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MONASH UNIVERSITY GAZETTE

CONTENTS

WOMEN POLITICOS: TWO STUDIES IN VICTORIA	1	THE MONASH ART COLLECTION	21
JOINT BUILDING OPENED AT PRINCE HENRY'S HOSPITAL	4	A JAPANESE LINGUISTIC PROJECT AT MONASH	24
NEW CHANCELLOR AND DEPUTY CHANCELLOR	5	THE BAKER MEDICAL RESEARCH INSTITUTE	26
COMPARATIVE RESEARCH ON THE TEACHER'S ROLE	7	CELL BIOLOGY OF CEREALS AND OTHER GRASSES	27
WORK PROCEEDING ON DIABETES	9	RESEARCH INTO ULTRA-HIGH-SPEED MACHINING <i>or</i>	
MARIST COLLEGE OFFICIALLY OPENED	11	THE FACTS ON THE MONASH CANNON	31
SOME RECENT DEVELOPMENTS IN SCIENCE EDUCATION	12	MANNIX PLANS FOR 225 STUDENTS	33
UNIVERSITY CONFERS FIVE HONORARY DEGREES	15	THE SECOND INTERNATIONAL CONFERENCE ON	
CHILD STUDY CENTRE	18	SYSTEM SCIENCE	34
PREVENTIVE MEDICINE AND THE COMMUNITY	19	NEW COMPUTER OPERATING	35
FOUNDATION STONE OF GREAT HALL	20	UNIVERSITY STAFF	37

WOMEN POLITICOS: TWO STUDIES IN VICTORIA

By Margaret Bowman, Lecturer, and Michelle Grattan, Senior Teaching Fellow, Department of Politics

It is a commonplace that women in our society generally know less and care less about politics, and are less politically active than men. They are, of course, late starters, having had political rights for less than a century,¹ and appropriate attitudes and behaviour tend to lag behind opportunity: but Australian women have made even less use of their formal rights — perhaps because they came by them more easily — than British women. Although there are many staunch party workers, some occupying high positions within the party ranks, at present there is only one Federal and one State woman Minister,² only a tiny handful of M.P.s in Federal and State parliaments, and a sprinkling of local councillors. Nevertheless, whereas most women are content to acquiesce in the politics of their menfolk, a few have reached, if not the peaks, at least the higher ground of the political world. It is these few who invite attention by their very unusualness. What makes political women tick?

This report is of two linked but independent studies which seek answers to this question for Victorian women active in political parties and in local government. The first of these took as a sample sixteen women occupying top positions within the hierarchies of the State branches of the A.L.P., D.L.P. and Liberal parties. Each of them was interviewed at some length over dinner, in her office or at home, each answering the same general series of questions. Most respondents were frank and friendly, ready to reminisce and to elaborate their answers: one or two would reveal little more than a careful public face. The interviews were designed to

explore a number of questions. One of the basic ones was — how did these women develop a taste for politics? There is evidence from other studies that politics, like music, art and support for a particular football team, runs in the family. Children growing up in homes where politics matters, exposed to opinionated talk about issues, seeing (perhaps sharing in) party activity, meeting visiting (or resident) politicians, are likely to get drawn in — and the taste and skill, once acquired, tend to stick. Our interviewees, therefore, were asked about their family background, and how they first became interested in politics.

But, even for these women with a keen interest, it is a long step from the spectators' stand into the arena of active politics. The process of recruitment, therefore, was the second area to be explored: how did each of them come to join her party and to climb its ladder? Two aspects in this process were investigated — the external factor of circumstance and the internal elements of motive. What led these women into the party; what kept them staunchly active; what were, and are, their ambitions; what does each of them see as the rewards gained and the sacrifices claimed by the political life?

Women typically enter politics from a social base which differs from that of men, their personal relationships usually having a greater claim on their time and energies. It seemed important to look at the interaction of the private lives and public performances of these women politicians. Is it, for instance, the absence of family ties which permits women to enter — or drives them into — politics? And do the husbands of the married

women determine the extent of their political activity either by their encouragement or by the extent of their acquiescence in it?

The second study was of women in local government: as there are only forty-two women at present³ among the 2,500 councillors in Victoria, it was possible to interview all but one of them (the last was not able to spare time to see us). Although the questions asked were not identical to those of the first study, they were along the same lines, and a similar form of structured interview was used. Because local government is typically non-party — and at most semi-party (only the A.L.P. endorses candidates) — particular attention was given to the circumstances of recruitment. If at Federal and State level it is the parties which catch, nurture and support candidates, what agencies of recruitment serve non-party local government? To explore this question we asked the councillors how they came to nominate, and where they found their support.

Also, in order to provide a basis for comparison, we carried out a survey of men councillors, using written questionnaires posted to the women's council colleagues. Although we would have liked to duplicate the women's interviews with a sample of men councillors, a postal survey was chosen for its economy. In an effort to ensure a good response rate, we wrote to the respective Town Clerks requesting that councillors answer questionnaires, and enclosed a copy for their information. Individual questionnaires (anonymous), each in a self-addressed envelope, for easy return, were sent in batches to the Town Clerks for distribution, while the women councillors (all but one of whom we had met) willingly agreed to encourage their colleagues to fill them in. 105 out of 227 sent us completed forms, a response rate of 46 per cent. From these, we have data about the men's ages, occupations, the voluntary associations they belong to, their length of residence in the municipality, and their comments in reply to this question: 'Do you think women have a special part to play in local government?'

This latter type of mail survey supplies basic sociological data, but the harvest, though useful, is meagre. On

the other hand, the extended personal interview which affords the opportunity for richer exploration into career patterns and the personal drives underlying them, also presents its own problems of technique and interpretation.

The value of extended interviews for getting at politicians' views and 'style' of politics is very great. One gets the 'feel' of the participation by hearing the respondent's own account of it. Moreover, a researcher gleans many useful clues about his subject's general approach simply by listening to how he describes things, by coming into contact with his personality, and, most desirably, by seeing him in action.⁴ Documents, speeches, newspaper accounts, etc., can never give this insight. And the type of short interview used in the 'mass' surveys (based on market research methods) has the limitation for research on political style and motives of being very brief and, one always fears, of presenting unrepresentative snapshots of the respondents' political outlooks. Moreover, interviews in these mass surveys are often done by professional interviewers and thus the interpreter of the material is at the disadvantage of never having come face to face with his subjects. While such surveys provide much useful statistical data (e.g., about voting habits, etc.) they can be of only limited value in assessments of motives and style.

However, the 'depth' interview approach has its hazards. One which looms for the future will be saturation of the market, for it is the limited number of full-time or near full-time political activists to whom this technique will be most directed. Our surveys on Victorian political women did not encounter any difficulty of 'overinterviewed' respondents (although there was a minimal overlap between the membership of our two samples), for this depth interview technique is still not widely used by Australian political scientists and, moreover, in our project we were dealing in the main with low-level political figures (and women at that). However, as Australian universities' rapidly flourishing political science and sociology departments continue to increase the number of those in the 'trade', and as the use of sociological and psychological techniques spreads, we may find that the limited number of potential 'guinea-pigs' among activists at the higher level imposes restrictions on this type of research. Already there have been stories from the United States of congressmen inundated with questionnaires, with the result that some sort of restrictions and selection become necessary: a similar sort of 'rationing out' of politicians and the like to academic fieldworkers may come to pass in Australia.

Another difficulty with this type of research is that one is probing at a depth and into areas which may make the active political participant, and especially the public figure with a career to consider, reluctant to take part in such studies. We encountered this to a minor extent with our women: a couple of the respondents in one survey raised objections to publication of the material. Moreover, obviously the higher up the political ladder one goes, the more this problem arises: the top political figures either simply would not submit to this type of interview, or would maintain a perfectly 'public' face throughout it, or else place severe limitations on the use of any such material. Thus it is the 'middle-level' political figure who is most accessible for this type of research.⁵ And yet it is the tallest poppies whom one would most like to examine closely and whose politics

MELBOURNE CHANCELLOR LEAVES BEQUEST TO MONASH

A former Chancellor of the University of Melbourne, the late Sir Charles Lowe, has left a bequest of \$1,000 to Monash University.

The bequest will be used for a prize in a subject to be determined by Monash's faculty of Law.

SECRETARY-GENERAL TO A.U.C.

Dr Hugh W. Springer, Assistant Secretary-General (Education) at the Commonwealth Secretariat in London, has been appointed Secretary-General of the Association of Commonwealth Universities, to succeed the retiring Secretary-General, Dr John F. Foster, as from 1 October 1970.

Dr Springer was educated at Harrison College, Barbados, and Hertford College, Oxford.

would yield the most interesting data under this technique.

This trend towards using extended interviews, psychological techniques and the like, in the study of political motivations and styles (the way in which a person acts out his political role) is a manifestation of the general pushing-out of the boundaries of political science — for so long tied to historical-legal-institutional approaches and studies — into the neighbouring areas of psychology, sociology and statistics. The development has been evident throughout the postwar period, with the blossoming of the 'behaviouralist' school, and its effect has been felt in most aspects of political science (for example, the switch in emphasis from historical-descriptive studies to a model-building statistical approach is nowhere more evident than in recent work in international relations). However, extending the frontiers makes new demands on researchers. Political scientists have realized the greater depth of analysis made possible by using techniques from other disciplines, but many of us (at least in Australia) have to use these techniques without having had full training in the theoretical concepts of the disciplines from which they derive (for example, the spread of the methods of psychology among non-psychologists). In our own researches, we soon found ourselves in the 'grey' area between political science and psychology when we started exploring the women's motives and drives towards political activity. The fruitfulness of these studies, however, will extend as political science departments increasingly give their students some bases in allied fields — either by courses within their own departments or by cross-teaching with other disciplines. A start has been made in a number of politics departments (including Monash) along these lines. Although the problems of such a cross-disciplinary approach are great, especially with political science, which is less a discipline in itself than a hotchpotch of bits and pieces of many disciplines, the advantages far outweigh them. There is a wealth of gold to be found by investigating what makes people tick politically, the sources of their attitudes, how they pick up their skills, and why they choose to play a political role: but we must band together and mine the material as a company, rather than stick to our individual tools.

¹Women got the right to vote and stand for Federal Parliament in 1902; in Victoria they became eligible to vote for State Parliament in 1908, but it was not until 1923 that the bill was passed making women eligible for seats in it.

²Federal: Dame Annabelle Rankin; State: Mrs Joyce Steele (South Australia).

³During 1968, including both those who were defeated or resigned and those who first took their seats in August of that year.

⁴One limitation on the usefulness of politicians' personal accounts of their activity is that unless it is seen in the context of their behaviour in their party or council, it tends unduly to highlight the elements of private motive and thereby reduce the significance of inter- and intra-group pressures which significantly affect both opinions and decisions.

⁵Note that Alan Davies' pioneering book in this field in Australia, 'Private Politics', dealt only with what he called 'second drawer' politicians.

EMBASSY'S GIFT OF 2,000 BOOKS

A gift of approximately 2,000 books has been received by the University from the United States Embassy. The Embassy's Counsellor for Public Affairs, Mr Charles F. Blackman, acting on behalf of the current United States Ambassador, Mr William H. Crook, officially presented the gift early in 1969. These books became available after the reorganization of the U.S. Information Service library in Sydney.

The Vice-Chancellor, Dr J. A. L. Matheson, accepted the books on behalf of the University.



Dr Matheson examining one of the books with Mr Richard Service, Consul-General for Victoria and Tasmania, and Mr Charles Blackman, an Embassy Counsellor for Public Affairs

PROTEST SYMPOSIUM

'The Anatomy of Protest' was the theme for a series of public lectures held at Monash during July this year.

The Anglican Archbishop of Melbourne, Dr F. Woods, began the series with a lecture about protest and religion. He was followed by Associate Professor H. Mayer, from the University of Sydney, who spoke about protest and politics; Professor P. Brett of the Law faculty at the University of Melbourne then lectured on 'Protest, the Community and the Law'; and Professor A. G. Hammer, University of New South Wales, spoke about 'Protests, Motives and Personalities'.

JOINT BUILDING OPENED AT PRINCE HENRY'S HOSPITAL

A new building was opened at Prince Henry's Hospital on Thursday 27 March 1969 — the year of the Hospital's centenary. The building was a joint enterprise by the Hospital, the Victorian Cytology Service, and Monash University, which has been affiliated with Prince Henry's since 1962.

In his introductory address the president of the Hospital's board of management, Sir John Jungwirth, expressed pleasure at the achievement of such a unique enterprise.

He continued: 'Being a joint venture, the construction of the building has not been easy. There have been many bosses, or perhaps I should say many interests, to satisfy. But now that it is completed, although already we realize that it does not satisfy the needs and desires of all parties, nevertheless I believe it will make conditions better for each partner.'

Sir John went on to say that any further building programmes would be impossible until the Hospital acquired more land.

'You will possibly be amazed to learn that the area on which this Hospital is built comprises less than two and a half acres of land, and each day in this building we house over 3,000 people, including out-patients, all of the staff necessary, and the visitors.

'The Government, through various authorities, is searching around hoping to find a solution to our space problems, because we cannot build any more here unless we get more land. Despite all of these difficulties we are not despondent at all. We believe that, with the co-operation of partners, we are rendering a good service to the people of this State, and that these new additions will help us to more efficiently carry on our work. I can assure you that Prince Henry's will do its utmost to help its partners.'

The Premier of Victoria, Sir Henry Bolte, performed

the official opening of the building and congratulated the Hospital on its fine record of achievement during its hundred years of service. He went on: 'Instead of one medical school we now have two and it will not be long before we have three. A few years ago we would have had about 145 doctors graduating; in the next triennium we could reach 350, and this is why this particular school at Prince Henry's was so necessary.'

In his vote of thanks to the Premier, Dr F. G. Lennox, the Deputy Chancellor of Monash, declared that the affiliation between Prince Henry's and Monash was extremely valuable. By providing hospital facilities for the training of medical students it resulted in better-trained graduates. For the Hospital, valuable research was stimulated by the existence of University science departments.

