clerks (after 15 years with the Owners) 21/-d.

The owners hereby recognize the generosity of the new labour laws, but will expect a great rise in output of work to compensate for these near Utopian conditions.

I am told that this is not an authentic piece of history but that it was slipped into the industrial archives by an imaginative humorist. Nevertheless, it probably described fairly accurately the relationship in the 1850s between the employer and the worker, the master and the servant, as they were known in those days. We have progressed far since those days. Not only have wages, hours and general conditions of work improved beyond the wildest dreams of Mr Ryder's wretched staff, but the worker has been accorded a status in keeping with his rights as a human being.

There is no need for me to give you a list of the prevailing conditions of work. Assuming that the past movements will continue, we may expect the level of real wages at least to double by the end of this century and the amount of leisure available to the worker to be increased. Affluence, of course, brings its own problems but at least it gives us the economic capacity to deal with them.

There is, of course, the philosophical question whether the primitive subsistence social system in parts of Africa and the Highlands of New Guinea provide the basis for a better life than our affluent society. But I don't pretend to know the answer to this question.

The course of economic history since the first industrial revolution has thrown considerable doubt on the predictions which Karl Marx made a hundred years ago. He predicted that in industrial countries wages would not rise above bare subsistence level, that the share of wages in the national product would continue to dwindle and that misery and unemployment would grow and grow until the whole social and economic system would collapse under its weight. In fact, what has tended to happen in most industrially developed countries is that real wages have kept pace with the increased output per worker (roughly 2 per cent per annum) and that the rate of profit on capi-

tal has not risen and that, furthermore, we seem to have acquired the ability to avoid the kind of unemployment Marx prophesied. For the last twenty-five years, our rate of unemployment has rarely risen for more than a few months above 1.5 per cent. Marx was right in drawing attention to the social injustices of his time and there is every reason why we should continue to do so. But his predictions of the course of economic events have been somewhat astray—so far, anyway.

A vital stimulus, industrial and political, in this economic progress has come from the trade union movement. Again this was contrary to Marx's prediction. He did not believe that unionism could raise the level of wages above subsistence or stem the tide of unemployment.

To the casual onlooker who obtains his diet of industrial intelligence from headlines, trade unions appear as the instigators of industrial disorder: they are always asking for more and being very difficult about it. Those who think more deeply about industrial relations believe that despite the considerable harmony of interest which exists between workers and employers, conflict is inherent in industrial relations. In a constantly changing world, fundamental differences are bound to arise as each group strives to obtain what it sees as its rightful dues. This is not a sign of a morbid society. Indeed, it is this situation of constant conflict which provides the fuel for economic and human progress. The important thing, of course, is that means should exist for resolving such conflict without social and economic collapse. The development of trade unionism, intent on improving the conditions of the workers, provided the means for containing conflict and resolving conflicting issues as they arise, to create the basis for evolutionary progress and social and political stability.

It is unfortunate that the publicity given to strikes tends to obscure the important role which union officials in general, and the Australian Council of Trade Unions and its branches in particular, play in helping to resolve industrial conflict and reducing the incidence of strikes. Strikes, it should be remembered, usually affect wage earners and their families at least as hard as other sections of the community. It is a pity too that publicity about strikes tends to hide the cold statistical fact that in Australia the amount of time lost through strikes in the last twenty years has rarely exceeded an average of two hours per worker per year; and if two small but somewhat troubled industries are excluded, the figure falls to below one hour per worker per year.

What I am trying to do in a few words is to emphasize the important and extremely difficult role which trade union leaders perform in advancing the causes of wage and salary earners who make up the bulk of the workforce, and doing so in a manner which minimizes industrial breakdown. For, despite the appearance of industrial chaos,

there is system and order in industrial relations. Our economic progress is tangible evidence of this.

In Australia one of the signs of system, cohesion and stability in industrial relations has been Mr Albert Monk's active presence for half a century in the highest councils of organized labour. In that time the labour movement has changed greatly, its fortunes have ebbed and flowed. Our governments, our social and industrial structures, our sense of community and international responsibilities have all altered profoundly; and each change has called for some response on the part of working men and women and their industrial representatives. Throughout most of this period, Mr Monk remained at the head of the trade union movement and to many of us he has been the voice of organized labour for all our lives. His continued presence in the ever-changing, tumultuous and sometimes acrimonious and confusing world of industrial relations is a significant reminder that it is an orderly world.

In 1927, at the first meeting of the ACTU executive, Mr Monk was present in an administrative capacity, having had nearly ten years of service as a trade union official. Then followed the years of depression in the middle of which he was elected president of the ACTU. He led organized labour in the difficult years of the depression and later of war into the prosperous peace that followed. At the end of 1969 he presided for the last time over the same body which he had helped to create.

One would hesitate to select any of Mr Monk's achievements as being his greatest. Perhaps they are all summed up in his qualities of leadership which are revealed in his organizational and negotiating skills, his sense of timing, his tact, his tenacity in matters he believed to be right—all this without drama or charisma. He has well earned the title 'the gentle rebel'. These qualities kept the labour movement united in difficult times and have won concessions and respect for the union point of view in government committees and employer organizations.

Outside his own country, and particularly at the International Labour Organization, Mr Monk has left a lasting impression, an impression that belies the numerical insignificance of the Australian workforce and the eccentricities of its industrial relations system. He was on the governing body of the ILO from 1945 to 1969 and, in his last year, he was elected vice-president of the International Labour Conference on its fiftieth anniversary. From 1951 to 1969 he was a member of the executive board of the International Confederation of Free Trade Unions.

It is in this sphere of international activity that best exemplifies those qualities of Albert Monk which the whole nation has come to recognize and admire. In the Australian environment he has constantly reminded us of the rights and duties of labour,

and that it is inevitable that labour must struggle for its rights against the employer. But in his international activities, Albert Monk's contribution has been to emphasize that humanity as a whole is engaged in a greater struggle which over-rides the competing interests of employer and employee—the struggle to rise from the depth of poverty and ignorance to enlightened peace and prosperity.

And now Mr Monk has retired to write the history of the organization he helped to build. It will also be the history of Albert Monk.

It is fitting that Monash University should acknowledge this man's work.

*Citation delivered by Professor G. R. Manton on the occasion of the conferring of the degree of Doctor of Letters honoris causa upon Dr Ursula Hoff:*

For the second time in its history, Monash tonight confers the honorary degree of Doctor of Letters. As is only fitting, the choice has fallen on a scholar of world-wide reputation and of outstanding service to Australia, and it is a source of encourage-



Dr Ursula Hoff

ment to myself and my colleagues in the Arts faculty, at a time when we are planning to establish a department of Visual Arts, that the recipient is an art historian. Ursula Hoff was born in London but educated in Germany. Her main university was Hamburg, but like many other enterprising students in Continental universities she attended several. Among her teachers in Hamburg she especially acknowledges her debt to Erwin Panofsky, one of the greatest living art historians, and to Fritz Saxl, who was director of the Warburg Institute in Hamburg and moved with it to London in 1933. There it has thrived as a centre for the study of the great classical and humanistic tradition of Europe in all its aspects, not least in those concerned with the visual arts,

It seems that such connections as Ursula Hoff had with England may have had some influence on the direction of her studies, since the subject of her doctoral thesis was 'Rembrandt and England', and during the years immediately before the war she studied in London and held positions at the Courtauld Institute and at the British Museum.

It is as an authority on Rembrandt that she is best known. Her contributions were recognized by the Dutch Government in 1956 when she was invited to represent the National Gallery of Victoria at the Rembrandt tercentenary. In 1966, she won the Britannica Australia award. In 1969, the City of Bruges invited her to attend the International Exhibition of Anonymous Flemish Primitives. In October of last year, she attended a Rembrandt symposium in Chicago which arose out of the recently published catalogue of the works of Rembrandt by Horst Gerson. Many of the present audience will remember how, when somewhat hasty judgement had been passed on the National Gallery's self-portrait by an art historian who had not visited Australia, it was Dr Ursula Hoff who was able immediately to produce the evidence which reinstated the self-portrait as an undoubtedly genuine work of Rembrandt.

She came to Australia before the war, and within two or three years of her arrival became assistant keeper of the National Gallery of Victoria. From 1950 onwards, soon after the arrival of Professor Burke to take up the foundation chair of Fine Arts in Melbourne, she joined his staff as a part-time lecturer.

Since 1956, she has been curator of prints and drawing at the National Gallery. She has also served on the Council of the National Library in Canberra and the Australian Humanities Research Council.

Among her publications are monographs on Charles I as patron of the arts and on Charles Conder, the Australian painter. Her *Catalogue of European Paintings Before 1800 in the Victorian National Gallery* is a major work which set new standards in art history in Australia. She has been responsible for various other National Gallery publications and, as editor and part author, must take the main credit for the magnificent volume entitled *Painting, Drawing and Sculpture in the National Gallery*, which was published in 1968 when the Gallery moved to its new quarters.

It is well known that the National Gallery of Victoria, after small beginnings early in the 1860's, suddenly became, in 1905, the recipient of the Felton Bequest, which brought to the trustees and to a succession of directors the possibility of raising the Gallery to international status.

But a mere collection of paintings, however carefully it has been purchased in the first place and however valuable it may have become as the years have gone by, is not in itself a possession of which its owner, whether he is a private individual or a city or a nation, is entitled to be proud. We do

not earn the right to call ourselves the owners of a collection merely because someone gave us the money to buy it and we were fortunate in our choice of advisers. The collection only becomes ours by right when we have studied it and researched into it, when the paintings have been judged and assessed in relation to each other, in relation to works of art in other great collections, and in relation to the life and times in which they were produced.

This is the especial achievement of Dr Ursula Hoff. By her work within the Gallery and by her publications and her teaching she has enabled those of us who are prepared to take advantage of her work to know and truly to possess our national collection. What is more, she has enabled us to see the work of our own Australian artists from the Heidelberg School to the present day in relation to the European tradition.

And her influence in this regard has extended far beyond Melbourne. As the present director says in his foreword to *Painting, Drawing and Sculpture*, 'she has set standards of scholarship and sensibility in the visual arts which have affected every public gallery in this country.'

*Citation delivered by Professor K. C. Westfold on the occasion of the conferring of the degree of Doctor of Science honoris causa upon Dr Alan Walsh:*

Scientists are by training, if not nature, persons who employ resource in tackling problems within their various fields of competence. With different admixtures of hard work and insight, some have been able to develop and apply brilliant *ad hoc* techniques, or variations on previously developed techniques, which have enabled them to master some of those problems. The way is arduous and strewn with attempts that have come to nothing. All too often fruitful ideas are thrown up in discussions with colleagues, kicked around over cups of tea, and then left languishing. It is given to few to perceive and evolve an idea in the mind, to work at it at the desk and laboratory bench, and finally design and put together equipment that will demonstrate both the validity of the original idea and its latent power yet to be realized.

Alan Walsh has done this more than once during his scientific career. After graduating in physics from the University of Manchester in 1938 he joined the British Non-Ferrous Metals Research Association, serving there from 1939 to 1946, including a year at the Ministry of Aircraft Production. In 1946 he joined the CSIRO Division of Chemical Physics in Melbourne, where he now holds the position of Assistant Chief of Division.

Dr Walsh's field is spectroscopy. In your professional position, Mr Chancellor, you are continually being offered information about diverse matters on which you must arrive at some judgment. May I today offer you the information, solely for your edi-



fication, that spectroscopy is that branch of science that deals with the characteristic patterns of radiation emitted from the multifarious atoms and molecules found in nature when appropriately excited, and their complementary patterns of absorption in a radiation field? The spectrum ranges from the radio waves which inform and entertain you, through the infra-red which warms your body and the visible colours that enrich a spectacle such as this, to the X-rays used to diagnose, and perhaps treat, your specific disorders.

In spectroscopy Dr Walsh has made a number of outstanding contributions which have achieved international recognition. I mention only one of these, and this because of



Dr Alan Walsh

its enormous significance in the present and future condition of the Australian economy. Absorption lines in the spectrum of the sun's radiation were first observed by Wollaston in 1802 and studied in detail by Fraunhofer in 1814. Not until 1859, after brilliant experimental work by Kirchhoff, was it understood that these lines denoted the presence of metals such as iron and calcium in the sun's atmosphere. Since then the determination and classification of the absorption spectra from stars has become the principal tool used by astronomers to infer in quite remarkable detail the chemical composition and physical state of the stars that stud the heavens. Yet not until the present day has the potentiality of this technique for determining the metallic composition of substances found on earth been realized. For this realization and the design of an instrument to perform the measurements, Alan Walsh is responsible.

This technique has completely revolutionized trace analysis in analytical chemistry. It is used in food control, medical research, agricultural science, and mineral exploration,

where the instrument can be operated without difficulty in remote areas. Extensive manufacture under licence to CSIRO has developed in Australia, and in Europe, the USA and Japan. Some idea of the significance of this new technique can be gauged from the results of a cost-benefit analysis, which put the figure of some \$22 million as the contribution it has made to the Australian economy up to June 1968; this figure has been projected to \$120 million by 1978. Again, a mineral assay can now be carried out at a cost of \$1.50 in place of the previous figure of \$5.50, and in a fraction of the time required for the previous classical methods.

Alan Walsh is a Fellow of the Institute of Physics and Physical Society, Fellow of the Australian Institute of Physics and its immediate past president, Fellow of the Australian Academy of Science, and a past member of its Council, Fellow of the Royal Society. He was awarded the Britannica Australia Award in 1966, the Research Medal of the Royal Society of Victoria in 1968, and the Talanta Medal in 1969. He was made an Honorary Member of the Society for Analytical Chemistry in 1969, and a Foreign Member, Royal Academy of Sciences, Stockholm, Sweden, in 1969.

In awarding its honorary degrees to distinguished scholars this University both recognizes and associates itself with the distinctions they have achieved. In the case of the present graduand and his colleagues, who are our neighbours on this campus, a close association with this faculty has been in existence for many years.