'One problem that had been raised when Monash first began to use Alfred and Prince Henry facilities', Dr Lennox said, 'was how would things be later on in the development of Monash University, when the hospital proposed for the site out at Clayton was developed. How would this leave Alfred and Prince Henry's Hospitals? These questions were properly presented to the University, and the assurance was given that the demand and requirement for teaching was such that all these facilities would be properly and fully employed. In other words, having established a link with such hospitals as Prince Henry's, the University was out to maintain this, and in fact to increase and expand the scale of operation.'

Professor S. L. Townsend, chairman of the Board of Management of the Victorian Cytology (Gynaecological) Service, seconded Dr Lennox's vote of thanks.

Monash's section of the building houses more teaching and library areas, a further chair in Surgery, and the new department of Psychological Medicine.



The opening ceremony. From left to right: Mr A. J. McLellan (vice-chairman of the Hospitals and Charities Commission), Professor R. R. Andrew, Professor K. C. Westfold, The Honourable Mr V. O. Dickie (Minister of Health), Professor S. Townsend, Dr G. Lennox, Sir Henry Bolte (Premier of Victoria), Sir John Jungwirth, Dr A. Piper (Prince Henry's), and Mr F. Rogan (secretary to the Department of Health)

NEW CHANCELLOR AND DEPUTY CHANCELLOR



Sir Douglas Menzies



Dr Gordon Lennox



Sir Robert Blackwood



Sir Michael Chamberlin

Sir Douglas Menzies was installed as second Chancellor of Monash University at a ceremony on 11 April 1969 in the presence of the Visitor, Sir Rohan Delacombe, and a number of other distinguished guests. A graduation ceremony for the faculty of Arts followed the installation.

Sir Douglas graduated as Bachelor of Laws from the University of Melbourne and was admitted to the Bar in 1930. He has had a distinguished legal career, during the course of which he has held official positions on the committees of numerous organizations. In 1957-58 he was president of the Medico-Legal Society, and in 1958 held the position of president of the Victorian Bar. He was appointed a Justice of the High Court of Australia in 1958.

Sir Douglas is co-author of a book entitled *Victorian Company Law and Practice*.

Sir Douglas has an outstanding record in public life, where he has held numerous positions including Honorary Area Commissioner of Toc H between 1948-58, and president of the Heart Foundation of Australia during 1954-57 and 1961-62.

In the course of his address to the graduands at the ceremony, Sir Douglas said:

'This is called an occasional address. You know it is your occasion not mine, and it would be inappropriate were I not to use part of it to speak particularly to those who have graduated today. When you look back it probably doesn't seem very long since you came here as undergraduates, but when you came as undergraduates and you looked ahead, this day probably seemed a long way in the future. Both are, of course, linked. When you came to Monash University as undergraduates you committed yourselves to a life that I will call the student life. For a university is essentially a fellowship of students which embraces the youngest undergraduate and the oldest professor. There is a tie that binds us all together. But I would not have you think that because you have finished a course and you have ceased to be undergraduates and have become graduates that the student life is finished for you. I hope you won't shake the dust of Monash from off your shoes and I hope you won't say we have finished with university and we now start work. If you do, we have failed in the great part of the task to which this University is dedicated.'

DEPUTY CHANCELLOR

The recently-appointed Deputy Chancellor of Monash

University, Dr Gordon Lennox, is a Melbourne graduate in biochemistry who, apart from a short period at the London School of Hygiene and Tropical Medicine working on fungal enzymes, has spent his entire research career with C.S.I.R.O. The first three years were spent with the Division of Entomology in Canberra where he was investigating insect physiology and the mode of action of insecticides, but since 1940 he has been in Melbourne leading an ever-expanding team of biochemists, biophysicists, physical chemists and organic chemists studying the structure and chemistry of fibrous proteins, especially those in wool, skin, hide and muscle.

Dr Lennox became chief of the C.S.I.R.O. Division of Protein Chemistry when it was established in 1958 and has been chairman of the C.S.I.R.O. Wool Research Laboratories group since their formation in 1949.

Dr Lennox is a fellow of the Royal Australian Chemical Institute and of The Textile Institute and has been president of the Australian Biochemical Society. Apart from serving Monash he is interested in some other developments in tertiary education through his roles as chairman of the Schools Board for Pharmacy and Biological Studies of the Victoria Institute of Colleges and as a member of the faculty of Textiles of the Gordon Institute of Technology at Geelong.

In addition to serving on the Council and numerous University committees, the Deputy Chancellor is particularly interested in Monash's future development. He would like to see established in the University a new centre that would provide a means of improving communication with, and assistance to, the community outside.

Council Tributes

The following tributes by the Council were recorded in honour of the retiring Chancellor and Deputy Chancellor.

SIR ROBERT BLACKWOOD

To Sir Robert Blackwood, who retired from the Chancellorship of the University on 9 December 1968, the University, the State of Victoria and a great number of individuals owe a debt which is beyond both assessment and praise.

When the Interim Council was established in April 1958 Mr Robert Rutherford Blackwood, as he then was, was appointed chairman. Immediately he brought

to that office the wisdom, the enthusiasm and the personal care so essential for the newly-created institution, and which have marked his service through all the succeeding years. Already fully occupied in his business life, in social affairs, with his family and his hobbies, he nevertheless found time to give generously to Monash. Few, if any, universities can have had a Chancellor, as he became in 1961, who has attended more committee meetings than has Sir Robert. But he has not attended in any merely perfunctory way; his detailed knowledge of matters under consideration and his ability to concentrate attention on vital points have always accompanied his presence. That same care with which he has guided Council through its often voluminous papers has been apparent also at all committee meetings which he has chaired or at which he has been present. No detail of staff administration, no minor expenditure on a building, no financial opportunity, no organizational re-arrangement, seemed to escape his attention; while at the same time his broad vision of the ultimate purpose of it all was never obscured.

In all this and in every relationship with the University, he has been a friend to all. Members of the University at all levels who have worked with him have found him kindly, understanding and encouraging. In personal relationships, as on committees, he has listened to and been willing to accept views other than his own, whilst insisting and ensuring that basic needs and principles were not to be sacrificed. This same combination of flexibility and firmness has been apparent, together with his business acumen, when he has acted for the University in sensitive negotiations with governments and with other bodies. All these and his many other qualities the Council will be sorry to lose when his period of office as a Council member also comes to an end in a few months' time.

Sir Robert has presided at the ceremonial functions of the University, represented us in innumerable places, and been our spokesman on occasions both grave and gay. More recently he has put us in his debt by recording in great detail in his book, *Monash University—The First Ten Years*, the early growth of the University. The story that it tells would have been very different without his leadership.

The Council was glad that its ex-Chancellor accepted its proposal that the Great Hall be named in his honour 'Robert Blackwood Hall', but in reality the whole University is a memorial to his Chancellorship. To him, and to Lady Blackwood, who has both spared him to us and shared in Monash activities to the full, the Council expresses its very great gratitude and records this minute of appreciation.

SIR MICHAEL CHAMBERLIN

Sir Michael Chamberlin was a member of the original Interim Council when it was formed in 1958. When the Council proper was established in 1961 he was appointed by the Governor-in-Council as one of the members representing industrial and commercial interests. He was elected Deputy Chancellor in 1961 but, in addition to his formal duties in that capacity, he has served the University in innumerable ways.

At this time we think especially, perhaps, of his membership of the Finance Committee where his great knowledge of the commercial world enabled him to give invaluable advice on the conduct of the University's affairs; of his chairmanship of the Staff Committee which regulates the conditions of employment of the

staff at all levels; of his work on the Residence Committee and perhaps especially of the great interest he has always taken in the Religious Centre and in the work of the chaplains. But this is a far from exhaustive list; his advice was always available to individuals, to committees and, especially, to the Council itself.

He played a great part in the foundation of Mannix College and was largely instrumental in steering the sometimes rather complicated negotiations to what shows every sign of being a successful conclusion. It was his hope that he might still be in office when the college opened and, with the building rapidly nearing completion in good time for the next academic year, he can be said to have virtually fulfilled that ambition.

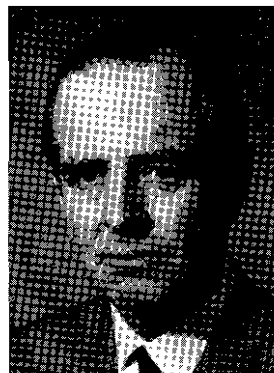
He was a most consistent member of Council until his health began to be troublesome earlier this year, and he missed only eight meetings in ten years. For all that time he served the University with devotion and affection and we are deeply grateful.

We extend our thanks and good wishes to Sir Michael and Lady Chamberlin in the hope that they will enjoy a long and happy retirement.

DEAN LEADS SEMINAR IN MEDICAL EDUCATION

During late April and early May 1969, the dean of the Monash faculty of Medicine, Professor R. R. Andrew, acted as director of a Travelling Seminar in Medical

Education, conducted by the World Health Organization. The seminar opened in Manila and later moved on to Sydney, Perth and Singapore with the purpose of meeting deans and chairmen of medical schools for discussion. The major aims of the seminar were to provide an opportunity for an exchange of information and views on the organization and programmes of medical schools in the region. It also discussed the major problems related to medical education in the area and how



Professor R. R. Andrew

these might be solved, and explored possible avenues of co-operation between the various schools.

Whilst in the Philippines the seminar visited Bay, Laguna, near Manila, an area containing 70,000 people. In 1965 the University of the Philippines, supported by the Rockefeller Foundation, established an interdisciplinary health centre. Here, sociologists, anthropologists, physicians, nurses and pharmacists work together to fulfil the community's health needs.

The seminar made many recommendations, largely concerned with modern medical curricula. It stressed the need for adequate assessment of medical manpower requirements and the necessity of using all relevant social and paramedical facilities in the community to support hospital activities. Finally, it was decided to explore a scheme to establish a Western Pacific Regional Association of Medical Schools.

COMPARATIVE RESEARCH ON THE TEACHER'S ROLE

By B. J. Biddle, Visiting Professor, Faculty of Education

For the past five years I have been leader of a team of social scientists who were studying what it is like to be a teacher in four (supposedly) English-speaking countries: New Zealand, England, the United States and Australia. Data for this project were obtained from large and representative samples of teachers in each country and provided information on the hopes, the fears, the conflicts, the activities, and the values and aspirations of teachers in each of these countries. This project has involved social scientists from each of the participating countries, for in conducting comparative research it is vital to involve scholars from all settings — not only to facilitate data collection and to choose important issues for research, but also to re-word questions so that they are equally meaningful for speakers of each 'local' tongue. In the case of our project, regular meetings of the participants have taken place every few months, and all phases of the research — planning, pre-testing of instruments, data analysis and interpretation — have been co-operatively engendered.

Why is it useful to study the role of the teacher? Three answers may be given to this question, and each has played a part in motivating the study. In the first place, we have wanted to study the teacher's role because teachers play a vital part in education and because the procedures and rationale of education differ from country to country. The research literature of education is full of studies concerning learners and learning, but with little research concerning teachers and teaching. One of the reasons for this imbalance lies in the common belief that teaching is merely a facet of learning, or the counterpart of it, or inferable from it. Yet little is actually known today about the actual classroom behaviours of teachers, or about the beliefs, norms, and values held by teachers constraining their classroom performances. This lack of information is truly tragic — since politicians and educational administrators continually indulge in decisions aimed at influencing teacher behaviour, and teachers (for their part) continually worry over the degree to which their professional behaviour measures up to the standards they have arbitrarily accepted for it.

Our second reason for the study concerns teachers themselves. Although the primary tasks of the schools concern pupil education, unless teachers are recruited, properly trained, and kept adequately motivated there will be no education. In each of the countries studied there is a teacher shortage. Thus, the problems, concerns, beliefs, and professional commitment of teachers are matters of public concern, and to the extent that the study throws light on these problems a public service will have been performed.

Our third reason, however, is the soundest — that of scientific curiosity. It is well known that most 'findings' in the social sciences have been validated on but limited populations. (In fact, it is conceivable that the bulk of experimental social psychology may be merely 'the psychology of American university sophomores' — an appalling thought.) In the field of role theory, almost nothing is known about the professional roles of persons occupying similar positions in different societies. In addition, comparative research in which strictly com-

parable data are collected from several countries is almost unknown in education. (The I.E.A. study of mathematics achievement is, of course, a notable exception to this generalization.) In the case of teacher role, almost no comparable data have ever been collected from more than one country.

So much for why. *How, then, was the project conducted?* For all practical purposes we can divide the effort into two phases. The first phase, a pilot study, was designed for exploration and consisted of an intensive interview conducted with relatively small samples of teachers. One hundred and twenty teachers were contacted in each country including equal numbers of men and women, primary and secondary teachers, and teachers from schools of various sizes. A battery of three research instruments was developed and administered to all respondents, including an interview schedule, a questionnaire, a diary form, and a shorter questionnaire that was filled out by the headmaster of the teacher's school. Of these, the most important source of data was the interview which took approximately 2-2½ hours to complete. These interviews were tape-recorded, and were later transcribed verbatim.

Since it was not possible to use the same personnel to administer the instruments to respondents in each country, a detailed training programme was designed to be sent to all countries for local implementation. This programme involved a training manual and tape recordings of sample interviews designed to exemplify all of the exigencies likely to occur in the course of interviewing. Research associates at each of the sponsoring universities (in Australia, the University of Queensland) were responsible for the training of personnel to be used in collection of data.

Data from phase 1 were then subjected to detailed analyses, and the results then formed the bases for discussions among the associates concerning the second phase of the project. It is difficult to convey the detail and time involved in these discussions, but regular meetings were held over more than two years attempting to code and interpret responses, formulate hypotheses concerning national differences in teachers' roles, and design and pre-test instruments for testing these hypotheses within larger and more representative samples of teachers. Some of the problems we encountered had to do with disparities in educational terminology. For example, we found it impossible to establish any reasonable degree of equivalence between the systems used for classifying pupils by grades in the four countries. Instead, teachers were asked to report the age ranges of pupils in their classes. More subtle problems had to do with the implications of words. For instance, in studying career commitment we first attempted to use the term 'dedicated'. Dedication, however, has a ring of fanaticism to British teachers that it does not to Americans, and so (despite the fact that Americans occasionally presume 'commitment' to mean incarceration in an asylum) we decided to ride with the latter term.