*Citation delivered by Dr J. A. L. Matheson on the occasion of the conferring of the degree of Doctor of Engineering honoris causa upon Sir Walter Bassett:*

In 1919 young Walter Bassett, back from the war with a Military Cross and a stiff leg, joined the staff of the engineering school of Melbourne University. We celebrate today his fifty years' membership of staff, faculty and Council of two of Victoria's universities; this is a record that can but rarely have been equalled, much less surpassed, and we are duly grateful especially for that part of his service—the riper part shall we say—which Monash has enjoyed in the last dozen years or so.

He personifies engineering history in this country in a unique way for, when he graduated in 1914, he was among the very first group of Bachelors of Electrical Engineering of Melbourne University. In the latter part of the Great War he transferred from the Field Engineers to the new Australian Flying Corps; and he was a foundation member of the Institution of Engineers, Australia.

You will see from this mini-biography that to the pioneer's liking for being in at the beginning of things he brings that talent for perceiving future success which is characteristic of a good engineer. We call this talent judgement, and it is a talent which

engineers must continue to cultivate even in these days when it almost seems that computers are replacing our brains as well as our slide rules. But even computers have to be pointed in the right direction, and this is where judgement comes in.

Judgement, it has been said, is a compact of experience, temperament, imagination and reason, and Walter Bassett's career testifies to the truth of that definition.

His lectures in mechanical engineering are still remembered by his former pupils as being models of their kind; as well as being clear, logical and informative they went beyond the mere exposition of engineering principles into the practice, ethics and philosophy of the profession of engineering; in today's jargon they were 'relevant'.

But although his talents for teaching and scholarship would undoubtedly have taken him far in an academic career his real love was for the practice of engineering. While still at Melbourne University he built the first wind tunnel in Australia, and this is still in use having survived many modifications. He began to give professional advice on such matters as air-conditioning, and in 1930 he began full-time practice as a consulting engineer. His field is the mechanical and electrical equipment of hospitals, city



Sir Walter Bassett

buildings and factories, and he has done work for several universities, including this one.

During the Second War he carried out extensive work for the Allied Works Council, including such novel projects as low-pressure chambers for training RAAF pilots, and equipment for the production of penicillin at the Commonwealth Serum Laboratories. In addition to his consulting work he holds many important positions in industry such as director of the Gas and Fuel Corporation, president of the Mount Lyell Mining and Railway Company Limited, and Renison Limited. He was the foundation president of the Copper Producers' Association of

Australia, and was a member of the board of the Colonial Mutual Life Assurance Society Ltd., and of a number of leading fertilizer companies.

He has won many honours: the Kernot Memorial Medal of Melbourne University; the Peter Nicol Russell Medal of the Institution of Engineers, Australia, over which he presided in 1942; and he received the K.B.E. in 1959.

Those of us who have some familiarity with the rigour and sophistication of engineering theory are apt to squirm at the school-master's advice—let young Johnny become an engineer, he is so good with his hands; but, you know, there is something in it! Certainly one can think of many engineers who find relaxation in their workshops. Walter Bassett, it seems, does not really relax in his workshop: he brings to his hobby the same thought and skill as he uses in his daily professional life. His famous rotating cake stand, which he makes for fortunate friends, is a triumph of economical design, elegant craftsmanship, low running cost and indefinite life.

Fishing, too, is an intellectual exercise for him, as the schnapper of Port Phillip have reason to know: he has pursued them with cunning and determination for getting on for seventy years, and seldom comes home empty-handed.

I spoke earlier of his powers of good judgement; these were never exercised to better effect than when, in 1923, he married Marnie Masson and so established that remarkable firm, W. E. Bassett and Partner. This University is proud that, after today, both the partners will be numbered among its honorary graduates.

*Citation delivered by Professor K. C. Westfold on the occasion of the conferring of the degree of Doctor of Science honoris causa upon Professor Rutherford Ness Robertson:*

When we first look at the community of objects, living and inanimate, in the environment provided by this planet we cannot but be struck by the fact that living organisms grow and multiply, in the face of a host of natural processes that are heavily biased towards their breakdown and decay. A graphic illustration of this tendency is provided by the case of a certain Mr Valdemar, which was carefully reported in the literature over a century ago and can be found reprinted in the collected works of E. A. Poe. You will recall that this Mr Valdemar was maintained in an intermediate state after death for seven months. When the mesmeric trance was broken his body immediately degenerated into what Poe described as 'a liquid mass of loathsome—of detestable putridity.' Living organisms subsist only by the continuous expenditure of energy, which must be provided from their surroundings.

The basic unit of living systems is the cell, which is itself a structure of fragile complexity. In a cell, energy extracted from

outside the system is transformed into work of various kinds that constitute the life processes of organisms. One of these processes is respiration, in which oxygen combines with fuels such as glucose within the cell and yields energy to do the work required, be it muscular contraction, transfer of nerve impulses, or whatever.

Rutherford Ness Robertson has worked in this field for some thirty years in the University of Sydney, the CSIRO Division of Food Preservation, and the University of



Professor R. N. Robertson

Adelaide, where he was professor of Botany until last year. He began with the study of the pumping of salts into plant cells and his group in Sydney was the first to obtain good quantitative evidence for a close relation between the amount of salt pumped and the amount of oxygen consumed in respiration. The gradual elucidation of these processes over the years has led him into the realm of biochemistry, where one of the major problems is how the energy-bearing compound ATP is formed in the sub-cellular particles known as mitochondria. Robertson has more recently championed the view that this process and ion pumping are alternative uses of a more functional energy source, the breaking up of hydrogen atoms into protons and electrons, separated across cell membranes.

Along with the development of these concepts, which he has recently incorporated into a book, Professor Robertson has over the years shown a genius for inspiring young research workers to test his ideas with experiments. His Sydney unit was a major training ground for plant physiologists for a generation. He is one of the few Australian plant physiologists who have gained the complete confidence and respect of his American colleagues, and has thus been able to form an important bridge facilitating the passage of young research workers between the two countries.

He was elected to the Australian Academy of Science in 1954, the Royal Society of London in 1961, and achieved the rare distinction of election as a Foreign Associate of the United States National Academy of Sciences in 1962. In the more general field of Australian science, Robertson was appointed the first chairman of the Australian Research Grants Committee in 1965. It speaks volumes for the gentleness and understanding of its chairman that one is not aware of any fundamental criticism of the way that committee has disbursed its meagre funds over the years to contenders from all over Australia. His just reward on retirement last year from that position and from his chair of Botany in Adelaide was his appointment as master of University House at the Australian National University. Last year he was awarded the honorary degree of Doctor of Science from the University of Cambridge. He has just been elected to the presidency of the Australian Academy of Science.

*Citation delivered by Professor K. C. Westfold on the occasion of the conferring of the degree of Master of Science honoris causa upon Mr James Leslie William:*

Research in science cannot proceed without measurement. Indeed, I believe that the principal criterion on which a discipline should qualify for admission into the distinguished company of the sciences is that the data upon which its superstructure is raised are based on measurements.

It is probably true to say that measurements in any science are, in the first instance, made by human beings. But human beings are notoriously unstable instruments. A set of measurements collected by such creatures is usually overlaid by so much noise as to be quite unsuitable for drawing any but the grossest of inferences. No—when it comes to making high-precision measurements, inanimate creatures, instruments designed by human beings for particular purposes, take pride of place.

James Leslie William stands high in the world company of scientific-instrument makers. In this country he was a pioneer in high-precision electrical instrumentation. During the last war he was able to design and produce locally instruments which were of vital importance to the defence of this country. His factory in Hughesdale is a repository of high technical skill, where only the best will suffice. His instruments are to be found in Standards and other laboratories throughout the country.

William began his manufacturing career at the age of eighteen after acquiring his design knowledge from the study of the works of Clerk Maxwell and the British Association Reports on electrical instrumentation in the library of the University of Melbourne. He qualified for matriculation in his spare time, but, until this evening, he has been without a university degree. It is gratifying that the Australian Institute of Physics did not allow William's lack of formal academic

Child care and child study have been recognized for a long time as areas of concern—social, psychological, educational, and medical.

Monash is now in the fortunate position of having, in the Elwyn Morey Child Study Centre, a focus for these concerns, and a place in which the University can exercise some of its specialist services, skills and research interests.

Three aspects of University activity can be considered in relation to the Centre: community service, teaching, and research. The Centre provides direct service to the community in three ways: through the kindergarten; in making consultative services available, and in diagnostic programmes and special education for individual children and their parents.

Kindergartens aim to provide for the health, education, and welfare of children in the years before they go to school. They ar-

range for children's physical well-being to be supervised, they organize environments in which children are helped and encouraged to extend their skills and competence in intellectual, social and physical endeavour, and they lay the foundations for accepting and tolerant human relationships. It is a matter of reproach to the community at large that the demand for entry to kindergarten far exceeds the number of children who can be accommodated, and that many children who would profit from the experience are unable to attend kindergartens at

matics, to assisting with plans for curricula, washrooms, or compensatory courses in basic school subjects. The members of staff most closely connected with the Child Study Centre are psychologists, some of whom have particular interests in children's behaviour which is in some way exceptional. Behaviour which is out of the ordinary may be attributable to stress, or handicap, or opportunities to develop skills and interests not available to other children; it may be shown by unsatisfactory progress in school, in bizarre actions, or by marked aptitudes in cer-



Watching kindergarten children working from the observation booth

**HONORARY DEGREES — Continued**  
qualifications to inhibit the recognition of his signal service to physics when it admitted him to its Fellowship in January 1969. Since this University began its operations a number of our scientific departments, not only in this faculty, have drawn on the skill of Mr William and the products of his factory, both for equipping their teaching laboratories and for the design of instruments for specific research projects. It is therefore most fitting that his contributions to the University should be recognized in this manner.



Mr J. L. William

all. This is the case in all areas in Victoria, even though this State's record for providing kindergartens is much better than that of most other parts of Australia. The kindergarten in the Child Study Centre is a link with the community around the University, for a proportion of children from the district, whose parents might otherwise have no contact with the University, attend it. Although this is a frail bridge, since the total number of children who can attend is small, it is nonetheless a valuable one. Contact through children enables these parents to receive directly some of the University's services which they might otherwise not know about.

Since the faculty of Education is multi-disciplinary, its members are called upon to provide services of many kinds, from giving speech-day addresses, through advising on careers or how to teach the new mathe-

tain fields of endeavour. Perhaps it should be said that the emphasis in the Centre is not on identifying particular kinds of behaviour as 'problems', whatever that might mean, but in assessing the needs of each individual child, and on planning, with his family, a programme which will give him increased competence to deal with his surroundings. Original assessment, and organization of the resulting programme, may include diagnostic and testing procedures from several disciplines, and, if the individual is close to school-leaving age, consultation with employer organizations or special employment agencies. The Child Study Centre is not concerned only with children of kindergarten age; older and younger children and their families may also be incorporated in this part of its activities.

The Centre's teaching programmes focus on the pre-school years (in the kindergarten),

on corrective or other special education arising from the services already outlined, and on demonstrating principles of developmental psychology to students at the tertiary level. A large number of students is enrolled in Diploma in Education courses at Monash; the Education faculty considers that it is necessary for them to have some notion of developmental sequences in children and of how advantage may be taken of these sequences in arranging programmes of instruction for children at any given level of development.

Most Diploma in Education students will be teaching in secondary schools, and it might be thought that observing children in a kindergarten is rather irrelevant. Nothing could be further from the truth. Many of the principles which guide teaching in a kindergarten are equally applicable to other levels: that work or activities should be fitted to the skills and abilities of the learners;



Using a brush to put paint on paper helps visual and motor co-ordination and provides great enjoyment for this young artist

that individual learners have a choice, as well as a chance to attempt a wide variety of activities; that activities are provided at a level which stretches the learner, and that skilled persons are ready to help him increase his skills; that the work-space is so arranged that a learner can proceed unhindered with a task if he chooses, and can move to another when he is ready to do so; that work is planned in advance, both short- and long-term, with details flexible enough to allow modification to fit the needs of different learners, necessary changes in organization, or failure of a particular line of action. All of this might be summarized under three headings: (a) forward planning of work, (b) organization of work-space, and (c) provision by teachers for individual differences among learners.

What has been left out is consideration of what is to be learned at different levels. Tertiary-level students can see, in the kin-

dergarten, how a programme is structured, adapted and modified, according to the skills, span of comprehension, and intellectual grasp of each individual child. They might note that two teachers are kept very busy implementing a programme with a relatively small group of children, and draw the conclusion that groups of learners should not be large. They could hardly fail to recognize the efficiency of a room arranged so that similar activities are spatially contiguous, and they might even notice how similar it is to a well-planned science laboratory (or a well-planned kitchen!). The fluidity of organization could hardly be overlooked, and the consequent flexibility of approach to a topic and to a child. What is to be learned needs less consideration than the inculcation of a systematic approach to finding out, and an awareness that although there are many unknowns they need not remain unknown. Tertiary-level students can observe in the kindergarten how children's experience of things, events, places, and people is extended, how their curiosity is stirred, and how they are enabled to satisfy their curiosity. There is much more in kindergarten experience than 'helping a child to get on well in school' later. The University students who are going to teach at secondary level will perhaps see a little more clearly how to arrange environments in which children will be stimulated to seek knowledge, and to work very hard to attain it.

#### GOOD PERFORMANCE

At the tertiary level the Centre is arranged so that the use of psychological assessment and diagnostic instruments and procedures can be demonstrated to students as a first step in their learning how to use them. Students can observe, through one-way vision screens, how an experienced tester gives a test to a child so that the child is put at ease and is encouraged to give as good a performance as possible. They can observe each other giving standardized tests, or using diagnostic and corrective procedures, and can learn from one another's strengths and weaknesses. Administration of research instruments and procedures can be demonstrated and learned in the same way. Research work in the Centre reflects the special interests of members of staff, and in both community services and teaching programmes a continuing series of research studies is necessary to illuminate and extend the work being done. Basic research as well as applied and practical studies is essential to advance the fronts of knowledge in these areas.

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## APPOINTMENT TO EDITORIAL BOARD

Professor S. R. Davis has been appointed a member of the editorial board of the *American Political Science Review*. This



Professor R. Davis

appointment is the result of a recent change in the constitution of the journal's editorial board whereby four non-Americans are appointed to act as editorial advisers. Together with Professor Davis, political scientists from Canada, Israel and Italy have been appointed. Professor Davis, who is a Bachelor of Laws and Doctor of Philosophy from the University of Western Australia and the London School of Economics respectively, came to Monash in 1961 as senior lecturer in Politics. In 1962, he was appointed foundation professor of Politics in the faculty of Economics and Politics. Between February and August this year Professor Davis was on leave and for most of this period held the position of visiting professor in the department of Political Science at Berkeley University. He returned to Australia via eastern U.S.A., England and Israel.

## NEW RESIDENTIAL HALLS

The building of a second complex of residential halls commenced early this year. The first of the two halls — Roberts Hall — will be completed in the first months of 1971, and will accommodate approximately 200 students. Work on the second hall — named after Henry Handel Richardson — is planned to start at the end of this year. Although these halls will be situated near the three already established — in the north-east corner of the University grounds — they will function independently.

## GRADUATION CEREMONIES

At graduation ceremonies during April and May this year almost 1,600 students were awarded degrees. Approximately one-third of these were awarded by the faculty of Arts. The faculties of Economics and Politics, and Science each awarded almost 300 degrees. The Science faculty awarded its first Doctorate to Dr Mollie E. Holman of the department of Physiology, for her thesis entitled *Electrophysiology of Smooth Muscle and its Innervation*.

The fourth Doctorate of Medicine to be awarded by the Medicine faculty was conferred on Dr Keay M. Foster for her thesis on Post-transfusion Mononucleosis.



For some years I have been conducting research into the conditions and consequences of the use of computers for administrative purposes in organizations, mainly industrial. This must be distinguished, of course, from their use for direct control of industrial processes on the production side—which is a more limited and tractable problem. This research has had a sociological, or social structural emphasis, the content of which has broadened as the administrative applications of computers have themselves developed.

In the first ten years or so of their exploitation—and still, predominantly, in most organizations today—computers have been used for limited *ad hoc* purposes. These purposes were conventional ones, the aim of computer application being to achieve them more economically, speedily and accurately. Thus they represented simply either the further mechanization and routinization of procedures, such as payroll, invoicing and accounting, or the increased control of very limited areas of decision-taking, such as stock control. Given this limitation to specific and narrow areas, the social structural implications were correspondingly restricted, and did not necessarily imply any managerial involvement or impact. Thus systematic re-

search was concerned with such aspects as the occupational structure, career patterns and skills of clerks, and the group consciousness, affiliations and attitudes of them as a group. Similarly, management could delegate the operation of limited applications to others—which is not, of course, to deny that higher management involvement and interest is nonetheless often related to success. But a watershed is now being reached. Advancing technology, both administrative and physical (or 'systems' and 'hardware' is preferred), has now attained the point where decisions of a more and more general nature may be taken, with computer assistance, more effectively and on a more adequate informational base. 'Integration' and the 'management information system' are becoming keywords. The latter does not necessarily imply more effective decision-taking, as it may lead only to the assembly of much more data which is not effectively used. Increasingly, however, the endeavour is being made to spell out explicitly the dimensions of decisions, and thereafter to 'integrate' the relevant data from the various areas or departments of an organization. In industrial practice, this approach has already been applied fairly widely to production planning and control, requiring as it does

the 'integration' of information from the areas of marketing, sales, production, purchasing and personnel. In the future, it will be applied increasingly to general financial, production and marketing policy. With this extension of computer applications, managerial involvement becomes, of course, central rather than peripheral, for decision-taking is one of the main functions of the manager. The research in which I have been involved has been concerned more recently with these managerial implications, and it is already clear that resistance to change may be as marked, if not more marked, among managers than among the shop-floor employees where it has been over-publicized. Progress in applying the computer to managerial problems has indeed been slow—even in the USA, which had a lead of perhaps six to eight years in the development of 'hardware' applicable to industrial purposes. There are exceptions—for example, some banks, insurance companies and airlines—but this is to be expected, since the problems in these organizations are simpler and more tractable than in complex manufacturing concerns. Nevertheless, progress has been slow, at least in the sense that the technological possibilities now far outstrip the level of general industrial application. Some

CDC 3300 computer



reasons for this are becoming apparent.

Some of the problems derive from the nature of manufacturing operations and of the technical demands of the new procedures. An engineering firm, for example, may be producing hundreds of components or a fairly wide range of products, and it may be operating in a somewhat unpredictable market situation. Clearly, in this situation, it is no simple matter to schedule and to control production for some period ahead in the most efficient manner, let alone to devise procedures quickly for the taking of more general and long-term decisions on the most appropriate basis. In these circumstances, and indeed in any situation where an 'integrated' computer system is envisaged, it is usually necessary to build up a much more adequate and accurate informational base than has existed in the past—and the time necessary to establish and to verify this has often been underestimated. Moreover, firms which are developing computer applications invariably, and naturally, lack internal expertise on the changes in organization and procedures which advanced uses require; in the past, computer suppliers have failed to provide adequate advice on these 'software' aspects, and although it appears that consultants are now beginning to fill this gap, a relationship between a firm and a consultant is often brief.

More basically, however, there is a lack of knowledge of these organizational aspects which only solid research can fill. Where a firm has access to existing expertise, however, a communications problem often remains. The manager, if he wishes to exploit computer potentialities fully, must learn to explicate carefully the dimensions of his decisions, and those who have relied largely on hunch and experience find this difficult to do; the computer specialist, on the other hand, may be expert in computer requirements and procedures, but knows little of the content of business decisions. The business economist who has also a clear appreciation of computer demands and possibilities may come to meet this need, just as the industrial sociologist will help increasingly with problems of re-organization, but meanwhile a communications 'gap' remains.

Difficult as these procedural changes are, they are accentuated by resistance to change among managers. We have referred already to the difficulty many experience in becoming more self-conscious and self-disciplined about the content of decisions. There is also, of course, the need for greater numeracy, or at least for a greater facility in interpreting numerical data. Of equal importance, in many situations, is sheer 'political' resistance, especially on the part of those who do not feel at home with the new developments. Increasing scale of enterprise, with its accompanying specialization and proliferation of 'functions', has produced many empires, large and small, in the big organization, and the influence and privileges of each tend to be guarded jealously by its controllers. 'Integrated' computer applications,

however, emphasize interdependence and the pooling of information and expertise—for the solution of common problems. Co-operation should replace autonomy, and teamwork individualism. This, however, is often too demanding for those whose security rests in the relative autonomy of a 'defined' job, especially when their training and experience make them feel inadequate in the face of the new techniques.

As regards the future, the main need is clearly for more intensive research into the managerial implications of advanced computer systems. For, since progress in moving towards these applications has been slow, there are as yet few examples in manufacturing industry of 'integrated' systems for decision-taking and control, and hence little research into them has been done. Indeed, the boot is now on the other foot. Whereas in the past industry has complained at times about the duration of social research projects and, hence, of the time taken to produce results, it is now the case that research is being slowed to the pace of development in industry itself. Nevertheless, in the light of the little research that has been done, and of our perception of the likely demands of advanced computer systems, it is possible to indicate some problems which merit attention in current research.

Some of these have been hinted at already. Particularly at the higher levels of management, much more flexible and adaptable organization and procedures may be necessary. Rigid and delimited roles will be ineffective in a system which demands interdependence, adaptability and teamwork. A severe limitation of entrenched 'departmentalism' will be necessary as the particular decisions of separate functions and departments must increasingly be taken in strict conformity with overall plans and objectives. Similarly, for the individual manager, a greater degree of mental discipline will be required. Computerization may well relieve him of routine, but its assistance with decision-taking will require more attention to, and clear specification of, objectives, priorities and the dimensions of decisions—the revision of which will also require regular consideration as circumstances and constraints change. The effective discharge of this task will require the manager to be more conversant with the needs and demands of other functions and areas of the business—he will need, in other words, to be a man of broader education and experience.

From the angle of the total organization, an important question is the impact of advanced computer systems on the centralization v. decentralization controversy. Will they lead to a re-centralization of decision-taking responsibility, or not? Basically, the computer is neutral, and can just as satisfactorily be used to facilitate the taking of better decisions at existing levels of responsibility, as it can to promote some recentralization of it. What happens in particular organizations will no doubt depend on the nature of their activity, the kinds of decisions required, and

the overall managerial philosophy that obtains. In one respect, however, a trend is clearer. As organizations have grown in size, and as decision-taking responsibility has had increasingly to be delegated, top management has become more and more anxious about its ability to 'control'—even where this control has been exercised only at fairly long intervals—because of the difficulty (often accentuated by the erection of deliberate obstacles) of assembling full and reliable information on which to base judgements. Computerization can eliminate this difficulty, and thus offers the possibility of a more effective combination of delegated responsibility for short-term decisions and centralized responsibility for long-term review and control.

These are but a few of the future probabilities which research must pursue and evaluate. Space precludes reference to others, and permits only a brief examination of the importance of this kind of research work. The best 'field' or 'applied' research should promote the interplay of theory and practice; theory must guide problem selection and observation, the analysis of practice should feed back into theory, and the results of research should influence policy. Much research in industrial sociology has been influenced by this philosophy, and the present project is no exception. From the academic standpoint, one of the aims of organizational theory is to define the conditions and consequences of varying patterns of organization and management; computerization has introduced a new and important variable, which may well have implications for theory and also serve to reduce some of the problems which beset large organizations today. On industry's side, the firms in which independent research is undertaken may well gain a good deal at little cost to themselves; more importantly, perhaps, industry as a whole can benefit cumulatively from the publication of the results of this kind of research—a process which, within industry itself, is often impeded by unnecessary and excessive manifestations of ideas of individualism and secrecy. Management education also stands to gain. As indicated earlier, advancing computer applications are reinforcing other pressures towards a higher level of education and training for managers, and there is every indication that this movement will snowball in Australia as elsewhere. Since, in an advanced industrial society, our future depends so much on the quality of management, everything possible should be done to promote this development. Clearly, research into the managerial and administrative implications of advanced computer systems has an important contribution to make to the educational process in industry and educational institutions.

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Perhaps more than most other scientific achievements of the century, the advent of the space age has not been a wholly unexpected event. The principles have been known for many years. The feasibility had been recognized and scientifically studied, and the success of these studies can be judged from the fact that even in detail actual space missions have displayed many of the features predicted. To what extent, then, have universities recognized this activity? The answer depends on which aspect of space travel one is discussing.

The foundations of the whole subject were laid by the philosophy which led to Newton's unrivalled work published in 1687 which described not only the widely-known Law of Gravitation but more significantly the Laws of Motion (without which the Gravitational Law is impotent) and the foundation of the mathematical method (the calculus) by means of which these laws could be applied. The extension of this work has attracted the attention of a steady stream of mathematicians ever since. In spite of the apparent simplicity of the Law of Gravitation the resulting problems are not easy. It is obvious that one cannot land a man on the moon if it is not known where the moon itself is, but an adequate lunar theory is about eighty years old, and this theory is not without its small defects. This whole branch of mathematics is often known as celestial mechanics, and has long formed part of university mathematics courses. At Monash this is taken in first and second years as part of Applied Mathematics, though there are currently no advanced studies being undertaken in this area.

The elegant theories developed in the past, however, are of limited application to the problem of a particular space mission. For this purpose there is no avoiding heavy arithmetic computation which in this decade suggests to everyone electronic digital computers. The development of these machines, and, even more, the reduction from room-size to desk-top cabinet (which can therefore be carried on board a spacecraft) have been crucial in increasing the probability of success of space missions.

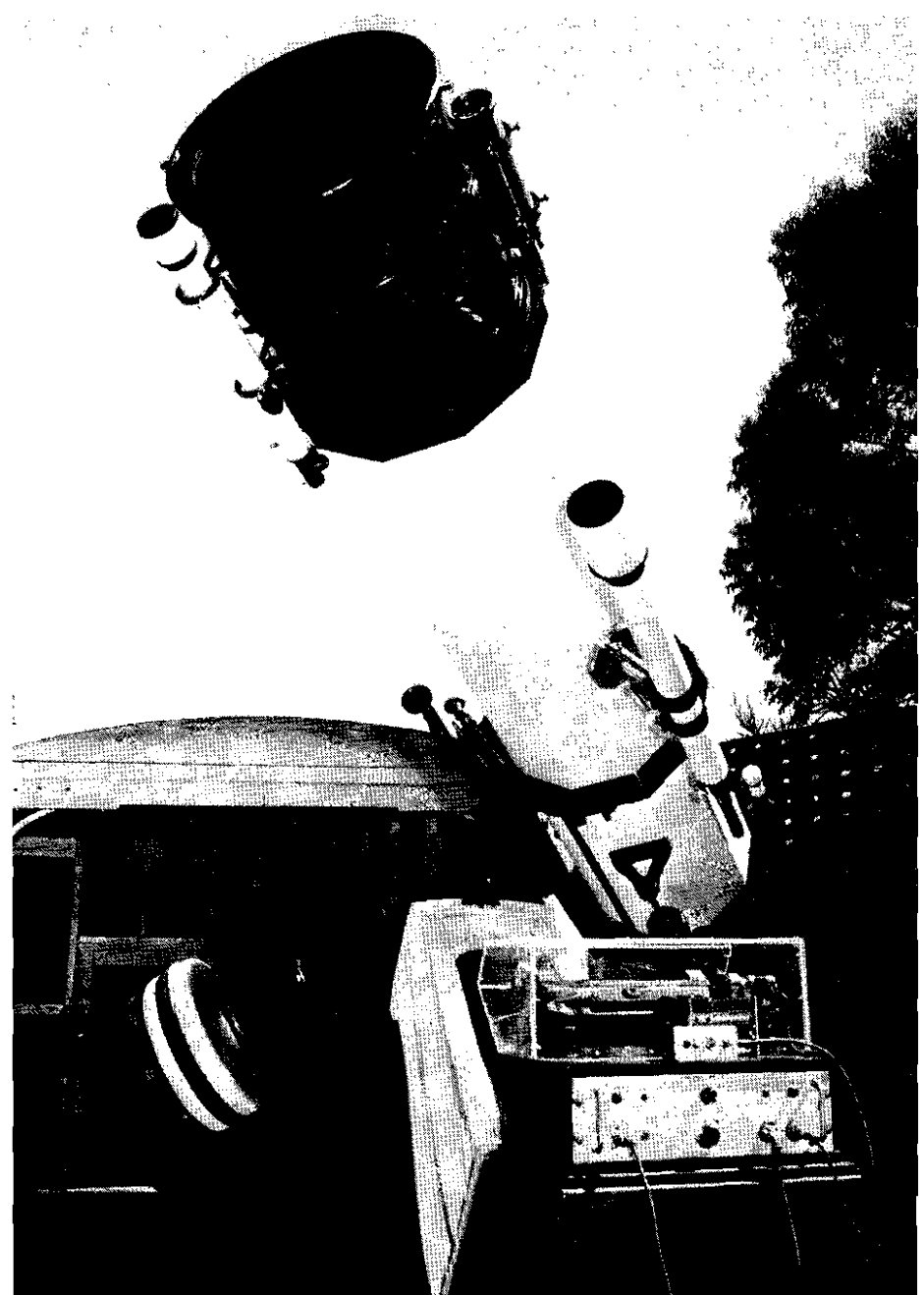
The on-board computer is only one of many complex systems necessary for the whole space vehicle. Whether talking about navigational methods, communications, or the propulsion system itself, one is discussing the application of familiar principles applied in a new and unfamiliar environment. This application is done largely by engineers, whose tasks are not only more compelling in their insistent deadlines for completion than the scientist who evolved the principles, but whose activities are much more expensive. For this reason it is not so easy for