The second phase of the project was concerned with gathering data from a national sample of teachers in each of the four countries. In general, this was done by drawing a representative sample of schools, and then

contacting the headmasters of those schools and asking them to distribute questionnaires to all of their full-time teachers. In Australia the sample was drawn for us by the Australian Council for Educational Research and was a random sample of state, independent, and Roman Catholic schools, stratified by state. Approval for the study was obtained through personal contact with the Directors of Education in each state capital. In addition, representatives of Catholic educational authorities were consulted as were those of the Headmasters' and Headmistresses' Associations and of the teachers' unions and professional associations in each state capital. Similar samples, and endless contact procedures (!), were carried out in the other three countries.

Each school in the study received a package containing: a short questionnaire for the headmaster, sufficient questionnaires for each full-time teacher, and a two-page personal letter explaining the purposes and rationale for the study and soliciting the co-operation of the headmaster and teachers. The letter also pointed out that participation in the study was voluntary and that re-

spondents' anonymity would be preserved. Each questionnaire was accompanied by a stamped envelope addressed to the participating university; consequently respondents were able to return their questionnaires privately so that school officials had no occasion to see the answers given. Questionnaires carried an identification number telling us which school they came from, however, and schools that failed to respond were solicited by additional letters and packets of questionnaires.

In general, response rates for the study were high. Of those teachers contacted, in New Zealand 76 per cent returned usable questionnaires to us. In Australia the figure was 62 per cent, in England 56 per cent, while in the United States 54 per cent participated. Although the meaning of these differences may not be interpreted unambiguously, it is noteworthy that in those countries with centralized control over education (New Zealand and Australia) response rates were higher than in those countries characterized by local control (England and the United States). Altogether, 12,263 questionnaires were coded and processed — not including some 120

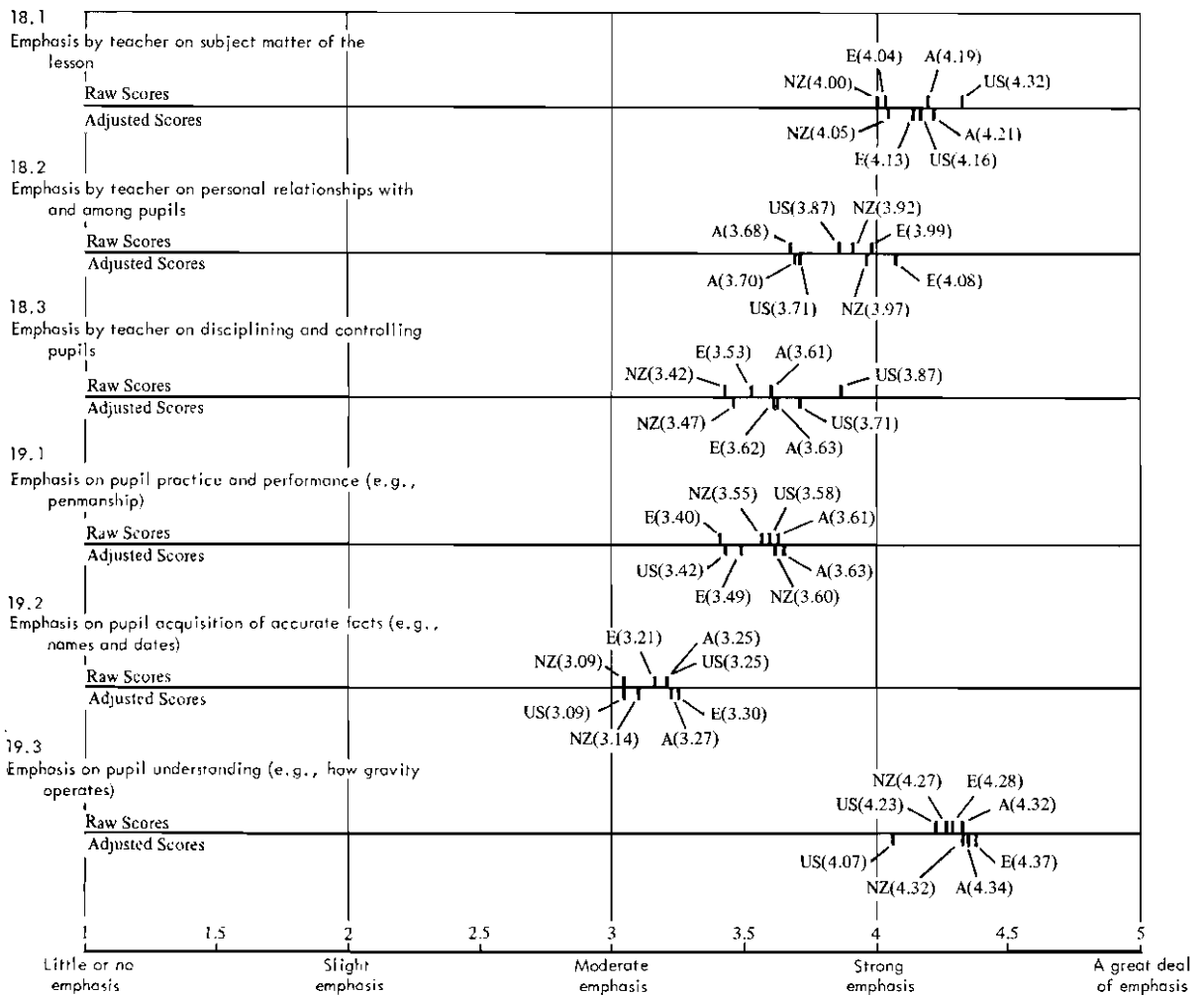


Fig. 1. National differences for selected items

questionnaires which were not usable for one reason or another. Completed questionnaires were returned to the participating university in each of the four countries. After being checked they were then forwarded to a central location for coding and analysis, the latter being accomplished using computers.

So much for why and how. *What, then, was studied, and what have we discovered?* Insufficient space is available here to provide more than a brief overview of coverage. The questionnaire used in phase 2 of the study, for example, dealt with personal and professional backgrounds of teachers, classroom teaching style, perceptions of professional role and role conflict for the teacher, norms concerning in- and out-of-school professional behaviour, history and attitudes towards professional involvement, questions indicating teacher morale, and values regarding a number of controversial education matters such as the use of corporal punishment and educational grouping.

Fig. 1 illustrates national findings for six questions selected from those dealing with classroom practices. Respondents were asked to indicate how much they emphasized 'subject matter', 'personal relations', 'discipline', 'performance', 'facts', and 'understanding' in their classroom instruction. National averages (means) for respondents from each country are given in Fig. 1. Two sets of figures are presented. Those above the line constitute the 'raw' averages from each country. However, in looking over responses to all items, it quickly became apparent that respondents from different countries differed in the degree to which they 'emphasized' things. Thus, Americans said they gave 'more emphasis', followed by Australians, New Zealanders, and Englishmen in that order. In addition to confirming some international stereotypes, these effects generated 'response bias', to compensate which, scores from all countries were weighted to equalize averages. Weighted averages are given by scores appearing below each line of the figure.

As will be seen in Fig. 1 respondents from all four countries tended to answer each of the six questions displayed in similar fashion—that is, all said they tended to emphasize 'understanding', and all gave somewhat less emphasis to 'performance' and even less to 'facts'. However, substantial differences also appeared among the four countries in terms of emphasis revealed for these items. Australian teachers, for example, said they gave more emphasis to 'subject matter' and 'performance', and less emphasis to 'personal relations' than did teachers from the other three countries, suggesting a somewhat *traditional* classroom. Interestingly, American teachers said they gave less emphasis to 'performance', 'facts', and 'understanding' than teachers from the other countries—leaving one to speculate as to exactly why they conducted their classrooms in the first place! Other findings may easily be seen in the figure.

My appointment to Monash as a visiting staff member is allowing me time to complete this study—to conclude data analyses and to write up findings in article and book form. Some of our findings support, but other challenge, widely-held stereotypes concerning education in the English-speaking world. However, comparative research of substance is impossible to conduct without opportunities for co-operation among academics of various nationalities, and Monash is to be commended for its programme of staff visitors that facilitates projects such as this study.

WORK PROCEEDING ON DIABETES

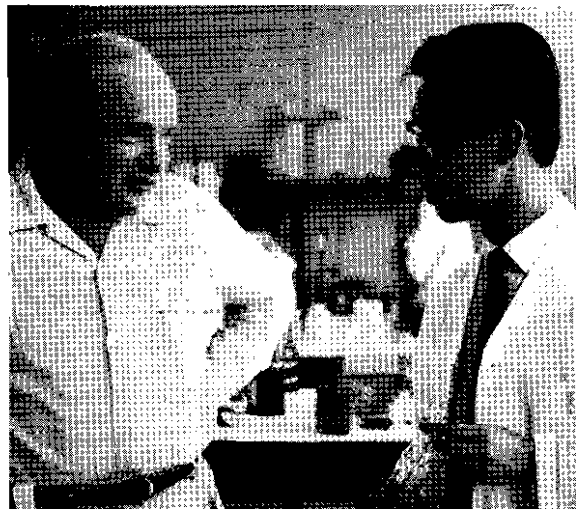
Considerable interest has been aroused by the announcement early this year of a new approach to the clinical treatment of diabetes by a team headed by Professor Joseph Bornstein of the department of Biochemistry.

In a comment on the results, which were published in the *British Medical Journal*, Professor Bornstein said they followed upon twenty years' research into mechanisms controlling the use of glucose and fats in mammalian tissues. He emphasized that no new treatment existed. What did now exist was a finding that had therapeutic potential.

Professor Bornstein added:

'Work in this field was begun in 1948, initially in an endeavour to determine the cause of anomalies in insulin dosage observed in the treatment of diabetes. Initial work proved that a sizeable proportion of diabetics did in fact secrete insulin often in amounts greater than normal but that this was inadequate to their needs.

'The clear conclusion was that some anti-insulin substance was operating in such patients. Research was then



Professor J. Bornstein (left) with Dr F. M. Ng

switched into an endeavour to isolate and characterize this substance.

'At about the same time it was shown by workers in the Argentine and England that the injection of pituitary growth hormone into animals produced over a period of time, first, insulin resistance, then temporary diabetes, and finally permanent diabetes. Other workers in the U.S.A. noted that prior to the development of insulin resistance, there was a sharp fall in the blood sugar of the injected animals.

'My work proceeded in England, the U.S.A. and Australia on mechanisms related to the growth hormone induced resistance, and the first glimmerings arose when Dr C. W. Baird and I were able to show that a certain method of extraction of plasma from diabetic patients yielded a very crude material which opposed the action of insulin in experimental systems. Then with Dr

Margaret Sanders, Miss D. Hyde, and Dr F. I. R. Martin we demonstrated that the presence of this material was dependent on a functional pituitary gland. Research was then switched to the pituitary and we were able to demonstrate that the material was derived from pituitary growth hormone and was of small molecular weight. Laboratory studies with partially purified insulin antagonist from growth hormone, however, at times produced anomalous results. Statistical studies of these indicated that the insulin antagonist was contaminated by a similar-sized molecule with diametrically opposed action. These were separated in micro quantities and studies began at Monash into two aspects of the problem.

The first was obviously into methods of preparation and purification and the second into the mechanism of action of these fractions.

Although these studies are still proceeding, sufficient data had been obtained by the beginning of 1968 to indicate clearly that the insulin antagonist operated by specifically inhibiting three enzymes involved in glucose use and fat synthesis and by virtue of these actions indirectly stimulated the use of fat. The other fraction (code named ACG) reversed these four actions by competitive action on the three enzymes involved.

Study of the model systems thus derived enabled an hypothesis as to the cause of diabetes mellitus in the presence of insulin to be made.

In order to test this hypothesis, a group of volunteer patients, all known to be capable of secreting insulin, were injected with ACG and their blood sugar levels followed. In all cases there was a highly significant fall in blood sugar, thus suggesting that the hypothesis was tenable and bringing up the possibility of a new method of treatment of a condition affecting over 2 per cent of any high living standard community.

From this point research has to follow two lines. Firstly we will continue to investigate the systems involved in these actions, to elucidate completely the structure of the two polypeptides and to synthesize them.

Secondly, an investigation into the possible role of ACG in the treatment of diabetes mellitus has already commenced in association with the Alfred Hospital's Metabolic Unit headed by Dr H. P. Taft. It must be realized that at this time we do not even know the correct dosage of ACG, the time relations of administration or indeed whether it has any advantages over orthodox methods of treatment.

'Such an investigation is necessarily prolonged and its cost on a scale capable of yielding results in a reasonable period of time far beyond the resources of the University or our hospitals. Thus the scale of the undertaking is beyond our control.'

Professor Bornstein concluded by saying he wished to thank all members of the research group, notably Dr J. Mc D. Armstrong, Dr F. M. Ng, Dr H. P. Taft, Dr M. Gould, Professor M. E. Krahl, Mrs L. B. Marshall and our graduate scholars, for their contributions in taking the problem to this point.

MONASH STUDENTS SET RECORD IN BLOOD DONATION

Monash University students donated 345 pints of blood during a four-day visit to the campus by the Red Cross Blood Bank in October 1969. This figure is the highest ever reached at the University.



Miss Mona Lai, sociology student, shown in the pottery class conducted by the Fine Arts club

EXTRA-CURRICULAR COURSES PROVIDED BY THE UNION AND STUDENT CLUBS

In 1969 the University Union and student clubs and societies offered courses of extra-curricular tuition in subjects ranging from handcrafts to languages. Over 1,000 students and members of staff participated in these classes, some of which were organized by the Union staff, and others by student clubs. In many cases professional people from outside the University were hired to take classes on the campus.

Although most tuition was given on a small class basis, seventy people received individual tuition in the playing of musical instruments and singing.

Among the wide range of subjects offered there were courses in Italian, Esperanto, Hebrew, various forms of dancing and music, the fine arts and effective speaking.

Many of these activities are to be included in the prospectus for a Monash Summer School which has been arranged by the Union for January and February 1970.

FOURTH HALL OF RESIDENCE NAMED

Monash's fourth hall of residence, the building of which will commence early in 1970, has been named 'Roberts Hall' after the Australian artist, Tom Roberts (1869-1931), a prominent member of the Heidelberg school of painting.