university engineering departments to become involved with hardware details of space engineering, most especially at places remote from the launching administration. The Mechanical Engineering department at Monash has a long-standing interest in space. As early as 1961 a seminar was held on re-entry problems, and for the past five years the department has offered a short course to final year engineers on the general problems of space missions, with particular reference to computation of trajectories of

spacecraft. It also has a modest research programme in hand on some specific aspects of spacecraft dynamics—of some significance with the now commonplace technique of rendezvous in orbit.

The greater impact in non-American universities of the space age, however, is likely to be indirect. The engineering-oriented problems solved for the space programme frequently have application in more conventional areas, but the observations made in space and on extra-terrestrial bodies are

*The 40 cm. Jeeffe telescope, for which an observatory is in the process of being established by the University, will form an essential part of research programmes in the future*



providing great impetus for new ideas and theories. Though the field of space exploration is but recently opened up, the new vein is already yielding evidence in conflict with traditional explanations and thereby demanding formulation of new ones; examples of these unexpected observations are the seismic data gathered on the moon as a result of the first manned landings and the close-up photographs of the surface of Mars which reveal a low relief surface pitted with craters. Other work, more traditional in concept but using products of the space programme, is provoked by the expeditions into space, and a group in the Physics department have plans to reflect a laser beam from the moon to study the absorption and scattering of light by the tenuous matter lying in space between the earth and the moon. All traditional science disciplines can find new information to incorporate into their own corpus of knowledge, but particularly those concerned with extra-terrestrial studies such as astrophysics (in which there is a strong group in the Applied Mathematics department at Monash) which has been greatly assisted by the data from probes which evaluated the space immediately outside the earth's atmosphere. Nor is the flow of information all one way. The problem of the 'geological' history of the moon is very relevant to that of the earth. A clear problem in the lunar history is that of the formation of the thousands of craters on its surface. The most popular current theory is that these are due to high-speed impacts, a field of study already under investigation because of its application to high-speed deformation of materials (particularly metals). Work in high-speed de-

formation is in progress at Monash by a mechanical engineering group using a converted gun to achieve the required projectile speed, and the results may well be applicable to this lunar problem.

Although not all of the activities discussed above extend the body of human knowledge, they constitute an important aspect of university education which in future must expand. For the space age is so real as to be common-place and of ever-decreasing news value. It is essential that the achievement, and the challenge, of the techniques being applied be put in perspective for future undergraduates so that not only can the contribution of the past be appreciated but (particularly in engineering) the application of new methods in space technology be recognized and applied in the wider service of the community.

It is a characteristic feature of man's activities that apparently useless enterprises often have side-effects the benefit of which is out of all proportion to the initial outlay. In this, the bicentenary of Cook's scientific expedition to the South Seas, it is interesting to reflect on the return to the United Kingdom over the following century of that investment. It is so frequently true that, in a more restricted sphere, 'successful' scientific expeditions have posed more problems than they have answered. While the enormous cost of space programmes exclude universities from any direct contribution to launching vehicles, it is through them that the benefits can be expected to be applied and disseminated to the community. This being the case, notwithstanding the activity already going on, we might ask ourselves whether we are doing enough.

## STERILIZATION BY OVARIOTEXY

Since the advent of family planning, gynaecologists have attempted to find an entirely satisfactory contraceptive. As the pill can produce unpleasant side-effects in some women, surgical techniques with the possibility of temporary sterilization are being explored.

This is not a new approach—eighteen papers on the subject had been published before 1930—but most techniques have not proved very successful. Either the chances of pregnancy are low after reversal of the procedure, or the risk of ectopic pregnancy—development of the foetus in a location other than the uterus—is increased. Often women have become pregnant prior to the reverse operation.

In a recent publication, Professor Carl Wood and Mr John Leeton of the Monash University Medical School at Queen Victoria Hospital, described a new technique which they call 'ovariotexy' (*Lancet*, 2, 1213, 1969). The word ovariotexy is derived from the Greek root, *texy*, which means woven. This refers to the use of a silastic bag (silicon rubber) for covering the ovary.

Silastic has been used previously in sterilization operations but mostly in connection with the fallopian tubes. Silicon is a relatively safe substance for lodging in the body as it does not chemically react with body tissue.

Wood and Leeton divided the ligament that secures the ovary in position. They then covered the foot of the ovary with silastic fashioned in the shape of a bag and sutured the two together. The bag containing the ovary was placed in a pouch made by incision in the peritoneum—the membrane lining of interior abdominal cavity. This procedure prevents the eggs from travelling down the tube into the uterus.

Six patients have received the operation and none have been impregnated, after one year's maximum observation. They showed no abnormalities.

It is too early to demonstrate the efficiency of ovariotexy as a surgical procedure for reversible sterilization. But Wood and Leeton feel confident that their initial success will be repeated when they try to relocate the ovaries.

One advantage of their method is that the silastic bag prevents the ovaries from adhering to adjacent connective tissue—a serious problem encountered in other surgical techniques.

## FOURTH ECONOMICS LECTURE

The fourth Monash Economics lecture was held on Monday 14 September and was given by the General Manager of the Australian Resources Development Bank, Mr R. J. McCrossin, who spoke about the role of the Resources Bank.

*This impact crater, which closely reproduces the characteristics of lunar craters, was produced in the Monash engineering laboratories*





Mr. V. O. Dickie, then Victorian Minister of Health, announced on 16 February 1970 Government approval of a scheme to establish a \$20 million medical centre at Monash. The concept of a university hospital on the campus, integrated with the medical school, was first agreed to by the Interim Council on 11 August 1958. For this purpose fourteen acres were set aside in the original master plan in the south-west corner of the campus at Clayton.

The Committee on Medical Undergraduate Education in Victoria, of which the foundation Chancellor, Sir Robert Blackwood, was a member, reported to the Government of Victoria (August 1960) that 'Monash University has made provision for a hospital site . . . and that a teaching hospital be built on the Monash University site'. The size envisaged then was a teaching hospital of 600 beds (the minimum ultimate desirable size). The committee also reported that the ideal conditions included 'a complete medical school and teaching hospital physically associated on the University campus'. This report was accepted in principle by the Government.

Funds for planning were requested from the Government by the University and the Hospitals and Charities Commission, in a letter from the Vice-Chancellor and the chairman of the Commission (Dr John Lindell) to the Minister of Health (30 October 1964), and from then planning funds were granted annually until December 1967, when the professional planning committee had completed its task. This committee, which first met on 16 August 1965, was concerned in the 'Functional Brief' which was a guide, not to the physical shape of the hospital, but to its function—organization, staffing, etc. From this preliminary work has evolved the plan of a hospital to be built in stages. The project is based in part on the concept of what is now generally referred to as the 'balanced teaching hospital'. This includes Medicine, Surgery, Obstetrics and Gynaecology, Paediatrics, Psychological Medicine, and Social and Preventive Medicine, and the various specialties.

The opinion of the University members of the planning committee is that the viable range is between 600 and 800 beds, probably nearer the latter. A hospital of this size, together with the two already existing hospitals in the area—Dandenong and Southern Memorial Hospitals—both of which are expected to expand to 600 beds in the next ten years, will provide adequate facilities for the local population.

Within a 5-mile radius of Monash this presently numbers 350,000. A hospital of 800 beds would go a long way to satisfying the undergraduate clinical requirements. At

present the three general hospitals affiliated with Monash (Alfred, Queen Victoria and Prince Henry's Hospitals) provide 1,219 beds for the Monash teaching programme. The recommended number of beds required per student (Goodenough Report, 1944, and Todd Report, 1968) is ten. On this estimate the Monash requirement, based on an average of 156 students in each clinical year, is 1,560 beds. It follows that the present shortage of about 350 beds would be overcome by the medical centre. However, mounting pressures on undergraduate and graduate training have increased the number of beds required for a medical school.

Thus in 1948 the resident staff at Monash's three affiliated hospitals numbered 49; by 1968 it had risen to 173. The complex and growing graduate training programme reduces the effectiveness of each bed because of the very large number dependent for their clinical training on a limited pool used by both undergraduates and graduates. Furthermore, the centre would allow for an increase of the intake in first year from the present 160 to 200. The calculations are further complicated by the need for a hospital of somewhere between 600 and 800 to achieve a viable level for a balanced teaching hospital.

There are many advantages in having a balanced teaching hospital on the campus closely integrated, physically and academically, with the faculty of Medicine and the University. It provides the same academic inter-relations for clinical departments as for other University departments. Maximum opportunities are made available for educational integration of the six years of the

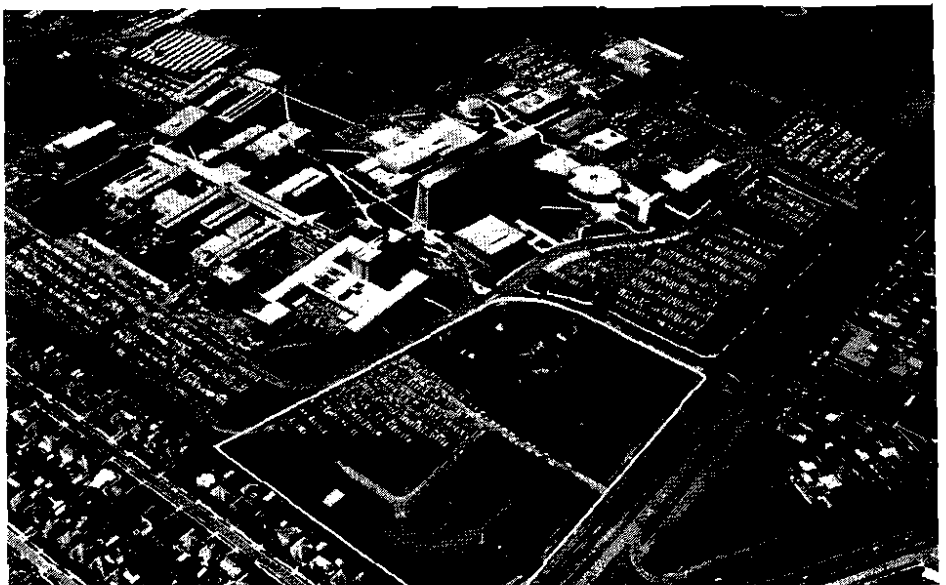
course and for inter-disciplinary research and service contributions from the behavioural, social, engineering and information sciences. The proximity of the medical centre would also facilitate team-work in health services, and maintain a strong and continuing influence of the basic medical sciences.

On the other hand, the assessment of the effect of the medical centre on the University as a whole is complex. The implications of the numbers of people necessarily involved, in a wide variety of ways, with the operation of the centre must be considered. In addition, the existence on the campus of a large hospital with a high degree of autonomy and owing its prime allegiance to satisfying the medical needs of a widespread community will raise special problems.

In the consideration of the numbers of patients, it is expected that about one-half of the admission to the centre will take place as emergencies. This imposes requirements of easy and, in some cases, priority access by road; the provision of a helicopter landing pad is also envisaged. For an 800 bed hospital eight or nine general purpose clinics are required to deal with outpatients in medical and other areas, such as occupational therapy, social service and speech therapy. Private consulting suites are also to be established for visiting staff who will have part-time appointments in the faculty. Daily visitors to the centre will include the staff necessary for the professional, nursing and technical operations of the centre and others, such as outpatients, relatives of in-

*(Continued on page 34)*

*Aerial view of the campus showing (foreground) an outline of the site reserved for the medical centre*



## ZOOLOGY DEPARTMENT SETS UP FIELD STATION

The Monash Zoology department has established a field station at Alvie about ten miles north-east of Colac in western Victoria. The station (below left) comprises a single-roomed laboratory and accommodation for four research workers. It is located immediately on the eastern side (in the lee of the strong prevailing westerly wind) of a volcanic hill known as Red Rock. This location is very central from the viewpoint of the total lake district centred on Lake Corangamite. Within this

area there is a large number of lakes ranging from quite fresh to highly saline.

The station is used largely by Drs Bayly and Williams and their graduate students in limnology of whom there are currently five. During the past year the station was extensively used by two limnologists from overseas — Dr U. T. Hammer from the University of Saskatchewan, and Dr C. Paterson, formerly of the University of Waterloo, Ontario, currently at Mount Allison University, Sackville, New Brunswick. Dr

Hammer studied the productivity of several lakes in the area using radioactive carbon techniques. Dr Paterson worked on the larvae of midges (chironomids) which are found in lacustrine muds.

The photograph at right shows the view from the top of Red Rock looking westwards.

The closest lake is Red Rock Tarn behind which is Lake Werowrap. Lake Corangamite, the largest lake in Victoria, is located in the background of the picture.

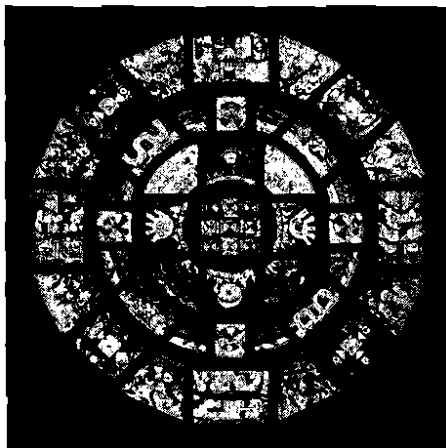


## ROBERT BLACKWOOD HALL

The first stage of the University's Great Hall, named after the foundation Chancellor, Sir Robert Blackwood, was completed at the end of August. The hall is the first Monash building to be designed by the eminent architect, Sir Roy Grounds.

As work finished on this project tenders were called for stage 2, which will provide a flat external terrace of 4,000 square feet on the south face. This terrace will be enclosed by a wall of glass to make an extensive foyer to the auditorium, suitable for exhibitions. Inside the stage 1 structure, the walls rise high in face brickwork of light brown, blending with wood panelling over the stage; along the north wall a processional ramp slopes towards the stage area.

The primary purpose of the Robert Blackwood Hall is to provide the setting for academic ceremonies. It accommodates 1,018 in the main hall with room for an additional 470 people on the stage and in the balcony.



*The west window of the Robert Blackwood Hall*

The stage design has in mind the further use of the hall for orchestral and choral purposes. Behind the large, level front-stage

area rise four tiers for orchestra or choir in which a 100-piece symphony orchestra can be accommodated. In keeping with this is the volume of the hall, which has a reverberation period of 1.8 seconds to provide satisfactory conditions for orchestral performance.

At the rear of the hall there is a projection box which makes it possible to show films and slides on a whole screen in the stage area.

Other equipment includes mechanical ventilation; heating by warm air and hot water floor coils; an amplifying system, variable lighting, and dressing-room facilities.

Steps have been taken to secure effective sound control to cover either speech or concert performance and direct telecasting from within the auditorium will be possible. Eventually, it is expected that the hall will house a concert organ; and structural preparation for its later addition has been made in the design of the building.

From December 1968 until February 1970, the University generously granted me leave of absence to serve in a United Nations international legal appointment in the kingdom of Lesotho.

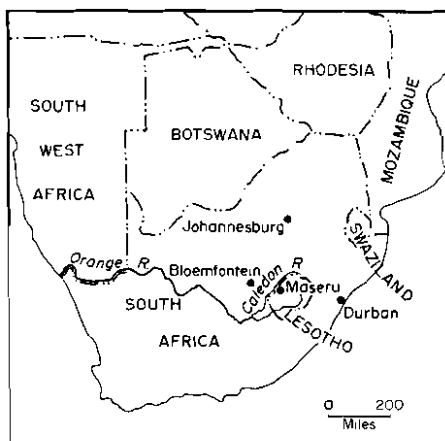
The little-known independent state of one million people is a small kingdom situated in one of the most sensitive areas of Southern Africa. Of about 12,000 square miles in area, roughly the size of Belgium, the state has a mountainous terrain. Wedged between the Orange Free State on the Western side and Natal on the eastern, it is completely land-locked. Apart from the insignificant Republic of San Marino, Lesotho is unique in that it is land-locked and surrounded by only one other state. The fact that the state is the Republic of South Africa does not make for easier living.

The Kingdom, formerly the British colony Basutoland, gained independence in 1966. The country, having an agricultural economy with exports mainly only of wool and mohair, has been dependent since independence almost completely upon British budgetary aid. It is paradoxical that here in the very heart of South Africa is an anti-apartheid state—a veritable island haven for Basotho opposing South Africa's race policies, but so poor economically that to survive large numbers of young Basotho men must go into South Africa to work. Pride bows down to sustenance.

#### LAND AND PEOPLE

Western Lesotho is situated on the plateau which stretches far across Southern Africa. Maseru, the capital, is nearly 5,000 feet above sea-level—comparable with Bloemfontein, the Orange Free State capital, or Johannesburg, in the Transvaal. As you move easterly, however, you enter immediately the Maluti foothills and then on quickly to the spectacular Drakensburgs rising to some 11,000 feet. The Drakensburg range forms a natural eastern boundary to the country from which you plunge down sharply into Natal soon reaching the semi-tropical climate of the Durban region. Lesotho's climate is healthy and invigorating. Winter nights are cold and mornings crisp but the skies are always clear and the days sunny. The rains come in the spring and summer. This mountainous country is stark but beautiful with its treeless, clean-cut lines, and there must be few places in the world with more glorious sunsets.

The life of the Basotho moves slowly. The plainsmen are more mentally alert and are gradually becoming susceptible to change and the ways of the West, but the more conservative mountain folk are tied far more to the village and the chieftainship system. The Basotho, however, are one of



Map showing the situation of the Kingdom of Lesotho

the most intelligent of the African groups. The literacy rate in Lesotho is now far in advance of 50 per cent, high by African standards, and the top echelon of administrators are well-educated and capable. The Roman Catholic and Protestant missions have been primarily responsible for education at the primary level. Lesotho does lack, nonetheless, sufficient secondary schools. At the tertiary level there is an agricultural college, an artisan training centre and a university.

The University of Botswana, Lesotho and Swaziland is situated in a very picturesque saucer campus twenty miles from Maseru in the Maluti mountains at Roma. It was formerly the Roman Catholic Pius XII University College but was by Royal Charter in 1964 created into a fully-fledged university offering its own degrees. The University, with nearly 500 students, is almost exclusively residential and serves the university needs of the three former High Commission Territories, Botswana, Lesotho and Swaziland. The pressures, however, of the other two countries may force, in the near future, the University to set up near-autonomous faculty units in each of these other countries. University economics will, in the end, have to give way to national prestige.

#### ECONOMY

The economy is agricultural. Export earnings are earned mainly from wool and mohair. Whilst the wool is of very uneven quality, largely due to bad breeding methods and flock control, the mohair is generally extremely fine and of high quality.

In such a mountainous area, arable land is at a premium and wherever contour ploughing is possible, but often inadvisable, the land has been ploughed up. Unfortunately, the land tenure system, dominated by the chiefs, results in immensely small strip holdings, and thus hinders economic develop-

ment of arable crops. Consolidation into co-operatives and greater use of machinery would have extremely beneficial effects upon arable production. As to stock, there is hardly a fence in Lesotho, which explains immediately the mediocrity of the herds and flocks.

Agriculture also suffers from the fact that most of the able-bodied young men are mining on the reef and whatever work is done on the land is performed, usually very inefficiently, by women and old men. Under the antiquated land tenure arrangements, left unfortunately undisturbed by the British, there is little or no incentive to undertake progressive farming methods. There is in the country a strong programme under way now to change methods, but, unless the land tenure system at least can be substantially modified, there is likely to be little result. As can readily be appreciated, the two major political parties tread warily when discussing land tenure—it is political dynamite. The Basotho, even the town worker, is anxious to have his little piece of land and such constant division results in microscopic apportioning and attempted development of non-productive areas. Further, bad farming practices together with heavy mountain rainfall in the summer months bring about very severe soil erosion. The winters, however, are cold and the trees which have been planted to arrest the erosion are hacked down for firewood and so the cycle goes on. Much of Lesotho's soil has been washed down the Caledon and Orange Rivers to the Free State!

Apart from agricultural products, the only other appreciable revenue producer, at the moment, is money sent home by the Basotho worker on the South African mines. This runs into some two to three million rand annually. It is, of course, of dubious value for the development of the country for it is derived from the very labour force which should be needed at home. It is, however, whilst development is at a low key, a very important backstop on revenue and prevents, at the same time, a rather disastrous employment problem which would otherwise have been faced by the government in the initial years after independence. There are, too, rather severe sociological problems produced by menfolk being away from their families and this is not lost on either the South African or the Basotho. Labour contracts, even though renewable, are normally not of more than nine to twelve months' duration. Lesotho has possibilities for increased revenue in four directions. The first has already been negotiated with the South Africans. Lesotho, Botswana and Swaziland have been in a Customs Union Agreement with South Africa since 1910. But the agreement did

not give an adequate or fair return to the smaller countries. This was recognized by the South Africans, and after a protracted and often difficult period of negotiation a new and much more satisfactory agreement was concluded between the four countries at the end of 1969. The returns from the agreement coming to Lesotho should enable a phasing out of British budgetary aid over the next three or four years. As yet, although common currency is used amongst the four countries, there is no monetary agreement which in itself should also be a revenue earner.

Second, there is an embryonic diamond industry. Last year, diamond exports topped the one million rand mark. Lesotho has interested Rio Tinto and Lonhro in the diamond areas and geological surveys so far have been optimistic. A successful diamond industry would be sufficient to take Lesotho 'out of the red'.



*The University of Botswana, Lesotho and Swaziland campus in the mountains at Roma, Lesotho*

Third, Lesotho is the watershed of Southern Africa. No attempt has been made to harness the waters either for water storage or power. The South African industrial complex to the north is water starved. At present, the World Bank is conducting a feasibility study on Lesotho's water resources. There is a great opportunity for Lesotho to negotiate and sell water to the Republic.

Fourth, whilst Lesotho has not the semi-tropical attractiveness of Swaziland, it presents an appeal to those tourists who like their holidays in high places! Unfortunately, snow does not fall regularly on the Drakensburg and there are no adequate ski runs for the development of ski resorts. Nevertheless, pleasant holiday resorts are possible in a land with attractive mountain scenery and fast, trout-laden streams. Already, as in Swaziland, Lesotho is building a casino which will open this year. Gambling facilities, outside of the race-course and the stock exchange, are not available in the staid Republic, and the territories are attempting to cash in on the inveterate gambling instincts of the 'men in the burg'.

Apart from the casino, Lesotho has not yet attracted much outside capital for tourism or for anything else. In 1969, however, a

Pioneer Industries Act was enacted which gives a substantial tax holiday to investment capital and other concessions as good as anywhere in Africa. Success in attracting capital for Lesotho depends very largely on adequate communications and an even political climate. Both road and air communications have improved recently but, unfortunately, the political climate in 1970 took a sudden downturn which could only have had a dampening effect on investment.

Economically, what had been achieved during the colonial period? The answer is simply very little. It is not unfair to say that the High Commission Territories, and Basutoland, in particular, were just about the bottom of the list as far as development was concerned. Until the Nationalists gained power in 1948 in South Africa and pursued a strict policy of separate development, it was always the hope of the British that the Territories would become absorbed within

South Africa. The Nationalist apartheid era changed the situation and between 1950 and 1966 the British made some rather feeble and halting steps to put Lesotho into some sort of position to stand on its own feet for it knew that otherwise it would be saddled with a fat request for budgetary and development aid which it could hardly turn down—not in its entirety anyway. Nothing was done, however, on land tenure, roads, water storage or even, to any significant degree, on agricultural services. Real achievement did not take place until after independence and now the British compete rather more vigorously with other aid agencies from the United Nations, Canada, China, South Africa and the USA to tend to Lesotho's wants.

#### GOVERNMENT

Lesotho is one of the few monarchies in Africa; however, the position of the King, or *Motlotlehi* as he is called, is in jeopardy at the moment for he is presently in exile in Holland. Following the abortive elections of this year, the King was severely attacked by the Prime Minister, Leabua Jonathan, for the active role he took in suggesting support for the opposition. As a result, the King was placed under virtual house arrest

and is now in exile. His wife acts as regent. Since independence, the monarchy has consistently been an object of political discussion. In 1966 and early 1967, the King had attempted to gain additional powers for himself under the constitution. This was successfully resisted. There is, however, a pressure group in parliament operating in support of monarchical power, the Marematlou party. In the old parliament, it was small in number but a constant nuisance to the government, in that it was forced from time to time to turn aside from the main opposition, the Congress Party, to counter new proposals for increased monarchical powers.

The King is Head of State and executive authority is vested in him. As in the United Kingdom, however, he may only act on the advice of his cabinet which in turn is responsible to the Parliament. The present King, whose family name was Bereng, assumed the title of Moshoeshe II upon independence as a mark of respect for the greatest leader of the Basotho people, the nineteenth century founder of the nation, Moshoeshe. Moshoeshe led his people in the struggle with the Boers following the Great Trek of 1836 when much Basotho land was seized. The lands of the Basotho, originally extending far out into the now Orange Free State, were gradually compressed to the present boundaries, or thereabouts, of Lesotho. In order to protect his people and their land from further encroachment by the Boers, Moshoeshe sought the protection of the British and, in 1868, a proclamation was issued by the British that henceforth, 'The tribe of the Basotho shall be, and shall be taken to be, British subjects; and the territory of the said tribe shall be, and shall be taken to be, British territory.' This began the period of British control which lasted until 1966.

There are two houses of Parliament under the 1965 Constitution—the elective National Assembly consisting of sixty members returned from single member constituencies and the Senate made up of twenty-two principal chiefs and eleven nominees of the paramount chief, the King. At the first elections, held prior to independence, the present Prime Minister's National Party was, surprisingly in the eyes of many, returned with thirty-one seats. The Congress Party, under the leadership of Ntsu Mokhehle, won twenty-five seats and the King-supporting Marematlou Freedom Party held the remaining four seats.

One of the interesting features of the Constitution is the protection it accords to human rights. The British have willed human rights clauses on a number of African states in their independence constitutions. Lesotho is one of these and there is very far-reaching protection accorded to personal liberty, movement, political opinion, trial, and such like freedoms. But such constitutional rights have not counted for much in these growing societies. Little attention has been paid to the meaning of

these provisions and whenever a crisis ensues a government has withdrawn some or all of these rights without any worries as to its conscience. At present, the Constitution itself is suspended in Lesotho.