The decision that the hall would be so named is in keeping with the plan to name the halls of residence after distinguished Australians.

A planned fifth residential hall will bear the name 'Richardson Hall', after the novelist Henry Handel Richardson (1870-1940), the author of *The Fortunes of Richard Mahony*.

The three existing halls are named Deakin, Farrer and Howitt Halls.

PORTRAIT OF THE VICE-CHANCELLOR



Miss Christine Backhouse and the Vice-Chancellor with his portrait

The Monash University Parents' Group presented the Vice-Chancellor with a portrait of himself at a ceremony in the Alexander Theatre on Wednesday 24 September. This oil painting, which is the work of an English-born artist, Christine Backhouse, was presented by the president of the Parents' Group, Mrs Pat Hutson.

It is intended to hang the portrait in the Robert Blackwood Hall.

DR MATHESON VISITS OVERSEAS UNIVERSITIES

In the early part of 1969, from March to June, Dr J. A. L. Matheson made a tour of numerous American and Canadian universities. On his return trip he visited three universities in Britain.

There were two major questions which Dr Matheson investigated during his visit, namely, the effects of recent developments, including student activities, on the universities, and also the methods of government, the budgeting techniques and the effects of year-round academic operation in North American universities.

The tour was financed by a grant from the Carnegie Corporation of New York.

ALEXANDER THEATRE

During 1969 fourteen major productions were held in the University's Alexander Theatre, as well as numerous one-night performances. Of these productions five were by Monash groups.

The Monash productions were: Alan Seymour's 'One Day of the Year'; 'Lysistrata'; 'Zoob', a collection of four contemporary plays; Lorca's 'Blood Wedding'; and the musical 'Kiss Me Kate'. The Melbourne Youth Theatre was the outside group which used the Alexander Theatre most frequently. It performed three plays—'Macbeth', 'Three Sisters', and Genet's 'The Balcony'—and sponsored the Sydney Company, The Margaret Barr Dance Drama Company.

MARIST COLLEGE OFFICIALLY OPENED

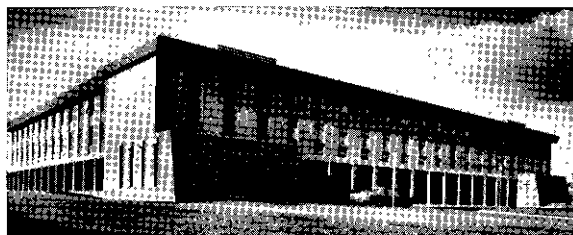
At 3 p.m. on Friday 7 November 1969 the Marist College, a residential college for male students of Monash, was officially opened. His Grace, Archbishop J. R. Knox, gave the blessing. The college was officially opened by the Minister for Immigration, Mr B. M. Snedden.

Marist College, affiliated with Monash University, consists, in the first stage, of two three-storey brick residential blocks, lined by a covered walk to a single-storey refectory building.

The designers have produced a plan that combines traditional university college functions with an enclosed monastic concept which includes a cloistered quadrangle, 'family' grouping of students' bedrooms and tutors' suites and areas designed to foster organized or impromptu discussion.

Marist College is under the direction of the Marist Brothers, a religious order which has been involved in Australian education for the past one hundred years. The college owes its origin to the need of the Order to qualify its future teaching members as university graduates. Hence, the Marist Brothers purchased the present property on Normanby Road at a time when Monash was first projected.

The building of a residential college at Monash by



Marist College

the Marist Brothers was done primarily in the interests of their own trainees. However, there will be a balance of accommodation at the disposal of other students wishing to benefit from the facilities of the college. Commonwealth and State Governments have consequently shared with the Brothers the cost of construction.

The present stage caters for a total of ninety students, seventeen tutors and administrative staff. Final capacity will be two hundred. It is anticipated that about one quarter of the 1970 intake will be Marist trainees. Their university courses are geared to secondary teaching needs and the range of tutorials offered at first is likely to reflect this bias towards science and arts.

GANDHI CENTENARY

The centenary year of Mahatma Gandhi—1969—was celebrated by members of Monash with a ceremony in the Religious Centre.

The commemoration took the form of readings from the Gita, the Bible and the Koran. Professor A. Boyce Gibson, formerly professor of Philosophy at the University of Melbourne, delivered a short address.

SOME RECENT DEVELOPMENTS IN SCIENCE EDUCATION

By P. J. Fensham, Professor, Faculty of Education

Late in 1968 the Commonwealth Minister of Education and Science announced that the Government was prepared to make a substantial contribution towards an interstate venture to produce a new science curriculum for the first four years of secondary school. Over a five-year period the budget for this project will amount to more than \$1,000,000. This announcement marked the entry of Australia into the ranks of large money-spenders on courses for science education, such as the Nuffield Science Projects in England, and a variety of agencies in the U.S.A. which have spent large sums in recent years developing material for various science courses at all levels of schooling, from elementary to senior secondary.

The Federal Government had, five years earlier, announced a programme of special grants for building and equipping science laboratories in all types of schools. Indeed, science education was singled out as having such peculiar priorities that it was a suitable case to justify the double precedent of Commonwealth entry unilaterally into secondary education and of making public money directly available to non-government schools.

These events in Australia have had their counterparts in many countries of the world, and the launching of the Russian Sputnik in 1957 is a convenient event which is usually taken as the harbinger of a new era in science education. However, the technological demands of a nationalistic race for space supremacy, while substantial, are only one of many pressures that have produced a ferment in science education that is rapidly spreading to all parts of the world. The pressures may be different depending on the stage of national development. In an undeveloped nation there is the need for skilled scientists and technologists to take up particular features of the struggle for modernization. But there is equally the task of making a scientific way of thinking sufficiently indigenous to the population at large that scientific and technological potential for progress can be realized and accepted.

At the other end of the scale, in the more developed, and hence more technologically-dependent nations, there is a growing need to produce a higher and higher proportion of the work force with a high level of scientific and technical education. In these countries, this proportion is already so large that the need can only be met by including science more and more as part of the general education of the whole population, so that the base from which specialists can be selected remains as large as possible. This follows from the usual assumption that science itself is sequential, so that there can only be 'dropout' for the study of science; no real attempt is made to resume science after they have abandoned it for years.

These aspects of human resource development, which call for more and better science education, are inextricably mixed with a growing awareness of the contribution that science has to offer to education in its more general sense of developing individuals and groups.

An illustration of the way that these 'pure' and 'applied' aspects of education become one is the following comment: 'Creating in students the ability to cope with new and unexpected findings is a central objective of the

innovators who have been experimenting with educational programmes in the last fifteen years.'

Despite the different reasons for improving and extending science education, all countries are experiencing the same problems of an acute shortage of qualified and capable science teachers, of an urgent need for new science curricula with supporting teaching aids and materials, and of expanding laboratory facilities and equipment for the teaching of science. Universities have important contributions to make to the solution of these problems, especially to the training of teachers and to the basic research upon which the development of curricula and instructional materials depends.

However, it has only been in the last three years in Britain and Australia that the first appointments have been made in universities of professors of education with particular reference to science. It is new universities in both countries that have taken this step. The University of East Anglia has a chair of chemical education within its school of chemical science. The University of Surrey has a professor of physics who also holds a chair of science education, and the University of Stirling has a professor of education who has a biology background and who has introduced special courses for biology teachers. The two universities in Australia with special work in science education are Macquarie and Monash, with a director of teaching (with special reference to science) at the former, and a chair in science education at the latter.

In all of these cases there is a strong emphasis on the link between the science departments of the university and the education departments or faculties. This link is also strongly evident now in the U.S.A. where science education departments have existed for a number of years, but were, previously, usually rather isolated from contacts with practising scientists.

Development of New Science Curricula

The formation of new curricula and the development of associated instructional material has been the area of science education in which the most striking progress has been made since the Sputnik dateline. These projects, whatever their emphasis, have shared certain common elements. They have been initiated by distinguished scientific scholars who have worked side by side with teachers and educational psychologists. They have drawn on all the light that contemporary psychology and related disciplines can provide. They have been conducted outside the educational establishment of state departments of education and have usually been associated with a university centre, so that the link with working scientists is maintained. Examples of these are the relations between the Massachusetts Institute of Technology and the Physical Sciences Study Course (now used in fifth and sixth forms in Victoria and Queensland), the University of Colorado and the Biological Science Curricula Study, Chelsea College, London, and the Nuffield Science Projects, and the U.N.E.S.C.O. Chemistry Project and the University of Chulalongkorn, Thailand.

In the new look at the place of science in the educational programme of schools, these curricula constantly stress the need to teach the particular science as a

modern growing subject, to give pupils a lasting sense of its nature as a structure of knowledge and to engender proper attitudes to science and its social significance. There is usually a strong emphasis on the place of experimental work in the learning process. The nature of this practical experience varies, depending on how strongly oriented the particular course is towards a 'discovery' approach. A typical description of one of these secondary level courses is the following Nuffield one:

'In the early stages — forms 1 and 2 — the pupils will be making acquaintance with phenomena in the physical



Primary school children observing the phenomenon of dissolving

world, a stage of seeing and doing, without formal note-taking and without expressing the results in formal statements. Then, in forms 3 and 4, there should be a stage of more organized investigation and learning, with intriguing questions to provoke thinking. Towards the end of the course, in form 5, the part played by theory in making a grand scheme of knowledge can be explored overtly and shown to be a proper part of scientific work.'

Where science courses in the past tended to emphasize facts, and some specific laboratory skills, the new courses emphasize understanding. Studying a science subject is to become an interesting business of finding out facts, concepts and principles, of doing one's own experiments and of arguing from one's own thinking, as well as learning what the teacher says.

Some of the most exciting developments of new courses are occurring at the primary level of schooling, where science has traditionally been absent, except for the rather arid equivalents of the nature study familiar to many who have known Victorian education at any stage in the last fifty years. At this primary level it is much easier to relate the teaching of science to established knowledge about the intellectual development of children, and the work of psychologists like Piaget, Bruner, Skinner and Vigotsky has been particularly important in these courses. However, it is again customary to find highly-trained scientists side by side with teachers and educational psychologists in the project teams. The emphasis given to the three elements of a science course — phenomena, concepts and processes — again varies

from course to course. Greater extremes of emphasis occur at this level, as these courses are freed (unlike science at secondary level) from all the pressure to be the direct groundwork on to which are built the tertiary courses for scientists and technologists.

At one extreme are courses like the Nuffield Primary Science in England and the Elementary Science Study in America, which stress the child's involvement with natural phenomena and which leave concepts and processes implicit and an unstructured part of the involvement. At the other extreme, the American Association for the Advancement of Science Courses stresses the child's practice with processes and uses the phenomena only as vehicles and the concepts as tools. In between lie the others such as the new Victorian Primary Science Course, which is closer to the former, and the Science Curriculum Improvement Study centred at Berkeley under Professor Karplus — a physicist — still stressing phenomena but making concepts very explicit.

The Education of Science Teachers

Two substantial reports appeared in Britain in 1968. The committee under Professor Dainton reported on the drift of students away from science in the upper levels of secondary school, and its subsequent impact on the number of science students at the tertiary level. Among the large number of recommendations in the report are several related to science teachers and the teaching of science. Hard on the heels of the Dainton Report came the Swann Report, which deals with the flow of persons into science and technology. The two major areas of employment which are not, at the moment, receiving anything like the right proportion of trained scientists and technologists are industry and school teaching. Calculations suggest that somewhere between one-quarter and one-third of the tertiary graduates need to return to the training process if a stable situation with quite modest educational conditions is to be maintained. The Swann Committee regarded the problem of adequate supplies of qualified science teachers as so acute that they made a number of recommendations about it, including one



Primary school children being introduced to the process of categorizing by sorting nuts and washers

which suggests differential salaries and conditions for science teachers.

At the moment, in Australia, there are somewhat conflicting indications about the existence of a drift from science. It is certainly not as clear as in Britain, but there is no doubt that Australia suffers even more acutely than Britain from a shortage of well-trained science teachers, and exhibits an alarming inability to hold as teachers those who do begin a career in the classroom.

Several experiments in the further education of science teachers have sprung up in England. Some are full-time for a term, while most are part-time of varying lengths, but none yet approach the thoroughness of the Japanese programme which requires six months full-time refresher study every five years for all science teachers.

Macquarie and Monash now both offer courses for the further education of science teachers, but these are, at this stage, optional and touch only a tiny proportion of the teachers. New pre-service courses to train science teachers have been slower to emerge, although both the traditional undergraduate science course and the year of professional teacher training have unsatisfactory features. The new demands on science teachers to make science more attractive, to teach it as part of general education and to make its nature and social significance explicit, underline the need for changes.

At Chelsea College, within the University of London, a new one-year course for science graduates leads to a Diploma of Education. There is a minimum core of formal lectures and for the rest of the year the students and staff work together in small seminar groups, integrating as much as possible the experiences of teaching practice and the findings of the academic study of education. The association of the Nuffield science curriculum projects with this unit at Chelsea makes possible the easy familiarization of the students with the most recent materials and curricula ideas. A similar approach to preparing science graduates for teaching occurs at the very strong centre for science education of Ohio State University. Once again, the integration of teaching experience with academic findings is stressed and the significance of cultural and sociological context for teaching methods in science is a major emphasis. In both these courses full advantage is taken of the homogeneous background of the students as science graduates. As yet, there appear to be no such courses in Australia, although a radical revision along these lines is planned for science graduates at Monash.

The training of teachers is only one aspect of the teacher problem; the more major one is the essentially political problem of retaining them in education as a career, when they, above all other teachers, have a basic training which makes them highly marketable persons in a society essentially short of technically trained persons.

JAPANESE CONSUL-GENERAL PRESENTS BOOKS

Seventy-two valuable Japanese books were presented to Monash on 24 March by the Japanese Consul-General in Melbourne, Mr N. Imajo, on behalf of the Japanese Government.

The Acting Vice-Chancellor, Professor K. C. Westfold, formally accepted the gift. The books, which are about contemporary Japan, were then given to the University's department of Japanese.

MR R. OSBORN APPOINTED AIDE-DE-CAMP TO THE QUEEN

Mr Richard Osborn, a senior administrative officer on the staff of the Academic Registrar, and secretary to the faculty of Medicine from 1964 until the recent rotation of faculty secretaries, has been honoured by Her Majesty The Queen in being chosen as an Aide-de-Camp to the Queen. The appointment is for a term of two years expiring in August 1971. Mr Osborn's appointment stems from the occasions when he 'wears another hat'—in this instance the 'hat' of Commandant of the Victoria University Squadron, an office he has held for the past ten years, commencing in the days when there was only one university in Victoria and this unit was then called



Mr R. Osborn

the Melbourne University Squadron. The office of Commandant is distinct from that of Commanding Officer, and the role of the Commandant is primarily one of liaison between the universities and the Air Force in the interests of the Squadron and its undergraduate members, as well as 'showing the flag' at Birthday Levees and other similar ceremonial occasions.

Mr Osborn served as a night bomber pilot in the R.A.F. in England throughout the second world war, and was awarded the D.S.O. and D.F.C. in this capacity. He was twice wounded in action, and also spent nearly two years as a prisoner of war in Germany. As Commandant of the Victoria University Squadron he holds the rank of Wing Commander in the R.A.A.F. Reserve, and it is in this capacity that he has now been appointed A.D.C. to the Queen.

An A.D.C. is called upon to escort and assist the Monarch as occasions require — with the forthcoming royal visit in 1970, Mr Osborn anticipates some measure of direct involvement in the tour but as yet no details have been notified to him.

MEDICAL FACULTY AWARDS SECOND DOCTORATE

Dr D. M. de Kretser, from the department of Anatomy, has been awarded the degree of Doctor of Medicine. This is the second doctorate in Medicine to be awarded by Monash University and the first in the basic medical sciences.

Dr de Kretser's thesis *Studies on the Structure and Function of the Human Testis* is concerned with the structural bases of male fertility and infertility. Dr de Kretser is a member of an advisory group at the Endocrine Clinic of the Royal Women's Hospital and he has been able to provide an electron microscopic assessment of various forms of therapy used. He is at present on leave at the University of Washington in Seattle where he is continuing his studies on the mechanisms of hormonal control of gonadal activity.

UNIVERSITY CONFERS FIVE HONORARY DEGREES

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

Citation delivered by Professor R. R. Andrew on the occasion of the conferring of the degree of Doctor of Science honoris causa upon Sir Macfarlane Burnet:

I present to you Frank Macfarlane Burnet, Knight Bachelor, Member of the Order of Merit, Doctor of Science, Doctor of Medicine, Doctor of Laws, Fellow of the Royal College of Physicians, Fellow of the Royal Australasian College of Physicians, Fellow of the American College of Physicians, President of the Australian Academy, Fellow of the Royal Society, Emeritus Professor of Experimental Medicine at the University of Melbourne, Nobel Laureate.



Sir Macfarlane Burnet

It is surely appropriate that this University should today confer a Doctorate of Science on this notable scientist who graduated in medicine at the University of Melbourne in 1922 and whose research has been crowned by such success. Our new University and its medical school have leaned heavily on the University of Melbourne both for staff and the inspiration of many of its graduates. From the foundation of Monash University, Sir Macfarlane, a dyed-in-the-wool Melbourne man, has been a member of our faculty of Medicine, and his advice on important matters has been sought not infrequently and never without advantage to ourselves. For this we are indeed grateful.

There is probably no contemporary Australian better known both here and abroad, nor any who has so well deserved the many honours he has earned. I shall not attempt to describe his achievements which he has written about so objectively in his recent autobiography. And it is impossible in a few words adequately to convey the essence of such a world figure, or the ultimate value of his work to science and medicine and thus to the community. But I feel obliged, nonetheless, Sir, in presenting to you this illustrious man, to try and single out some characteristic which may exemplify his importance to all who would work in the broad fields in which he has laboured with such remarkable success.

While his intellect is clearly of the highest order, it is not so widely known that as an experimenter he had few rivals. His colleagues talk of the beauty of his laboratory technique, the excellence of his planning, and the inevitability of his success. He has published 248 scientific papers, 158 reviews and he has written eight books. It has been a source of wonder to many famous overseas workers how he has been able to accomplish such a vast and influential output of such high quality. The probable answer lies in his logical approach to problems, the virtuosity of his bench work; it has always been done, and been done well and truly, once and for all time. And so he has sailed serenely

through perilous scientific seas on a journey that one feels can have no ending. Whatever his own beliefs, or ours, about the ultimate mysteries, I would suggest that his work has in a sense earned him a form of immortality. As the result of his researches and their fundamental effect on medicine and the biological sciences, all who work in these fields (and this includes graduates of medicine) will have embedded somewhere in their thinking or being, a bit of Burnet, and will be the better for it.

He is, indeed, one of our greatest living citizens and scientists.

Citation delivered by the Acting Vice-Chancellor, Professor K. C. Westfold, on the occasion of the conferring of the degree of Doctor of Laws honoris causa upon Sir Michael Chamberlin:

Members and friends of Monash University will be aware of the subtle change that took place in our status during 1968. In that year we celebrated the tenth anniversary of our foundation by an Act of Parliament of the sovereign State of Victoria. Those of us who have been at Monash since its beginning and are conscious of what has been achieved in this short span—our student population has increased from zero to virtually the number attending the University of Melbourne at the time of our foundation—would regard this year as an epoch marking the end of our first era—a coming of age. To us it seems right that the University should at this time recognize in a fitting manner one who has rendered it outstanding service from the beginning and who has now laid aside the burdens of office.

Michael Chamberlin was a member of the original Interim Council, formed in 1958 and consisting of twenty-seven members, chosen to cover the whole spectrum of interests and abilities required to set this great enterprise going. When the first permanent Council was established in 1961 he was appointed by the Governor-in-Council as one of the two members representing industrial and commercial interests. Throughout the life of the Interim Council he had given to the University the benefit of his long experience in commerce and other fields, and Council recognized his great contribution when it elected him as its first Deputy Chancellor, a position he continued to occupy until his retirement last year.

At a time when critical attention is being paid to the working of a university I am glad to have this opportunity to pay tribute to the generous service to Monash University freely undertaken by members of our Council, particularly in its committees. Here the special expertise of those who have had fruitful experience in the world outside the University is available to assist the University in its multifarious non-academic functions, without which the essential academic activities would be seriously inhibited. Of these Michael Chamberlin can fairly be sure to have shouldered an ample share.

In 1964 his services to the community were recognized by the award of a Knighthood by Her Majesty The Queen. Together with the establishment of Monash University on a firm foundation, it must have afforded him further deep personal satisfaction to see his labours to found the University's first affiliated college, Mannix

College, brought to fruition with its opening at the beginning of the 1969 academic year. This satisfaction has been compounded by the more recent recognition of his long record of service to the Roman Catholic Church and to education by His Holiness Pope Paul VI in creating him a Knight Commander of the Order of Pius.

Citation delivered by Professor B. W. Holloway on the occasion of the conferring of the degree of Doctor of Science honoris causa upon Sir Frederick White:

Today we are here to honour an eminent Australian scientist. It is therefore proper on this occasion not only to record those aspects of his career by which he has attained his position of distinction, but also how we come to recognize such high ability and achievement.



Sir Frederick White

In science, Mr Chancellor, we can precisely measure and evaluate many aspects of the physical and biological world. Yet, by contrast, we have no such absolute standards for recognizing scientific talent and acumen. To overcome this problem, scientists rely on various collective processes of evaluation by their peers, surely always the most critical of audiences.

It is by these high standards of assessment that Sir Frederick White emerges as the scientist's scientist — and his achievements are the evidence for the high value placed on him, not only by his fellow scientists, but also by governments and institutions.

At the age of thirty-two, he was appointed professor of Physics at Canterbury University College. At thirty-seven, he became chief of the Division of Radiophysics, C.S.I.R.O. Four years later, he was appointed to the executive committee of that organization, where he has remained to become chairman of the executive of C.S.I.R.O.

Not only during this period has he actively championed the expanded role of C.S.I.R.O. in Australian and international science, but, through his personal scientific distinction, he has continued to receive those honours which can only be bestowed through the confidence of his fellow scientists—Fellow of the Australian Academy of Science, Fellow of the Royal Society, Fellow of the Institute of Physics, President of the Australian and New Zealand Association for the Advancement of Science. An even wider recognition of his service came in 1962 when he was made Knight Commander of the Order of the British Empire.

He has displayed excellence not only as a scientific administrator, but also as an experimental scientist, for in his early years he was one of Appleton's colleagues at King's College, London, at the time when this laboratory was one of the world leaders in experimental physics.

His life has not been restricted to either the laboratory bench or the office desk. He has travelled extensively overseas to establish those personal contacts with scientists and other notable personalities which are so

essential to an isolated country like Australia. His special role in the financing of Australian research has brought him in contact with many trade and industrial research associations.

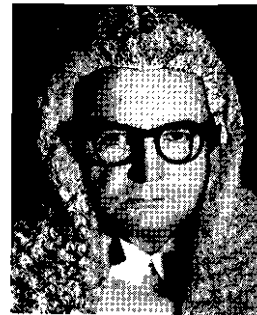
He has a special feeling for the outdoor life. The proximity of Canberra to the trout streams of the Snowy Mountains has not escaped his notice and he is an excellent example of one who is both the *complete angler* and the complete scientist.

His outdoor interests and, I feel sure, the continued success of all his professional activities, have been aided by his wife, Lady Elizabeth White, herself a person of considerable distinction and achievement and possibly one of the few Australian housewives who has practised mountaineering in the Himalayas.

Despite all these activities, Sir Frederick has found time to help us here at Monash, and he was one of the first members of the Council of this University. His advice during the early period of this University has been much valued.

Citation delivered by Professor P. L. Waller on the occasion of the conferring of the degree of Doctor of Laws honoris causa upon The Honourable Mr Justice Thomas Weetman Smith:

It used to be said that the common law of England resided in the breasts of Her Majesty's judges. Mr Justice Darling once said that to Counsel, who replied, 'a very happy residence', which in its turn led the judge to say, 'that does not justify what are called exploratory operations'. A better knowledge of legal physiology and judicial anatomy leads us today to conclude that it is what is in the *minds* of the judges that is of the greatest importance in the exposition and development of the living law.



Mr Justice Thomas Smith

It is unnecessary here, Mr Chancellor, to speak at length about the modern judges' role in law-making. It is enough to state that that role is a leading and vital one in our legal system. The Honourable Thomas Weetman Smith has been one of the Justices of the Supreme Court of Victoria since 10 February 1950. In almost two decades of judicial service he has shown himself completely fitted for the part of judicial law-maker, as a member of a court whose judgments attract keen attention and receive generous approval not only in Victoria but also in the rest of the common law world.

His many judgments, at first instance, on review of decisions in magistrates' courts, and as a member of the Full Court hearing appeals from all Victorian courts, have included a very large number which are regarded by all legal scholars (which term is meant to be all-embracing) as statements of legal principle and doctrine of the first rank. They are marked by the characteristics of order and clear expression, and informed always by a concern for justice and true human understanding. He is no aloof spokesman 'from the chill and distant heights', which Cardozo warned his judicial brethren not to occupy, but is conscious of 'the great tides and cur-

rents which engulf the rest of men'. It was a former Minister of State, himself a lawyer, who expressed a general view of the graduand when he said in Parliament: 'There will never be a better lawyer in the Supreme Court than Mr Justice Smith.' In a happy display of bi-partisan and bi-cameral unanimity, a Member of the Legislative Council complemented that tribute by saying: 'He is a great lawyer and this State is deeply indebted to him.'

It should not be forgotten that Mr Justice Smith, like every judge, discharges day-by-day the demanding and often, I am sure, nerve-racking responsibility of deciding particular cases between particular litigants. This is *the* business of the judge. He has presided over score upon score of cases, civil and criminal, since his elevation to the bench. His work is recorded, then, not only in the pages of the Victorian Reports, but also in the lives of many thousands of the citizens in this community. It is with this in mind that what has already been said about his contributions to the exposition, elucidation and development of the law in this State takes its full colour.

Aware, in all detail, of what the law is, Mr Justice Smith has made important suggestions for what it ought to be. He has been a witness before the Statute Law Revision Committee of the Parliament of Victoria, and there received high commendation for the assistance he provided. Since April 1962, he has been chairman of the Chief Justice's Law Reform Committee, which brings together judges, barristers, solicitors and law teachers, to consider specific criticisms of our legal system and to give form, on occasion, to specific proposals for change. It is the only standing law reform committee in this State and its hands are not left idle. As its chairman, Mr Justice Smith has presided over its meetings in such a way as to bring the best talents available to the consideration of the questions referred by government, the professional bodies or individual legal practitioners.

Mr Justice Smith has not confined his contributions to legal scholarship to those he has made, and continues to make, in the office of judge. The law, perhaps more than any other of the great professions, has always taken a corporate interest in, and responsibility for, the education and training of those who seek to join it. Today, in this University's law school, now firmly established with its large faculty of full-time teachers of law, there is still maintained a strong connection between the school and the legal profession; and members of the profession continue to play a much more than formal role in the on-going education of law students. In the days before the second world war, and for some years thereafter, a very large part of the formal teaching in law in our sister school in the University of Melbourne was provided by independent lecturers in law, appointed

from the ablest of the practising profession. You, Mr Chancellor, will know something of this yourself. Tom Smith was lecturer in the Law of Contract and Personal Property in the University of Melbourne from 1933 to 1941, and lecturer in the Law of Contract (a change of title following a change in syllabus) from 1941 to 1946, when he was compelled by the pressure of professional duties to resign his post. It can be seen, then, that it was for no insignificant period that he discharged, with signal success, the duty of bringing students to an understanding of a most important branch of their legal studies. For very many of them, now practising law in Victoria, and, in a number of cases, occupying judicial office, their grounding in Contract is forever associated not just with Anson's classic text but with Tom Smith's exposition and commentary.