#### FOREIGN POLICY

Lesotho has a small but active Foreign Ministry headed by a charming, articulate and extremely intelligent man, J. R. L. Kotsokoane. The Ministry maintains High Commissions in London and Nairobi, an Embassy in Washington and a Permanent Mission at the United Nations in New York. The High Commissioners and Ambassadors at these posts are in turn accredited to various countries in Europe, Africa and Canada. Their task is not only to undertake day-to-day business but actively to project the image of Lesotho wedged in the politically sensitive heart of Southern Africa, and to make large bites for aid of any and every description.

In taking its place with other nations of the world, it has sought its niche with the Western world, though I think it has been disappointed so far in its ability to gain tangible support and aid from the USA. With the changing pattern of its African policy, the USA is unlikely to be of much help for some time. Furthermore, Peace Corps politics has not, so far, always been to Lesotho's liking. The government has had more than its share of difficulties with these volunteers and this has often led to a moment of strain with the United States Embassy. From South Korea, Nationalist China and West Germany, aid has come in return for votes and Lesotho plays its cards strongly here. Both China and Germany maintain resident ambassadors in Maseru.

The United Nations Development Programme is a great source of aid, and like most small countries Lesotho sees advantages in the United Nations as a place to push its wares. On the other hand, the Organization of African Unity can prove difficult. Lesotho, as with a number of other Southern African states—Botswana, Swaziland and Malawi—believes that the 'boys in Addis Ababa' really are not very conversant with the realities of the South African situation, or, if they are, that the politics they play is not very sophisticated. The result is that Lesotho and the other Southern states living in the region do not always see eye-to-eye with the more extreme views pushed by countries situated safely in the north, who do not have to bear much responsibility for their opinions or actions.

Lesotho must live with South Africa or go under. This is the crux of its attitude to South Africa. The Basotho intensely dislike separate development not only because of their past association of being subject to the South African apartheid laws but also because whilst South Africa pays lip service to separate development the Basotho know it is far from ever being separate and equal development. Nevertheless, Lesotho must live at peace with South Africa and must



*Shearing sheep. The picture illustrates the dress of the Basotho—the multi-coloured blanket and intricately woven grass hat*

avoid any semblance of being a physical threat. It engages, therefore, in arms' length negotiation on matters of common concern and some telephone diplomacy. Ever watchful, as South Africa bends or becomes a little more flexible, Lesotho tends to shorten her arm. Owing to South Africa's economic wealth and tremendous know-how, it is very inviting for Lesotho to seek advisers and aid from her neighbour. This is realistic but it is important, too, that there be a limit to such aid unless Lesotho is to wake up one morning and find itself a Bantustan. Such considerations are not lost on the shrewder Basotho.

#### THE PRESENT CRISIS

The elections were held on Wednesday 28 January 1970, and on the following Friday, the Prime Minister declared the election invalid, suspended the Constitution, proclaimed a state of emergency, confined the King, arrested numerous of the opposition Congress Party including the leader Mokhehle, brought down a curfew and banned numerous publications. Since that date, the country has been ruled under emergency powers. A new constitution has been promised but so far has not seen the light of day. The crisis developed suddenly and startlingly with the knowledge that Jonathan was not going to be returned by the electorate. The resultant charges of ballot-rigging, undue influence exerted by certain chiefs and the King, and straight out violence were predictable. Whether or not there is much merit in them it is difficult to say.

There is no doubt that Jonathan was immensely surprised by the turn of events (as was Mokhehle in 1965), for he confidently expected not only to be returned but also

to increase his majority to more than two-thirds of the total seats to enable him to bring about certain constitutional reforms. The constituencies appeared apathetic during the campaign and this was read as support generally, if not enthusiastically, for the *status quo*. Certainly Jonathan expected the mountain areas to once again return him to power. They, however, were disillusioned at the lack of benefits they had obtained through supporting the National Party in 1965 and they changed their vote. A decisive factor could have been the decision of the King and his supporters, the Marematlou Freedom Party, to throw in their lot with the Congress Party with the positive suggestion that supporters should vote Congress. In marginal constituencies, this would have been sufficient, on 1965 figures, to tip the scales to Congress, hence the Prime Minister's reaction to the King and his subsequent forced exile.

The interesting thought, however, is what the King expected to gain. Mokhehle and the Congress Party have never supported increased powers for the King or even, very strongly, constitutional monarchy and certainly have attacked the chieftainship system. Personalities play a big factor, but, on a purely political assessment, the King and his followers have more to gain and are more politically attuned with the ruling National Party. Parties, however, often act for the immediate political advantage only to be swallowed up by events.

Why did Jonathan act? This is difficult to answer. On the whole, a Congress Party government would not, I think, have moved the country too far left to have unset South Africa. The Congress Party knows that Lesotho's South African policy must be al-



## GROOTE EYLANDT ABORIGINAL DANCES

By E. C. J. Snell, Audio-Visual Aids Officer

In the past several endeavours had been made to record both the music and movement of aboriginal dances. The use of commercial or professional production teams had led to the organization of the dancers to such an extent that the spontaneity of the dance was often lost. Sometimes the form of the dance was changed to suit the camera positions and lighting.

At other times low-cost, simple camera equipment was used in conjunction with unsophisticated audio tape-recorders, and dances recorded on film and tape as they occurred. The result was still far from satisfactory. Inexperienced camera operation and the inability to maintain any close synchronization of the film and sound when the films were later projected, did not allow for

an accurate assessment of the movement of the dancers in conjunction with the rhythm of the music.

The solution to such a problem was to get together a group of technically competent people who would be willing to document aboriginal dances on film with synchronized sound and who would not attempt to make a film designed to win an award at a film festival.

Funds made available from the Australian Council for the Arts and the Institute of Aboriginal Studies financed a research project prepared by Mrs Alice Moyle, of the Monash Music department. It was planned that the film and sound record of the dances would later be used for several purposes. The dances would be transferred to manuscript by a special type of notation (Miss Elphine Allen of the National Ballet Company undertook this work), Mrs Moyle would transfer the music to manuscript, the sound tape recordings would be used to produce microgroove recordings, and the accurately synchronized sound films would provide valuable archival material. The dancing would be done on Groote Eylandt in the Gulf of Carpentaria by two tribes—the tribe native to the island (the Wanindilyaugwa) and another group of eight from a tribe on the mainland of Australia (the Nunggubugu).

Subsequent to many detailed discussions on the aims of the project and the best possible methods which could be employed to achieve these aims, it was determined that an endeavour would be made to film the dancing of the groups from two points at an angle of approximately 90° to each other from the positions of the dancers. A third camera would be used to obtain close-up shots of individual dancers in order to pro-

vide a clearer record of the details of the dance movements.

The two cameras which were concerned with the dancing of the groups were to have synchronized sound tape-recorders connected to them, while the third camera would not have sound equipment associated with it. By developing a technique of dance and sound identification on the third camera it was planned to use this camera only on occasion. However, because the dance durations were so short, it was found in practice that, for simplicity—both at the time and for later editing—the third camera would begin operation with the other cameras and film the entire sequence. Because the motor speed on the third camera was so well controlled, with careful editing it has proved possible to use the sound recorded for another camera with the film from the third camera.

Although the audio-visual aids section has a considerable investment in television equipment, funds had not been made available to purchase motion picture film equipment, and as a result, the most critical equipment for the project had to be hired from two firms in Sydney.

Three members of the audio-visual aids section with limited film experience were supplemented by a secondment from the State Film Centre, by kind permission of the Premier's Department of Victoria. The team was planned to consist of Mrs A. Moyle, Miss E. Allen, Mr R. Power (State Film Centre), Mr D. Hauser, Mr G. Ivey and the writer (all from audio-visual aids). During the Friday afternoon, Saturday morning, Saturday afternoon and Sunday afternoon 10,400 feet of film had been exposed and 14,400 feet of  $\frac{1}{4}$  inch sound tape recorded.

LESOTHO KINGDOM — *Continued*

ways delicately balanced and that the room for manoeuvre is not very wide. Over all, its attitude would not have been different—only in degree. No, Jonathan did not want to go out a loser. His political advisers had assured him of victory, his new five-year development plan was about to be launched, he had struggled manfully over five years with difficult economic problems, and his foreign policy was beginning to bear fruit. If he lost the election, he would lose, as well, the party to his right wing. The only way he could hold on was to placate his right and act resolutely—even, if some thought, foolishly. In so acting, he was, after all, flying in the teeth of British and South African advice filtered through to him. But act he did, and he still holds power—some say tenuously, but there are more solutions than one.

Already conferences have been undertaken with the opposition for consideration of a national coalition government. This so far has been unsuccessful. Time is important, however, for the British, exerting pressure, have already withdrawn aid, and it is unlikely that South Africa would be willing to fill the gap.\* Jonathan has, meanwhile, applied stringent economic measures in the country to tide over the period. Will he be able to negotiate a political settlement? A lot depends on the unity of the Congress Party and the Marematlou Freedom Party. If Jonathan, tenuously holding power in his own party, can effect some inroads into the opposition he may be able to build up support to face the electorate again—and, perhaps, under his own Constitution.

\*Since this article was written the British have resumed 'relations' with the Jonathan government and aid has commenced to flow again. The economic situation, however, in Lesotho is extremely difficult owing to yet a further drought and famine conditions.



One of the cameramen filming a dance by the Wanindilyaugwa group

Much of the research in the department of Physics is concerned with solid state physics and in particular with the magnetic properties of metals. The use of extremely low temperatures is of great value in leading to an understanding of the atomic origins of these properties and the main aim of this article is to describe the very low temperature facilities which have been installed here since 1961.

Before proceeding however one must introduce the concept of an absolute zero of temperature. At very high temperatures all matter becomes gaseous. Apart from technological limitations there are no upper limits on the temperatures which can be generated—as the temperature is raised the motion of the atoms simply becomes more and more violent. At lower temperatures matter exists in the form of liquids or solids. As the temperature is decreased so does the thermal atomic motion. The absolute zero is that temperature at which all available heat energy has been removed and physicists believe that this temperature cannot be reached although there is no fundamental limit to how close we can approach it. Absolute zero is at about  $-273^{\circ}\text{C}$  or  $-459^{\circ}\text{F}$  and physicists generally refer to

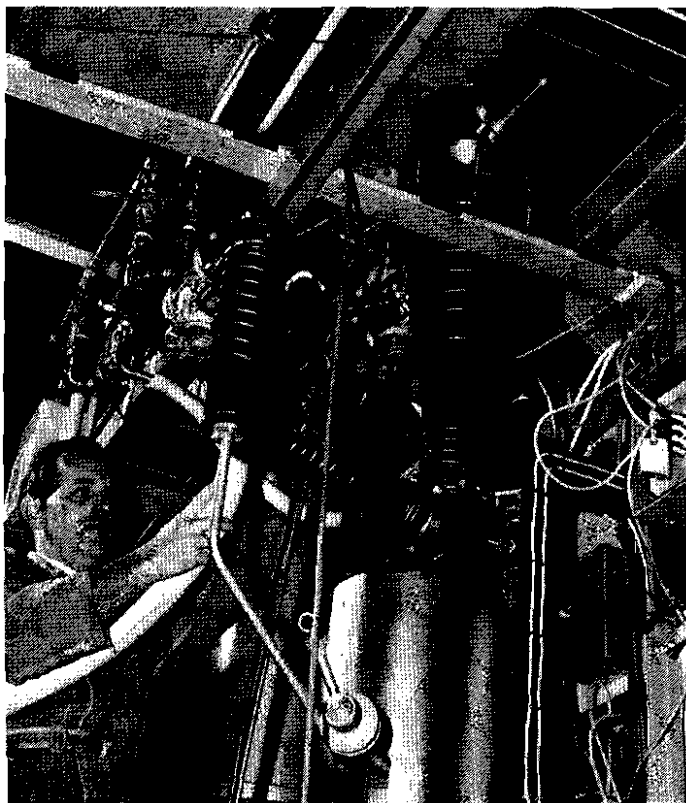
temperatures in degrees Kelvin ( $^{\circ}\text{K}$ ) where  $0^{\circ}\text{K}$  is absolute zero and  $1^{\circ}\text{K}$  means  $1^{\circ}\text{C}$  above absolute zero. In the behaviour of materials the ratio of two temperatures is generally a better guide to changes in properties than is the difference between the two temperatures. Hence, for example, in cooling by a little less than one tenth of a degree from  $0.1^{\circ}\text{K}$  to  $0.01^{\circ}\text{K}$  the properties of a solid may well exhibit as much interest to a physicist as does water between  $1000^{\circ}\text{K}$  where it exists as 'super-heated' steam and  $100^{\circ}\text{K}$  where it is 'deep-frozen' ice.