And he has not forgotten legal education, or withdrawn from real participation in it, in the face of the demands of his office. In 1962 the Council of Legal Education determined to institute teaching in law for those law students unable to gain entry, because of quota restrictions, to the University of Melbourne's law school. It was Mr Justice Smith who accepted the office of chairman of the Legal Education Committee of that council, to which committee was entrusted the responsibility for the institution of those courses in law, their development and their overall superintendence. In the eight years since that step was taken the graduand has spent much time and a great deal of effort to make sure that the courses offered were of the same standards as those set in the universities. He has taken the keenest interest in the selection of lecturers and tutors, and shown the same interest and concern in the regular progress of the students. He has had the satisfaction of seeing students who have successfully completed the council's course, in conjunction with service under Articles of Clerkship, gain admission as barristers and solicitors of the Supreme Court of Victoria.

We in this University know, and today acknowledge, how much counsel and assistance Mr Justice Smith has given to this law school. He accepted an invitation to become a member of the Advisory Committee for the to-be-established faculty of Law, instituted by the Professorial Board in 1963; he served on that committee until the faculty of Law came into being on 28 September 1965. He became a member of the faculty of Law and of its faculty board, representing the judges of the Supreme Court of Victoria, when it was formally established. He is a member today.

This University honours itself on this day when it brings Mr Justice Smith into its membership as an honorary graduate. He is a great judge and a great jurist who has made splendid contributions to legal scholarship and who, at the same time, has taken a most important part in the planning and development of the education of the lawyers of tomorrow.

Citation delivered by Dr J. A. L. Matheson on the occasion of the conferring of the degree of Doctor of Science honoris causa upon Sir Lindor Brown:

Speaking as a former Whitworth observer I commend to you another former Whitworth observer for admission to an honorary degree.

Sir Lindor Brown and I have at least three things in common—we are both graduates of Manchester University; we both, as postgraduate students, earned a

LE TRETEAU DE PARIS VISITS MONASH

The Parisian theatrical group, Le Treteau de Paris, made its third visit to Australia in 1969 and, for the first time, gave performances at Monash earlier this year. The company presented two plays—Moliere's *Tartuffe* and Samuel Beckett's *En Attendant Godot*.

The tour was sponsored in Australia by the Australian Elizabethan Theatre Trust under the auspices of L'Association Francaise d'Action Artistique of the French Government, with the assistance and patronage of the Australian Council for the Arts.

modest, midnight penny by reading and recording the instruments in the small meteorological observatory in Whitworth Park; and we have both been known to play the flute. It could even be that we share other experiences, but I must now stop reminiscing in order to concentrate on Sir Lindor's scientific achievements which, as you doubtless know, are very great.

Between 1934 and 1949, as a physiologist on the staff of the Medical Research Council, he played a major part in demonstrating that communication between one nerve cell and another, or between a nerve and a muscle cell, is commonly chemical in nature. The process by which an electrical nerve impulse changes to a chemical one, by liberating molecules of acetylcholine from the nerve endings, was demonstrated by Sir Lindor with outstanding experimental skill and he thus was able to provide crucial evidence in support of what was then a revolutionary theory. As I understand it, Mr Chancellor, this means that we all have a series of Eveready dry batteries up and down our arms and legs.



Left to right: The Vice-Chancellor, Dr J. A. L. Matheson, the Academic Registrar, Mr J. D. Butchart, Sir Lindor Brown, and the Chancellor, Sir Douglas Menzies

In 1949 he became Jodrell Professor of Physiology at University College, London, where his ability to stimulate research and to teach experimental methods led to widespread recognition of the scientific activities of his department and of the department of Biophysics which he helped to form.

In 1960 he moved to Oxford as Waynflete Professor of Physiology where he has continued to carry out and to stimulate important work on the chemical agents that act as transmitters of nervous information. He has also been very active in scientific and university affairs generally, having been biological secretary of the Royal Society and one of its vice-presidents for several years, foreign secretary of the Physiological Society, and president of the International Union of Physiological Sciences. He was a member of the Franks Committee which inquired into the governance of Oxford University and he is doubtless now watching, with the enviable detachment that goes with a reasonably safe vantage point, to see whether any more notice is taken of Franks than of the many reformers who have tried to influence Oxford over the centuries.

Sir Lindor, who is now principal of Hertford College, Oxford, is visiting the department of Physiology at this University as a senior fellow of the Australian Academy of Science and continuing here, in collaboration with our own colleagues, the studies to which he has devoted his scientific life.

CHILD STUDY CENTRE

On 19 January 1968, Elwyn Aisne Morey was killed in a car accident. Whilst her work with children had made Elwyn Morey known very widely during her life, she left in the making a centre which will keep her name before students and teachers as long as Monash is here. The Elwyn Morey Child Study Centre, in a building immediately to the north of, and linked with, the new education building, incorporates a kindergarten, interview rooms, provision for observing children at play or in highly-structured situations, a psychological laboratory, and opportunities for observation and research in child health.

Since the kindergarten was established in a small cottage on the campus some three years ago, a small amount of observation and research has been possible, but the very limited facilities have prevented much being done. Students from Monash Teachers' College and from the Diploma in Education course have been able to watch kindergarten sessions being conducted. Some students have worked individually with children. A visiting professor of psychology from Harvard has carried out a research project concerned with the conditions under which children commit themselves to a particular course of action. An elementary school teacher from Michigan, on study leave with her husband, has investigated an aspect of the skills which are needed before children can begin to read. Some standardized testing has been done.

With the facilities provided in the new building, a systematic programme of observation by Diploma in Education students will be possible. This should be of great value; most young graduates have had little or no first-hand contact with small children, have little notion of children's skills and competence, and little understanding of the continuities in abilities and temperament to be observed throughout early life and into maturity. If they can see change and continuity integrated, as they are in developing children, students will be better equipped to respond to and direct the young people whom they will teach in secondary schools.

Interests in cognitive development (the changes in intellectual competence to be observed throughout life), in influences which may interfere with or facilitate learning (physical abnormalities, loss of schooling, particularly 'favourable' circumstances during early years, marked abilities in some areas), verbal and non-verbal communication, among children and between children and teachers, are some areas in which members of the faculty plan to develop research programmes in the child study centre. It is hoped to make it a fitting remembrance of its founder.

NEW FUND FOR STUDENTS

A Melbourne firm has given Monash University \$750 to start a fund for students whose courses are endangered by lack of money.

The fund, to be administered by Monash's careers and appointments office, will provide short-term loans for students who are considered to be desperately in need of aid.

PREVENTIVE MEDICINE AND THE COMMUNITY

By Professor B. S. Hetzel, Foundation Professor of Social and Preventive Medicine

The practice of medicine has undergone profound changes in the past thirty years. This has been the result of an explosive increase in knowledge, stemming from applications of physical and biological science to the problems of the causal mechanisms of disease. This explosive knowledge has led to a rapid increase in specialities in medicine, built round appropriate technology which has resulted in remarkable improvements in curative medicine. Outstanding amongst these achievements has been the control of infection, which has led to a greatly changed pattern of illness in the community in modern Western societies. We are now confronted by a greater dominance of chronic illness—chronic heart, chest, or brain disease, chronic disability following injury, and mental illness—in contrast with thirty or forty years ago when acute illness was dominant. Social and psychological factors have become much more important in relation to illness, increasing the complexity and the time required for management. Finally, the greatly increased knowledge means an increased cost of medical care, which is therefore affected by economic factors. In the affluent societies medical care has reached its most highly-developed state, but even within these societies it is now recognized that a uniform quality of care is not available to all. Increasing attention is being paid, particularly in the U.S.A., to the problem of 'the delivery of medical care' to underprivileged minorities in the country. Recent investigations in Australia indicate that we also have such minorities.

The aim of modern medicine is the prevention of disease. Clearly our knowledge is insufficient at the moment to be able to prevent the occurrence of disease, so that our approach to the present situation is to divide prevention into three major facets:

(i) *Primary prevention*, which is concerned with the complete prevention of all manifestations of illness—this has been achieved so far only in the case of the infections by preventive inoculations and vaccinations, ranging from diphtheria to poliomyelitis.

(ii) *Secondary prevention*, concerned with the containment and the efficient treatment of disease based on early detection and diagnosis.

(iii) *Tertiary prevention*, which includes rehabilitation and the restoration of the patient as a socially productive and individually satisfied member of the community following his illness. Such a concept of prevention embraces the whole complicated structure of modern medicine.

The decision as to how much money is to be spent between these three phases of prevention is becoming urgent. The amount of money to be spent on heart and kidney transplants, for example, finally has to be decided by the community, through its elected representatives. At present the difficult problem of chronic disease can be best approached through early detection, appropriate treatment and rehabilitation of the patient. This applies, for example, to heart disease, in which some definite progress has been made in recent years as a result of community interest and financial support through bodies like the National Heart Foundation. However, less respectable conditions, which are not so clearly defined, such as alcoholism, continue to languish

and persist as major economic and social problems, due largely to community apathy.

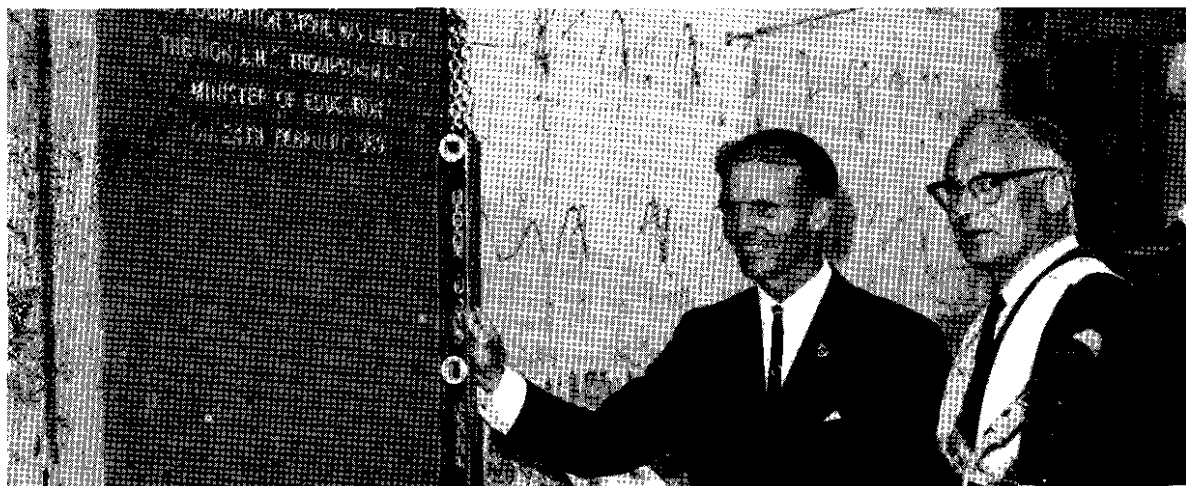
We are beginning to recognize that the use of the term 'disease' has severe limitations when confronted with current patterns of modern medical problems. A traffic accident causing major disability is not a disease; neither is much behavioural disorder, ranging from juvenile delinquency to sexual deviation, appropriately defined as a 'disease'. Alcoholism, although it causes physical defects in the brain, liver or heart, becomes a problem as soon as an apparently healthy man is found to be driving a vehicle when he has an elevated blood alcohol level. Such conditions are better described as community health problems than as diseases.

Social medicine is concerned with such problems, and is the modern name for public health. The newly-created chair at Monash is only the third in Australia; the other two chairs in the Universities of Sydney and Queensland have recently metamorphosed from chairs of Public Health, and were concerned originally with the hazards of infectious disease and its control using social and legislative means. Social medicine is not a discipline in itself, but makes use of a wide variety of other disciplines in seeking control at all three levels of prevention by social means. Varying disciplines, ranging from genetics and biochemistry, and more recently the behavioural sciences, including psychology and sociology, are used. Traditional clinical medicine is primarily concerned with the individual patient. Social medicine is more concerned with groups, such as migrants, widows, the elderly, or youth—school children, adolescents or students. However, there is clearly an over-lap in the management of the individual patient between what might be termed the mechanistic aspect and the social aspect. In the case of chronic illness and disability, the personal and social setting of the patient is all-important in management. These factors include the occupational and family aspects as well as cultural background; for example, the attitude of the employer is most important in rehabilitation.

What are the implications of these new concepts of prevention for medical education? It must be admitted that medical education has lagged in relating itself to these recent changes in health problems. This is hardly surprising when we realize how recent the knowledge explosion has been. In general, medical education has been concerned with sound training in biological science as a basis for understanding the mechanisms of disease, from which the principles of management follow. So great is the knowledge now available that medical students and their teachers tend to be over-absorbed in this fascinating aspect.

However, it has become apparent that a biological scientific training is not adequate by itself as the basis of any branch of medical practice, concerned as it is with people. This is especially true for the doctor of first contact, the general practitioner or family doctor. The family doctor is today, in a fragmented society, greatly sought as friend and counsellor for a bewildering variety of personal and social problems. There is much minor psychological and social illness for which knowledge of molecular biology is largely irrelevant. The economic

GREAT HALL NAMED IN HONOUR OF SIR ROBERT BLACKWOOD



The Minister for Education, Mr L. H. S. Thompson (left) with Sir Robert Blackwood at the ceremony

The laying of the foundation stone of the Great Hall by The Honourable L. H. S. Thompson, the Victorian Minister for Education, took place on Monday 24 February 1969.

In his welcoming address the Chancellor, Sir Douglas

PREVENTIVE MEDICINE—*Continued*

significance of this minor illness is great — so that there is need for a much better co-ordinated attack on the problem. Psychological medicine has provided clues but there is further need for operational studies in better defining the sort of help that patients require; ranging from that of a friend, who may not be available in the urban environment, to a social worker who provides support based on the provisions of the welfare state.

These helping resources in the community must be rationalized so that highly-trained medical manpower can be used for maximum benefit. It is becoming clear that the whole community is going to be increasingly involved in the maintenance of health care and the prevention and containment of disease. The doctor of the future will be required, as a leader in the community, to advise in this major area. To do this he will have to know the structure of the community and the helping resources available much better than he has in the past. Our teaching programme at Monash includes considerably increased exposure of the student to the community while he is still an undergraduate. This will enable him to see the setting of medicine in the whole community so that he can learn to work with other professions, both paramedical and non-medical, in order to meet the total health needs of the community. As it was put by Dr Millis, president of Western Reserve University, in a recent report on the graduate education of doctors in the U.S.A.: 'Medicine exists to serve society in common with the other socially useful professions. It must ever be responsive to the needs of the society it serves.'

Menzies, said: 'Today is a great day in the history of Monash, although, unfortunately, few can take part in it. This University is a new university, young not only in years but, we hope, in outlook. But it is a university in the great tradition — a tradition which we have inherited from England and the Continent. Part of that tradition is that there is an adherence to time-honoured pageantry. More profoundly, part of the tradition is that underneath the various disciplines that are here followed there is an underlying unity. Call it what you will — the pursuit of truth, the desire for excellence, the struggle for perfection — it is, I believe, one of the noblest manifestations of the human spirit. And this University is dedicated to the proposition that there is this unity.'

'Today is important because it sees the foundation of our Great Hall, and I believe that the Great Hall will be the centre for this tradition in which we proudly stand.'

Sir Douglas announced the University's decision that the Hall would bear the name of its first Chancellor, Sir Robert Blackwood.

'It is most fitting,' he went on, 'that today we have with us Sir Robert Blackwood, the father of this University and a great builder. The Council has decided that the Great Hall of Monash University will be known as the Robert Blackwood Hall. This we regard as a fitting tribute to the first Chancellor of this University.'

Mr Thompson, speaking for the Government, expressed appreciation of Sir Robert's contribution as a founder of Monash.

He continued: 'I've always strongly believed that there should be as high a degree of co-operation as possible between the academic world and the business and industrial world outside. In Sir Robert Blackwood we have a man who has been the successful general manager of one of our largest industrial concerns. A man who has been professor of mechanical engineering at Melbourne University and a man who knows university

(Continued on page 36)

THE MONASH ART COLLECTION

By A. P. McCaughey, Teaching Fellow, Department of English

In May 1961 the first annual grant of \$1,000 was set aside for the acquisition of works of art for the University. From the outset the Art Advisory Committee, responsible for purchases, has been composed of members of the University, including student representation — a system of 'external experts' was rejected. The first chairman of the committee was the late Professor A. J. Marshall, and through his friendship with a number of artists, most notably Clifton Pugh, the collection began with some impetus. An iron, sculptural mural by Pugh on the outside wall of the science lecture theatre, adjoining the department of Zoology, serves as a most appropriate memorial to Professor Marshall's contribution to Monash in this and numerous other directions.

In 1962 the size of the collection was substantially augmented when Dunlop Australia Limited presented the University with a group of paintings remaining from a Dunlop art competition. Rising prices on the Australian art market in the mid-sixties necessarily kept the rapid growth of the collection down. Only through the generosity of the McCutcheon Bequest did Monash acquire its most important work, the bronze cast of Sir Jacob Epstein's portrait bust of Samuel Alexander (1859-1938), the distinguished, Australian-born philosopher.

Acquired in 1964, it was installed in 1967 in the foyer of the Alexander Theatre.

The Union Board, in 1967, greatly increased the range of art purchases with an allocation of \$500 to be spent by the Art Advisory Committee specifically for works of art for the Union building. Together with an increase of \$500 in the annual grant for art purchases in 1969, the total sum now available stands at \$2,000, allowing for a substantial expansion of the collection. So much so that in 1968 Mr John Waterhouse was appointed curator to exercise closer oversight of the collection and its display. Generous gifts to the University include Dr John Burnell's collection of etchings and drypoints, among which are a small group of late Rembrandt impressions and two contemporary Australian paintings, a fine late George Bell figure study and a portrait sketch by Danila Vassilieff, given by Mr Joseph Brown. These gifts have further increased the range and diversity of the collection.

As no formal purchasing policy has ever been formulated, the character of the collection is naturally catholic. The changing membership of the Art Advisory Committee has made for an enthusiastic eclecticism. With the exception of the Epstein bust, three woodblock prints



Charles Blackman: Face Amidst Flowers (37½" x 51½")

by the contemporary Japanese printmaker, Hideo Hagiwara, and the Burnell collection, contemporary Australian painting forms the bulk of the collection. Few claims would be made for its representative quality, however.

The earliest Australian painting in the collection is Tom Roberts' portrait of A. W. Howitt, appropriately hung in Howitt Hall. Fine portrait as it is, it is fair to say that it was primarily acquired for its obvious associations with Monash. Rapidly accelerating prices in the market for nineteenth century Australian painting make further acquisitions in this field unlikely, besides the obvious concern of the appropriateness of purchasing such works for general University display.

The majority of works date from the inception of the University itself and naturally reflect a strong Melbourne bias. Fortunately, at the beginning of the collection Monash secured paintings by four members of the Melbourne figurative group, the Antipodeans. Clifton Pugh is most fully represented with six paintings, including a painting of 1952 which shows his pre-expressionist mode and relates him, through the mutual influence of George Bell, to Russell Drysdale's work of the late forties. David Boyd is finely represented with a large work, *Conflict*, which formed part of the Antipodean's single exhibition in 1959. The two major works of the Antipodeans in the collection are John Perceval's rich and typical painting of 1962, the *Artist's Studio*, and Charles Blackman's early work, *Face Amidst Flowers* (circa 1956-7). Both paintings show the artists at important stages of their development and are good examples of their major work. Where David Boyd unabashedly represents the mythic pretensions of the Antipodean Manifesto, Blackman and Perceval demonstrate how much of the best in the Antipodean adventure in Australian painting sprang from more conventional roots in post-impressionism, especially the intimism of Bonnard, and the milder side of German expressionism with the gnomic drawing and direct paint handling.

Sydney painting of the same period, allegedly against which the Antipodean Manifesto was written, is not represented as fully in the collection. A small but fine water-colour by Henry Salkauskas and a large, important recent painting by Elwyn Lynn, *Borderland* 1967, do nonetheless demonstrate how much the Sydney abstraction of the period develops from a strong, if generalized, sense of the landscape and the physical world. More impersonally realized than the Antipodean's world, to be sure, but, like them, very much alive and responsive to the world around them.

Although it would greatly enhance the representativeness of the collection if work by the other members of the Antipodean group (John Brack, Arthur Boyd and Robert Dickerson) and a larger group of Sydney painters and sculptors, especially John Olsen, John Passmore and Robert Klippel, could be added, present purchasing funds simply do not allow for such filling-in of gaps.

In one way this limitation has acted beneficially. It has compelled successive Art Advisory Committees to seek out works of quality from less familiar and less fashionable artists. Monash has secured some remarkable works thereby. An early painting by Don Laycock, *Two Heads*, with its heroic scale and attitude is a nice contrast to the more intimate and more familiar figurative modes of the Antipodeans, with whom the Laycock

is directly contemporary. Edwin Tanner's *Moral Philosophers* represents an idiosyncratic artist with a central work from his *oeuvre*. Tanner belongs to no schools or movements. Wry, sardonic and satiric, Tanner's art stands in isolation from his contemporaries and has been unjustly neglected for that reason.

A notable recent acquisition, Roger Kemp's *The Cross*, exemplifies best the policy of seeking out neglected works and artists. Kemp, one of the pioneers of abstract



Roger Kemp: *The Cross* (71" x 53½")

painting in Melbourne, is held in high regard by artists, museums and critics throughout the country. But his forceful, ecstatic mode of symbolic abstraction has proved non-domesticable. The Monash painting, one of the masterpieces of the collection, shows him at his fiercest and relentless best. After Monash had acquired the painting, it was entered for the 1968 Blake Prize for religious art and won it.

No painting better demonstrates the purchasing 'policy' if one can call the necessities of financial limitations a policy. Commissioned to buy the best works of art available for the University within the purchasing grant, it increasingly means in a rapidly inflating market that informed buying must replace earlier, enthusiastic speculation. Major works by neglected figures can still be obtained for a fraction of the price minor works by fashionable figures bring. Rightly or wrongly, the Art Advisory Committee has felt that adventurous acquisitions, often well ahead of generally accepted levels of taste, should play a major part in the up-building of the

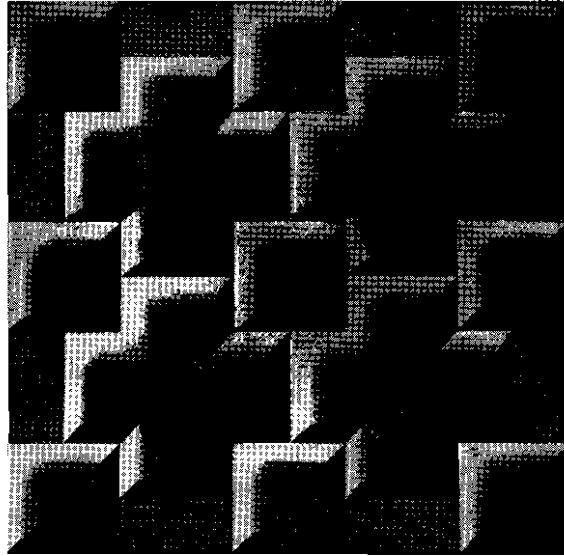
collection. This has meant buying the work of younger painters. In this area a notable group of paintings has been acquired over the past two or three years.

A group of younger Melbourne painters — Paul Partos, Robert Jacks, Dale Hickey and Robert Hunter — all emerged at much the same time in the middle and late sixties. While differing considerably amongst themselves, all emerged after the Antipodean wave had passed, both in style and ideology, and to some extent all have sought alternative directions for Australian painting, away from the regionalist ethos. Partos and Jacks were the earliest to emerge and both are represented with works from their notable first one-man shows. Although both have since developed into maturer styles, these early works, nonetheless, mark the moment of the break and new turning in Australian painting. The *Untitled Abstraction* by Dale Hickey (acquired directly by the Law faculty on the strenuous advice of the Art Advisory Committee) shows a mature style in the new abstraction. Hickey, who occupies a dominant position in the Melbourne wing of the new abstraction, has consistently tried to maintain a residual image even in the most abstract-seeming paintings. His work focuses, as nobody else's has done in Australia, the two forces at work in sixties art: meeting the demands of the strict two-dimensionality of the painted art object and the remarkably resilient survival of the surreal image. The *White Painting* by Robert Hunter — associated both with Jacks and Hickey — completes the Melbourne representation of the new abstraction. With its austere, 'minimal' format of minute changes in whitish tones through a series of strict geometrical shapes, it represents the reductivist tendency in recent painting at its most forthright. To complement this group of Melbourne new abstractionists, Monash recently acquired a major example of Michael Johnson, the leading Sydney new abstractionist. Johnson with Sydney Ball, alas unrepresented in the Monash collection, has sought the fullest exploration of colour in the new abstraction, using colour not as a decorative adjunct to composition, but as the subject of the work itself. As a counterpoint to this group of new abstractionists, Monash acquired George Baldessin's *Girl in a Striped Dress* to show something of the later fortunes of Melbourne figurative painting. Generally the Antipodeans produced no successors. Baldessin, primarily a sculptor and etcher, produces few paintings and the Monash work clearly shows a movement away from the intimist work of Blackman to a more impersonal figurative style.

It is worth pointing out that the National Gallery of Victoria owns substantial works by all these younger artists. In some cases, Monash acquired them before the Gallery did. Certainly these recent acquisitions have established the Monash collection as the most forward-looking of university collections except the Power Gallery of Contemporary Art within the University of Sydney, whose financial resources are quite different and whose collection is specifically given over to non-Australian work.

Although most of the collection consists of movable objects, and part of the policy is the circulation of these objects through the buildings of the University so that no work becomes associated with a particular place, thus dulling its freshness, these permanent works should be mentioned for their outstanding interest: John Perceval's ceramic mural, *Homage to Lawrence Hargrave*,

in the stairwell of the Hargrave Library, and the stained glass windows by Les Kossatz in the main chapel of the Religious Centre and the two windows by Leonard French in the smaller chapel. The Perceval mural is the largest ceramic work he has ever carried out and the Kossatz windows have a buoyancy that accords well with the forward-looking policy of the recent acquisitions.



Dale Hickey: Untitled Abstraction (68" x 68")

EDUCATION PROFESSOR ON SOUTH AUSTRALIAN COMMITTEE OF INQUIRY

In February 1969 Professor S. S. Dunn, who holds the K. S. Cunningham Chair of Education at Monash, was appointed to a Committee of Inquiry into Education in South Australia. The committee will examine the whole of the South Australian education system with the purpose of determining the most effective use of the State's resources.

The chairman of the committee is Professor P. H. Karmel, Vice-Chancellor of Flinders University. Other members are Justice Roma Mitchell, of the South Australian Supreme Court; Mr I. S. Hayward, president of the S.A. Division of the Australian Institute of Management; Dr W. C. Radford, director of the Australian Council of Educational Research, and Professor Dunn.

Professor Dunn, who is particularly interested in the field of experimental education, is at present taking study leave in the United States, and has leave of absence from the committee until early in 1970.

ANIMAL STUDY AT MONASH

The University's Jock Marshall Zoological Reserve, situated on the campus, is the scene of considerable research. Members of the Zoology department have, during 1969, been carrying out work on the Cape Barren Geese, echidnas, the Parma wallaby, and on other animals.

A JAPANESE LINGUISTIC PROJECT AT MONASH

By J. V. Neustupný, Professor of Japanese

Linguists belong to the category of people who usually disappoint their friends. A linguist is rarely the hybrid of a phoenix and a parrot who pleases his neighbour by supplying proof to his belief that the man next door can talk in twelve—or more—languages. Neither is he the one who can advise on the meaning of *Ancora Imparo*. On the other hand you may easily find him doing strange things which he should not be doing: reading something that looks like a page from a mathematical paper rather than a piece of grammar; writing a book with 'language' in its title but without a single example from any language; inspecting graphs and diagrams which look like a seismographical recording . . .

I remember that the question as to what a 'modern' linguist does was asked again when the new project of a comprehensive grammar of Japanese was announced at Monash last year and won an A.R.G.C. grant. The degree to which the general public is informed about the modern science of linguistics is hardly very high. People who show no doubt concerning the indispensability of complicated experiments, equations, and theories for the production of a single new machine, are likely to hesitate in accepting the fact that experiments, equations, and theories are equally necessary in order to produce a good language textbook.