Apart from the interesting changes which can occur, for example, in the magnetic properties of solids there are also other important reasons for low temperature research. One is that at higher temperatures the violent thermal motion of atoms in solids often makes it impossible to measure fundamental properties such as the interactions between the nuclei and the atomic electrons. There are also technological reasons of which the most important is probably superconductivity. As the temperature is decreased the electrical resistivity of many metals suddenly becomes zero. It is then possible to pass very heavy electrical currents through extremely thin wires without

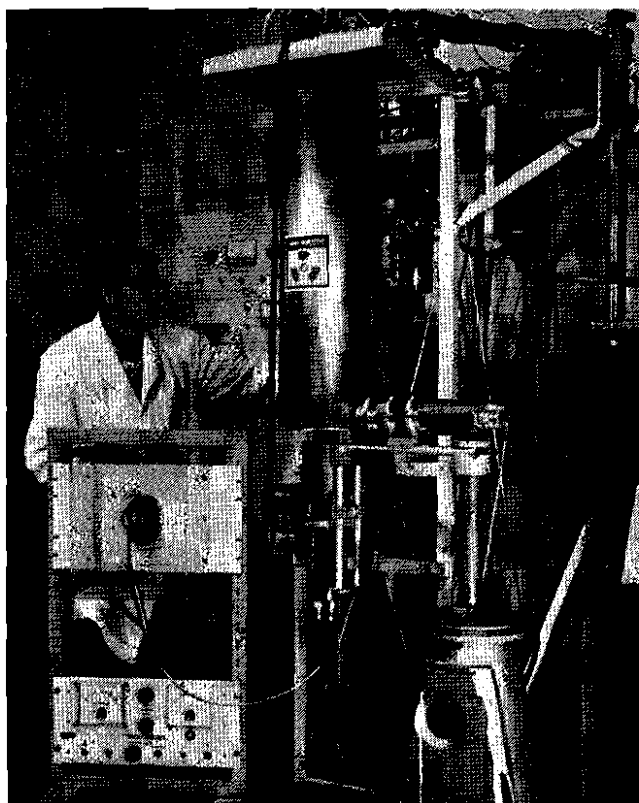
loss of electrical energy at all. As cryogenic installations become more and more common-place there is no doubt that the technological use of superconductivity will become important. In fact even now in Britain a very powerful electric motor with superconducting field coils is under construction. The beginning of low temperature research at Monash was in 1961 when a helium liquefier manufactured by A. D. Little & Co. (USA) was installed. At atmospheric pressure the common isotope of helium ( $^4\text{He}$ ) boils at  $4.2^{\circ}\text{K}$  so that temperatures down to  $4.2^{\circ}\text{K}$  are obtained in cryostats which are actually just glorified Thermos flasks in which the helium is a liquid coolant. Generally each cryostat also employs liquid nitrogen, which boils at  $77^{\circ}\text{K}$ , in an outer jacket. The liquid nitrogen is delivered in bulk to the department by a commercial industrial supplier.

As all those who picnic on tall mountains are supposed to know, lower temperatures may be obtained by reducing the pressure above a boiling liquid. In fact with ordinary laboratory vacuum pumps temperatures as low as  $0.9^{\circ}\text{K}$  are easily obtained with liquid helium. Remembering that to a physicist it is the ratio of temperatures which

*Senior technical officer working on the pumping system of the  $0.05^{\circ}\text{K}$  dilution refrigerator*



*A graduate student using the  $0.02^{\circ}\text{K}$  demagnetization cryostat to study radioactive nuclei at very low temperatures*



is important this factor of over 4 is excellent value for effort. By pumping on liquid helium consisting of the rare and expensive (but easily conserved) isotope  $^3\text{He}$ , temperatures as low as  $0.3^\circ\text{K}$  may be produced. Such a  $^3\text{He}$  cryostat was used at Monash in 1967 by Dr R. H. Donaldson to measure for the first time the thermal expansions of antiferromagnetic salts at these low temperatures.

Until quite recently the only known means of producing lower temperatures was that of 'adiabatic demagnetization'. Our first very low temperature cryostat was built in the mechanical workshop and reached  $0.05^\circ\text{K}$  in 1967. It is now used several days per week below  $0.02^\circ\text{K}$ . In this process an intense magnetic field is applied to a particular salt at  $1^\circ\text{K}$ . This causes the salt to warm up considerably but it is cooled back to  $1^\circ\text{K}$  by contact with the helium from which it is then thermally isolated. Upon removing the field the salt cools and, if sufficient care is taken, the warming rate can be kept quite small. A second, much more ambitious, demagnetization cryostat was completed early in 1969 and is now used for research below  $0.005^\circ\text{K}$ . After a demagnetization the salt remains below one-hundredth of a degree for over a day. These cryostats are used to study the interactions of radioactive nuclei in magnetically ordered solids. At very low temperatures the large magnetic fields which act on these nuclei cause most of the nuclear radiations to be emitted parallel with the magnetization—in strong contrast to the uninteresting behaviour at high temperatures (e.g.,  $1^\circ\text{K}$ ) where the radiation is emitted equally in all directions and can tell us nothing about the atomic structure.

The intense magnetic fields required for these cryostats are produced by means of solenoids wound from wire which is superconducting at  $4.2^\circ\text{K}$ . In the latest demagnetization cryostat over eight miles of wire was used costing \$5,000. However, to obtain such fields using a conventional electromagnet would require about a megawatt of electricity with installations worth several hundred thousand dollars—a striking example of the importance of low temperature technology.

Only a few years ago a new process for obtaining low temperatures was discovered in Britain and the USSR—the dilution refrigerator. Here continuous refrigeration, rather than a one-shot process, is possible using the fascinating properties of a mixture of the isotopes  $^3\text{He}$  and  $^4\text{He}$ . In 1968, Mr M. F. Wood (director of the Oxford Instrument Company which has a patent on this process and has close ties with the Clarendon Laboratory, Oxford) spent about six months at Monash supported by the ARGC. In collaboration with Mr Wood a dilution refrigerator was installed here and is now used at temperatures down to  $0.05^\circ\text{K}$ . in experiments on very strong radioactive sources where the radioactive heating is too severe for our demagnetization cryostats.

Recently Dr K. Thompson who worked on Britain's first dilution refrigerator at the University of Manchester was appointed as a lecturer here and is now supervising the construction of a  $0.02^\circ\text{K}$  dilution refrigerator.

In conclusion I should point out that to many solid state physicists the combination

of very low temperatures and intense magnetic fields represents a very valuable research tool. Largely because of an excellent effort by our technical staff and with strong financial support from the Australian Research Grants Committee we now have such cryomagnetic facilities as compare well with those available anywhere in the world.

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## RESEARCH TEAM WORKS ON HEPATITIS

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A joint Monash University-Fairfield Hospital for Infectious Diseases research team has discovered a virus-like agent (antigen) in the faeces of a proportion of hepatitis patients. Researchers believe that as a result of this discovery they are on the verge of characterizing the virus or viruses responsible for the disease.

Dr A. A. Ferris (now reader in Microbiology at Monash) and Mr J. Kaldor initiated the search for a possible agent in the faeces of hepatitis patients at Fairfield Hospital in August 1969. They were later joined by Mr G. Cross of the University's department of Microbiology and Dr I. D. Gust and Mr John White of the Hospital staff.

The development which led to recent advances was the discovery in 1964 by an American, working in a different medical field, of an unusual factor in the blood of an Australian aboriginal. This 'Australia antigen' was subsequently discovered in other human races.

The relation of the antigen to hepatitis only became evident when one of the American laboratory staff studying the new agent contracted serum hepatitis. This form of the disease has a much longer incubation period

than the infectious type and is most commonly transmitted by blood or blood products.

Nevertheless, Australia antigen was found in serum specimens from only about 7 per cent of Melbourne hepatitis patients. The majority of 600 or more cases admitted to Fairfield each year suffer from the much more common infectious form of the disease. The discovery of a larger particle associated with the smaller Australia antigen in blood serum was announced in April 1970 by the Fairfield-Monash group. The small and large particles have similar serological characteristics, and it is possible that the virus-like bodies are aggregates of the smaller units.

Tests by the group showed that the virus-like bodies found in blood serum and in the faeces, although similar in appearance under the electron microscope, can be differentiated by their serological behaviour. Pending positive proof that the particles are infective viruses, it may be speculated that the strain found in blood serum is responsible for so-called serum hepatitis, and that the one found in faeces by the Fairfield-Monash team is a related strain responsible for infectious hepatitis.

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## MONASH ASSOCIATIONS LIAISON COMMITTEE

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A committee, called the Monash Associations Liaison Committee, comprising delegates from various individual University associations has recently been formed. It held its first meeting in March. Representatives from the two staff associations, several student organizations—including the Monash Association of Students—the Faculty Club and the Friends of the Library and several other associations have joined the committee. The aims of the committee are threefold. It seeks to provide an opportunity for parents and others interested in Monash to associate themselves more closely with the University. It hopes to encourage greater contact between members of the University and the community for their mutual benefit. Finally, the committee plans to assist with specific projects and

help raise funds for specific University purposes.

The Committee will operate either by forming sub-committees to carry out particular tasks or by making one of its constituent groups responsible.

Already the committee has held some activities including several lectures, a graduation banquet, and a dinner for parents of first-year students.

It is currently investigating the possibility of arranging a large promotion function in the form of an art exhibition to be held in the foyer of Robert Blackwood Hall, planned to take place in May 1971.

MALC has undertaken to keep Victorian country areas informed of its activities and perhaps arrange some small-scale visits to different areas.

To most people Australian drama is a handful of plays centred around *The Summer of the Seventeenth Doll*, and the idea of an Australian drama in the nineteenth century would seem well-nigh absurd. But the years from the late 1880s to 1910 or thereabouts probably saw the most flourishing period in Australian playwriting—certainly the only period in Australian theatre when a management could bank on a local play being a resounding box-office success partly because it was local.

The earliest Australian plays date back to the late 1820s and '30s, and perhaps not surprisingly are mainly about bushrangers. David Burn's *The Bushrangers*, written in 1828 but not performed in Australia, pulls no punches about the brutalizing effect of the penal system or the corruption of the colonial administration. Charles Harpur's *The Bushrangers*, first published in serial form in 1835, and, like Burn's play, based on a real-life bushranger shows a similar sympathy for the criminal-outlaw—Captain Stalwart, villain as he is, takes on just the trace of the tragic stature of Macbeth at bay as he meets his end—it is the constabulary who are the unsympathetic buffoons. But this early strain in Australian playwriting lasted only a few years. In 1832 a system of licensing locally written plays

through the Colonial Secretary of New South Wales was introduced, and the New South Wales Archives contain a number of the scripts submitted. Nearly all are heavy sham-Shakespearean 'tragedy' set in places as remote from Sydney life as Mediaeval France or Imperial Rome—those few with an Australian setting are operetta, farce, or pantomime. I think it is more than likely that the Colonial Secretary's licensing of plays in the light of 'the special circumstances of the colony', with a ban on the portrayal of the criminal-hero type in a colony still largely a penal settlement, helped to suppress one of the early instinctive strains of Australian playwriting. Certainly the anti-authoritarian and socially critical play would have little chance with the censor.

It is not until the early 1870s, after three decades of mainly farce and pantomime, that Australian playwriting returns again to the melodrama form, at first with fairly stock transpositions of melodrama to the Australian scene, such as Walter H. Cooper's *Colonial Experience*—enlivened, however, by a gentleman new chum who has to be initiated into the ways of the bush by a pipe-smoking, easy-going caricature bushman. Most of these plays have long since disappeared—only a handful remain, most of them in the Mitchell Library; but it is pos-

sible to piece together many of the 'lost' plays, thanks to the theatre critics of the daily and weekly papers, many of whom spent several columns on a new production, with elaborate details of plot and staging, and often very pertinent comments on the plays' 'Australian-ness'.

By the late 1880s, Australian melodrama was in full swing with its headquarters in Melbourne, and two author-actor-managers rivalling each other for the audiences of Melbourne 'society' and gallery-boys who poured into the theatres to make local play after play a hissing, stamping, wildly cheering success. Alfred Dampier at the Alexandra (later Her Majesty's) had a fine edge on his rival, George Darrell, turning out play after play at the Theatre Royal. One of Dampier's earlier plays, *Marvellous Melbourne*, still preserved in the Mitchell Library, shows what brought the crowds flocking to the 'Alex'. Based on the doping of a racehorse entered for the Melbourne Cup, it boasts all the stock Melbourne tourist attractions—Spencer Street Station complete with newsboys, a Chinese opium den, a Toorak mansion (where the new chum detective-in-disguise proves his lack of colonial experience by trying to milk a cow with his gloves on), and Princes Bridge by moonlight. To quote one critic:

Left: The producer, Mr Bland Holt. Right: Miss Daisy Strudamore, in the popular role of 'Bushwoman'



*'Among the novelties in Australian life were the song and breakdown of the unemployed on the wharf, the custom of Chinaman cooks to go in and out of the front door of the Fairholme Mansion in pursuance of their culinary duties, and the knowledge that the arrival and departure of trains at the Spencer Street railway station is accompanied by a fanfare of cornets, violins, drums and other instruments, as if it were a continual Queen's birthday.'*

*Table Talk*, 25 January 1889

Another critic was tempted to remark that had an earthquake taken place in Melbourne during the season, it would have been written into the script by curtain-up that night.

But the formula worked, and Alexandra audiences became notorious for their riotous enthusiasm and, according to the critics, lowbrow tastes. But for all their lack of sophistication, Dampier's plays are perhaps the first 'classics' of the Australian stage—now lost, alas, except for two scripts in the Mitchell Library—and his adaptations of *Robbery Under Arms* and *His Natural Life* stood revival again and again well into the twentieth century, the latter becoming the basis for the film version of Marcus Clarke's novel.

George Darrell, at the Theatre Royal, perhaps had less of a showman's eye and ear for the expectations of his audience, and more of an eye to himself—certainly he took a drubbing from the critics:

*'But when a man by his demeanour assumed that a greater than Shakespeare is present in the flesh, and not far away either, and that he is equal to all the great actors that ever lived, or at least from Betterton to Irving, the public may be excused if they entertain doubts as to the actor-author's ballast.'*

*Table Talk*, 3 July 1885

Darrell wrote his plays mainly as acting pieces for himself, and the recurrent pattern of them, commencing in the Old Country with the Australian scenes basically an

eventful interlude before the hero and heroine return to reap the reward of virtue by living ever after in England suggests, as well as plain old Anglophile snobbery, a practical eye to the English theatre market. The only one of his plays which appears to be extant is *The Sunny South*—Darrell would surely be pleased to know that it is preserved, not in the colonies, but in the British Museum.

*The Sunny South* has all the marks of a Darrell play. It begins in an English stately home, where we find an English knight, a lisping aristocrat, a clean-cut straightforward Australian bushman (heir to the estate, but nobody knows yet), a hearty Australian girl, and a collection of English comic servants. The estate is to pass, through the owner's bankruptcy, into the hands of the son of a butcher (a sore point, made much of); so the whole crew takes off for Australia, where all seem to undergo a sudden personality change, and are found inexplicably indulging in sack races and boxing on the goldfields. While thus pleasantly employed, someone suddenly trips over a nugget, which is subsequently wrapped up in the Union Jack because it was found 'on the old woman's birthday'.\*

There remains but to have the usual colonial adventures with goldfield villains and trains held up by bushrangers before the happy couples return to the stately home in England, the son of a butcher now soundly discredited.

It is easy to make fun of plays of this kind, and fun they certainly were intended to be, though perhaps not always as we see them now. Darrell, who seems to have lacked a sense of humour, inevitably managed to play on others':

*'Arrived on the station of an idiotic squatter and his impossible wife, he induces them . . . to stand in the boiling sun for some minutes while he tells them how he, 'Daredevil Ned', rode and boxed, danced and gambled, and fought for the Queen and the honour of 'Hold Hingland', and then, arrayed in a bed-curtain shirt, corduroys and hessian boots, rushes from the peaceful home, whence he would have been soothed by dogs twenty minutes previously in real life, brandishing a bread-knife and an usher's wand, and yelling, "Up boys, and at 'em!" This fraudulent attempt at the impersonation of an Australian type, however, soon returns, apparently for his billy, and, recognizing his wife, now a governess, faints again . . .'*

(*Bulletin*, 30 October 1891—review of *The Sundowner*, by Darrell)

Many of the critics wrote thus of Darrell, but in the end it is audiences who make successes, and successes these plays certainly were, of a resounding kind no longer found in the theatre at all, least of all in those theatres producing Australian plays.

One of the chief elements of their success was, I believe, their vaudeville quality. During the thirty or so years before the development of an Australian melodrama local playwriting had produced mainly comedy, burletta and pantomime. I have already suggested that the Colonial Secretary's cen-

\* Queen Victoria's—for those who couldn't guess.

sorship may have had something to do with this, but it was in fact reinforcing what early became evident in Australian playwriting—a tendency to see the local scene basically in comic terms. As Australian melodramas continued to be turned out, this tendency, together with the pressure of gallery-boy audiences, gradually pushed the usual comic and song-and-dance element in melodrama further and further towards vaudeville. In Darrell's later plays, and those of Dan Barry, whose company succeeded Dampier's at the Alexandra, we begin to find fan dances and electric ballets written into the plays, to such an extent that one critic remarked facetiously the authors might as well write show-biz characters in as part of the story. In the end that is exactly what happens . . . not only the vaudeville act stopping the show, but the travelling troupe amongst the diggers, the showman on stage as part of the plot, like Kitty Keeves, the variety artiste, in *A Desperate Game*:

*'but always — yours truly Kitty Keeves, the Kapering Kangaroo.—See press notices. (Hops.)'*

Melodrama continued well into this century in Australia, with the productions of Bland Holt and William Anderson. Darrell's and Dampier's successes were revived again and again, and scenic effects, always good for an ovation that brought the scenic artists on stage in the middle of the show, grew larger and more spectacular. But together with this the portrayal of Australian outback life on the stage becoming increasingly naturalistic, without losing the comic element. The end product of this vein of Australian playwriting is the dramatization of Steele Rudd's *On Our Selection*.

It is this play, too, which marks the loss of the comic-vaudeville element to Australian playwriting for many years. 'Serious' Australian playwrights had already moved from the large commercial stages into the little theatres, writing for coterie audiences. The broad comedy and song-and-dance which had held the Alex and Theatre Royal audiences for so long moved eventually into a new medium—radio—where 'Dad and Dave' became the forerunner of 'the Golden Age of Australian radio'. It has since almost disappeared, never having found a permanent home in Australian television. But there are signs that the theatre may find it again. Those more recent Australian plays which have exploited it, such as Hopgood's *And the Big Men Fly*, have touched on popular Australian consciousness, if only in a small way; and some of the work of the La Mama group is exploring a revue format in a similar way.

The latest Australian success from Sydney, *King O'Malley*, makes use of a lively vaudeville element. It is almost the earliest and certainly the strongest strand in our admittedly short and slight Australian dramatic tradition — I should like to see it back again where it belongs.

**MONASH HOSPITAL — Continued**  
patients, and tradesmen who provide house-keeping requirements. Vehicular access to the campus by all these will impose heavy loads on vehicle movement and parking facilities. It is estimated that the overall number of people requiring access to the centre daily would be 3,500 for an 800 bed hospital.

The medical centre and its support groups will be the largest single operating unit on the campus. Many of its activities will be entirely different in practice and principle from the academic activities of the rest of the University. Some of its large-scale functions may also be overlapping, for example, in the matter of nursing staff training if this is developed to the undergraduate level.

However, the members of the faculty of Medicine who have been concerned with preliminary planning believe that the site of the centre and its physical integration with the medical school provide an opportunity for medical education and research unique in Australia.



## PROFESSOR A. KING

Professor Alexander King, who held the second chair in English at Monash from the beginning of 1966, died on 7 March this year at the age of sixty-five.

Professor King was born in Dorset in 1904 and went from school at Sherbourne to New College, Oxford, where he took a degree in Classics. As a young man he was a fine athlete and dancer. He sang in the Oxford Bach Choir and belonged to a poetry-writing club which included

Cecil Day Lewis and W. H. Auden. In 1929, after obtaining a Diploma in Education in London, he came to Australia to be first a school-teacher and then, from 1932, a lecturer in English at the University of Western Australia.



Professor A. King

He remained there (as reader in English from 1951) until he came to Monash. Throughout his time in Perth he was active in the community's educational and artistic life. In the course of his career Professor King published a number of books, one in collaboration with his wife, Catherine, another with his father-in-law, Walter Murdoch. As well, he wrote numerous articles and reviews for Australian journals such as *Meanjin* and *Quadrant*, and contributed poems to various magazines. For thirty years he made regular broadcasts on literature, art, music and religion.

At one stage he was assistant editor for *Quadrant* and, at the time that he left Perth, was acting director of *Westerly*.

The following tribute was paid by Professor W. A. G. Scott, professor of English:

'Alec King came to Monash in 1966 after more than thirty years in the University of Western Australia which he joined as a young lecturer in 1932. He reached the normal retirement age in 1969. It had been expected that he would continue in his chair for a further period but ill health made this impossible and he was forced to retire as professor of English at the end of last year. He was then appointed a part-time special lecturer and as such remained a member of the department until his death on 7 March. Though he was not able to teach at Monash in the later part of 1969, he kept closely in touch with his department and continued working at home. Indeed during the last few days of his life he recorded a typically personal and stimulating introductory lecture for first year students.

'He was an unusually gifted teacher with a wonderful capacity to share with others his own rich experience of literature, especially poetry. A man of wide culture, he was deeply interested in all the arts—music and painting just as much as literature—and his feeling for the creative arts as a vital expression of human experience governed his writing and teaching. His last book, *Wordsworth and the Artist's Vision*, published just after his appointment to Monash, is wholly characteristic of the man in its freshness, penetration and above all the deeply imaginative nature of its response.

'Yet nothing he printed quite fully captures what the man himself was. He was a rare human being the fine quality of whose spirit sounded in the very tone of his voice. There was no pedantry or egotism. He cared about other people and was most generous in finding time to talk with students and colleagues. His nature was out-giving and everyone about him enjoyed his warmth and sympathy and responded to his complete integrity. He was possibly not as widely known to the Monash University community at large as he had been in Western Australia. He was not by nature a committee man, though he willingly undertook such responsibilities as fell to his lot. And circumstances made it less easy for him than in earlier years to participate in activities such as music-making which he so valued. But in the few years he was with us he made an immense and quite special kind of contribution to the life and work of the department of English. When he left the University of Western Australia, one of his senior colleagues ended a tribute with words which cannot be bettered: "We shall have to get on without him but we should deceive ourselves if we thought him replaceable".'

## MR. J. C. FLETCHER

The death occurred on 1 August of Mr James C. Fletcher who occupied the position of Central Services Manager for almost six years. Mr Fletcher came to the University from the RAAF where he had completed 23 years' service. The funeral took place on 4 August. A memorial service in the Religious Centre preceded the funeral. In his tribute to Mr Fletcher delivered at the service the Vice-



Mr J. C. Fletcher

Chancellor, Dr Matheson, said:

'We are gathered here this morning to pay our last respects to our late friend and colleague James Fletcher who died at the age of 51 last Saturday.

'He had not been in good health for some time but not many knew that he was in such danger and, as a consequence, the shock of his sudden death has been very great.

'Shocked and sad as we are our thoughts must go first to his widow Pauline and their two young children who are left to make their way without the strength and comfort of a husband and father.

'We pray that they may find the courage and endurance to carry on as James would have wished.

'Before coming to Monash almost exactly six years ago James was a regular officer in the Royal Australian Air Force and retired from that service, after 23 years, with the rank of Squadron Leader.

'His overseas postings included Britain, the United States, North Africa and Gibraltar. He was on active service throughout the war in Coastal Command.

## Hard-working

'Here at Monash he became Manager of Central Services and he had under his control a great many of the people and functions that we rely on for the everyday efficiency of the place. He was in charge of transport, of the Central Stores, of parking, of the telephone, cleaning and postal services and of the general duties and patrol staff. Indeed it was only when I started to make these notes that I realized just how much we relied upon him and his staff for the orderly functioning of the University.

'He was hard-working, efficient and competent; something of a disciplinarian but none the worse for that; absolutely reliable and trustworthy.

'He made the not very easy transition from service to civilian life without bringing with him too much of the serviceman's rigidity and without losing the serviceman's liking for orderliness.

'He was inevitably involved in the incidents that have sometimes occurred here in recent years and he invariably conducted himself with a calm and unruffled confidence that was much admired.

'We shall go out from this beautiful place to resume our daily tasks saddened that one of our friends is no longer sharing those tasks with us but enriched by the memories of a man who, without pretensions in a place that he may sometimes have found a little pretentious, did his job well.'

## UNIVERSITY STAFF

## PERSONAL CHAIR IN BIOCHEMISTRY



Professor D. A. Lowther

A personal chair has been created in the department of Biochemistry for Dr Dennis Arthur Lowther, who has been with that department since 1962, first as a senior lecturer and from 1966 as reader.

Professor Lowther graduated as Bachelor of Science with honours in biochemistry from Leeds University in 1951 and was later awarded the degree of Doctor of Philosophy by the University of London.

From 1952-55 he was a research worker with the National Institute for Medical Research, where he was involved in study of the biosynthesis of hyaluronic acid by micro-organisms. He was then appointed as the Nuffield Research Fellow with the department of Chemical Pathology (Research) at St Mary's Hospital, London, where he worked with Professor Neuberger on the formation of collagen.

From there Professor Lowther came to Australia, to the position of research fellow in the department of Microbiology at the Australian National University, where he remained for two years until the end of 1961.

Coming into Monash's Biochemistry department at a time when the undergraduate teaching programme was being initiated, he has been deeply involved in the planning and teaching of biochemistry courses to science and medicine students as well as with supervision of graduate research.

Professor Lowther is the author of many publications, including journal articles and monographs. His main area of research interest is the structure and properties of connective tissues.

He is married and has six children.

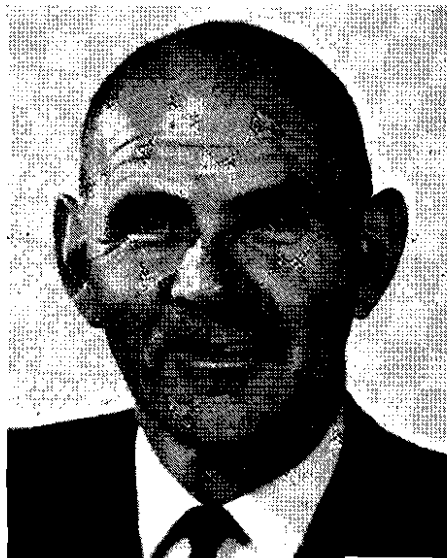
## FIRST CHAIR IN ADMINISTRATION

Dr Alan Keith Collins has been appointed to the new chair of Administration in the faculty of Economics and Politics. He is the eleventh professor in the faculty. In this position his main concern will be with the rapidly-growing course for a Master's degree in Administration.

Professor Collins holds a Master's degree in Education and a Doctorate of Philosophy from Cornell University. He is a member of both the American Psychological Association and the Australian Psychological Society.

Prior to his current appointment, he was, from 1963, a senior lecturer in Administration at Monash. Before that he held an assistant professorship in the school of Industrial and Labour Relations at Cornell University. In industry he held several posts with the Mobil Oil Company Pty. Ltd., including that of employee relations manager for Victoria.

Recently Professor Collins has been actively engaged in management development pro-



Professor A. K. Collins

grammes of the State and Commonwealth Public Service Boards and in programmes conducted by the Australian Administrative Staff College, the Commonwealth Department of Works and the State Electricity Commission.

His research interests lie in the areas of organizational behaviour, management theory and management education. He is the author of the book, *The Dynamics of Organization*.

## PERSONAL CHAIR IN PHYSIOLOGY

Dr Mollie E. Holman of the University's department of Physiology has been ap-

pointed to a personal chair in that department. Prior to this appointment she had held the position of reader.

As a student, Professor Holman was awarded the degree of Master of Science in physiology and pharmacology by the University of Melbourne. She then went to Oxford as a research student where she was subsequently awarded the degree of Doctor of Philosophy. Returning to Melbourne University in 1958 Professor Holman took up a position as lecturer in physiology; in 1962 she was appointed senior lecturer.

Professor Holman first came to Monash in 1963 as a senior lecturer. She took up the position of reader in 1965; in that year she was also awarded the Edgeworth David Medal of the Royal Society of New South Wales.

Professor Holman went to Stanford University during 1966 as visiting professor in the department of Surgery. Then, in 1967, she held the Chaffer lectureship in the University of Otago.

Since 1961 she has participated by invitation in nine international symposia on the Biophysics of Smooth Muscle and its Innervation. Her main research interests are in the biophysics and pharmacology of muscle, the innervation of smooth muscle and transmission in mammalian autonomic ganglia. In May this year Professor Holman became the first person to be awarded a Doctorate of Science by Monash for a thesis entitled *Electrophysiology of Smooth Muscle and its Innervation*.



Professor M. E. Holman