Most non-linguists do not realize that since early in the twentieth century linguistics has developed into a highly advanced theoretical discipline. Modern linguistics is often referred to as 'structural' linguistics. The basically independent parallel growth of the linguistic structuralism during the first half of the century in Europe and America demonstrates convincingly that something more than a mere fashion has been involved.

The 'structural' character of the new science of language has mainly been manifested in three features. One is the emphasis on *synchronic* studies. Instead of concentrating solely on the history of languages — an approach typical for pre-structural linguistics — the new discipline became interested predominantly in the study of a given language at a given stage of development. This approach, which represented an important contribution not only to the linguistic thought but to the methodology of humanities and social sciences in general, facilitated a deeper understanding of the functioning of language. It may perhaps be noted here that, in the sixties, linguists often still find it difficult to communicate with their colleagues in those humanities and social science disciplines which have not yet freed themselves from the one-sided historicism of the nineteenth century.

The second most important 'structural' feature of modern linguistics is its *selectiveness*, a conscious trend to limit its inquiry to a defined set of facts in order to grasp the overall structure, and to exclude everything else. The principle of selectiveness has been adduced to its zenith in the discipline of 'phonology' or 'phonemics'. The unanalysed 'sound' of the previous period was divided. Some of its features — those that were most important for communication — were accepted as objects of linguistic consideration; other features were rejected as irrelevant and attributed a subsidiary status. Hence the scope of linguistics for a 'structural' linguist

is always narrower than what a non-linguist would expect.

The third feature of modern linguistics, strengthened especially in the recent period, is its *arbitrariness*. A structural linguist is less concerned with a detailed picture of the actual speech processes than with constructing a system which makes it possible to emit and receive linguistic messages. In other words, the emphasis is on efficiency of linguistics, not on exact simulation of the mechanisms of speech.

The highest point of development in structural linguistics has been achieved in what can most conveniently be called *generative linguistics*, best known also outside linguistics proper from one of its branches, Chomsky's transformational grammar. The messianistic flavour given to this type of linguistic thought—still fully structural—by some of its, mainly minor, proponents should not conceal the essential positive contribution of the new current—emphasis on explicitness and the binding of all partial disciplines into a unified structure.

Many features of linguistic thought in recent years demonstrate, however, that the period of structural linguistics is approaching its end. One consists of attempts at a new understanding of the problems of synchrony, diachrony, the dynamism of the language systems, etc. The second current of thought to destroy the exclusive orientation of linguistics toward the study of grammar is contained in so-called 'sociolinguistics', and perhaps to a still higher degree in the 'ethnography of communication' (theory of speech) of D. H. Hymes. A third approach, directed against the principle of selection in phonology and grammar, and against the arbitrariness of linguistics, requires attention not simply to the overall general structure but also to its more detailed, sometimes fuzzy or vague features. This approach, recently obtaining wide support, has been most strongly represented by efforts of the New Prague School in linguistics.

The history of modern linguistics thus supplies the most general set of models for any inquiry within contemporary linguistics and explains the character of the Monash Japanese project. Inclination to the *pre-structural* model means constructing grammar which is a mixture of synchronical and diachronical rules, a description which has no recourse to the principle of selectiveness, and, as such, can hardly arrive at a plausible degree of systematization. A typical *structuralist* approach means omission of details and concentration on the central system of language. A *post-structural* model, still unavailable in great detail, may be expected to combine the strong points of its predecessors — stress on dynamism of language and on a wide range of facts (from the pre-structural period), and emphasis on synchrony and system (from structural linguistics).

The Monash project, programmed to the increasing requirements placed on the teaching of Japanese as a foreign language to satisfy a strong need for teaching materials especially on an advanced level, tries understandably to acquire at least some of the post-structural features. The basic objective is twofold, namely, to produce—

(a) a most comprehensive catalogue of grammatical

rules based both on published research and partly on one's own collection of material, and

- (b) a catalogue of 'question-marks' with regard to future development in the field.

The immediate usefulness of the first objective is in its potential application to *language teaching*, of the second, in the future development of *research*. In order to achieve the two objectives at the present stage of development in the area of Japanese linguistics, it appears necessary to refrain from emphasis on systematization and from subscribing to any particular school of linguistics and individual methodological inclinations. Compared with some pompous linguistic projects, fascinating an inexperienced reader by elegant mathematical formulae, this programme may seem modest. In practice this is harder than writing a purely 'structural' grammar.

The Monash project will result in the first *comprehensive* grammar of the Japanese language ever written. The feasibility of a project of this type, however, has been greatly assisted by the accumulated knowledge of Japanese grammar published since the middle of the last century. The Japanese language has always been given considerable attention by *Western linguists*. It was Russia who first showed modern linguistic interest in her Eastern neighbour. Through the work of E. Polivanov, details of the Japanese language penetrated in the twenties and early thirties into the thought of the Prague School, one of the strongholds of pre-war structural linguistics, and influenced its phonological theory to a more than negligible degree. The number of professional linguists who specialize in the field of Japanese linguistics in the U.S.S.R. is considerable.

The other Western country with a strong tradition in Japanese linguistics is the U.S.A. Books like S. E. Martin's *Morphophonemics of Standard Colloquial Japanese* (1952) remain valuable and basic, even if compared with contemporary Japanese work in the field.

Not only laymen but also linguists sometimes do not fully realize how complicated and advanced a picture is presented by *Japanese linguistics*. Social scientists who are familiar with the concept of 'dual structure', i.e., the dualism of a traditional and modern sector, will not be surprised to find that the development of linguistics in Japan has not been free from this characteristic feature. There is a basically traditional sector of linguistics called *kokugogaku*, and there is the strongly Westernized modern *gengogaku*, represented best by the name of the well-known Shiro Hattori. Traditional, of course, does not mean underdeveloped. The Japanese traditional linguistics exhibits certain features which are valid contributions to world linguistics. When Western structuralists were still thinking of written language as a mere reflection of the 'true' spoken language, the traditional Japanese linguistics clearly put up a case for its equal rights. It developed an independent theory of accent, collected an enormous amount of accentological material, and suggested a new analysis of the concept of word, valid for agglutinative languages, etc.

Nevertheless, the pre-structural character of *kokugogaku* and its concentration on earlier historical stages of the Japanese language are undeniable. It should be noted that the opposition of *kokugogaku* and *gengogaku*, the Westernized linguistics, has been neutralized after the second world war in the work of the famous National Language Research Institute in Tokyo. This Institute is not only far ahead of any similar institution in the world in the field of statistical study of language, but also

has presented, so far, the best results in the sociology of the Japanese language and in the modern treatment of the Japanese grammar.

The annual output of Japanese linguistics is enormous. As stated above, it belongs partly to the pre-structural period, partly to structural linguistics. There are also strong post-structural tendencies, but mainly outside the sphere of grammar, e.g., so-called *genko seikatsu*, the Japanese pendant to the 'ethnography of communication'. To survey synthetically the individual findings of this complicated network of knowledge is a task which could hardly be put on Japanese linguists alone. And this is where the Monash project may help.

Through the person of F. Minami, the Monash project sustains strong connections with the work of the National Research Institute in Tokyo. Another former member of the Institute, one of the best Japanese specialists in the lexical and graphical system of modern Japanese, Oki Hayashi, now of the Japanese Ministry of Education, visited Monash in August and September this year to take part in the first stage of the project. A number of other Japanese scholars are expected to take part in the project later. This, together with forces already present at Monash, probably represents the greatest concentration of specialists on Japanese language anywhere except in Japan.

Besides the conscious attempt to be different from current 'structural' linguistics, to concentrate on comprehensiveness or even exhaustiveness and disregard superfluous emphasis on systematization, and to cover synthetically the maximum width of both material and interpretations, the Monash project may achieve an output distinguished from existing sources in several respects.

First, there is a clear emphasis on the analysis of meaning. This might seem to be a self-evident requirement of any grammar to a non-linguist. Unfortunately this is not so. Until quite recently, in one part of structural linguistics, so-called 'descriptive' linguistics, the study of meaning was the victim of the principle of selection. Not much contribution on the study of meaning may be expected for any language from native grammarians to whom meaning is automatically granted, thanks to their knowledge of the language. Hence, little has so far been achieved in this important sphere.

Secondly, some aspects of Japanese grammar will be covered for the first time. This is, for instance, true with regard to a detailed analysis of the Japanese system of writing. Practically this means that the Japanese characters, of which there are about 3,000 in frequent use, will not be treated as ultimate components, and methods usual for the analysis of morphemes — the analogous units in spoken language—will be applied to them.

Thirdly, for the phonological part of the project, i.e., description of the sound system, the phonetic laboratory established at Monash by Professor U. G. E. Hammarström and representing one of the most advanced phonetic laboratories measured by very strict criteria, may be amply used. On the other hand, valuable statistical material prepared by the National Language Research Institute in Tokyo will be accessible for the purpose of the project.¹

¹The project has been kindly supported by the Australian Research Grants Committee. The Japanese Ministry of Foreign Affairs has helped with a travel grant which has enabled us to bring to Monash research associates from Japan.

THE BAKER MEDICAL RESEARCH INSTITUTE

By a Special Correspondent

In 1966 the Monash University *Gazette* recorded an affiliation agreement between the University and the Institute signed on 23 December 1965. The formal basis for this affiliation was the provision in the Monash University Act 1958 that one of the objects of the University is to provide facilities for University education throughout Victoria by the affiliation of existing educational institutions to the University. Affiliation with the Baker Research Institute was appropriate because, since its foundation, one of the purposes of the Institute has been to provide laboratory training for medical students and instruction for graduate students. Since the affiliation Monash students have used the Institute's facilities in their studies for the degrees of B.Med.Sci., B.Sc. and M.Sc. and for elective studies in M.B., B.S. At the same time mutual help has developed in research projects.

The Thomas Baker, Alice Baker, and Eleanor Shaw Medical Research Institute was established in 1926 by the late Thomas Baker, his wife, and sister-in-law to provide laboratory services for Alfred Hospital and to conduct medical research. It is situated in the grounds of the Hospital.

By the end of 1948 the Institute's routine services had been transferred to successively developed departments of the Hospital, thus freeing facilities to pursue medical research and some graduate teaching. Early in this formative period the founders created a Trust which assumed responsibility for most of the maintenance expenses and, in 1966-68, for the cost of re-building.

Although additional laboratories had been added from time to time, the continuing expansion of its activities and the creation by the Hospital in 1949 of a clinical research unit, functionally joined with the Institute, ultimately necessitated its complete rebuilding and re-equipping in 1966-68 to provide adequate space and up-to-date facilities.

The \$1,600,000 cost of this new building project contrasts with \$6,000 for the original building. Similarly the annual maintenance costs have increased from \$6,000 in 1926 to \$25,000 in 1948, and to approximately \$250,000 (including the Clinical Research Unit) in 1969. The medical and graduate staff has grown from 7 to 25.

'Medical research' embraces many things, and over the years has received varying emphasis. In the earlier years and arising from the service commitment emphasis lay heavily on improving the routine medical services of the Hospital. Today, although the service commitment has gone, developments sponsored by the Institute continue to help establish new service departments in the Hospital. It may be justly claimed that the clinical pathology services, the cardiovascular diagnostic service, and the diabetic and metabolic unit of Alfred Hospital arose from Institute activities.

During the first half of the Institute's existence research for answers to immediate practical problems was spread over a wide field. These problems included the introduction of insulin treatment for diabetes to Victoria, the study of beef measles as a public health hazard, and the

treatment of detached retina of the eye. During the war problems associated with chemical warfare became important studies.

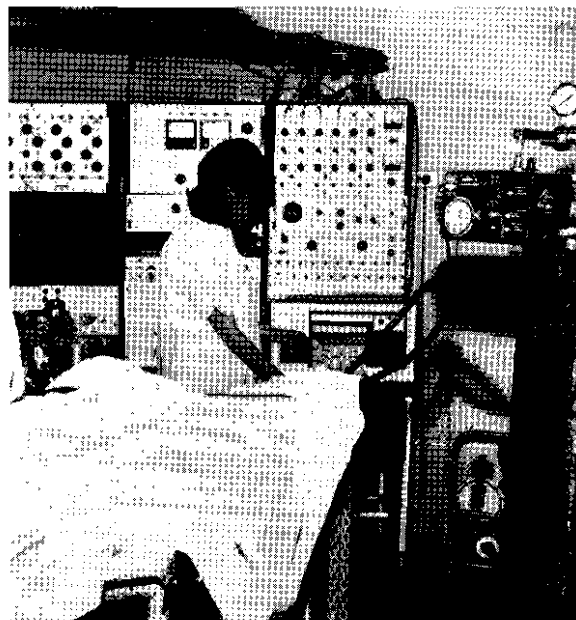
In latter years this 'applied' aspect of research has dominated the scene less, but nevertheless has led to considerable improvement in the treatment of haemophilia and to improvements and extensions of cardiovascular surgery.

Today 'pure' research represents the major portion of the Institute activities, and the necessity to mix fields of interest the better to study any biological problem is illustrated by the linking at cellular component level of research into problems of the cardiovascular system (embracing heart, blood vessels and blood), the production of some forms of cancer by the action of chemicals, the disturbance of the air passages of the lungs producing asthma, and the motility of parts of the alimentary canal.

The range of these cardiovascular projects is indicated by the following: the role of calcium ions in cardiac muscle contraction, the mode of action of drugs which influence cardiac muscle activity, the function of membrane systems of the cardiac muscle cell, the mechanisms that control the distribution of blood in various regions of the body, and the nature of the substance called kinecard which circulates in the blood and has a powerful influence on the working of all parts of the cardiovascular system.

These projects are directed towards a better understanding of the way in which various components of the

(Continued on page 30)



Equipment for cardiovascular research which is in use at the Baker Institute

CELL BIOLOGY OF CEREALS AND OTHER GRASSES

By Dr T. P. O'Brien, Senior Lecturer, Department of Botany

The general appearance of the organs of flowering plants (leaves, stems, roots, flowers and seeds) is familiar to all. If one cuts these organs into thin slices (10-25 μ thick; 1 μ = 1/1000 of a millimetre) with a razor blade and examines them with a microscope, it is easy to see that all of these organs are composed of cells and extracellular material, the cell walls. That all organisms — plant, animal or microbe — consist of cells and their products was a generality recognized clearly by the biologists of last century. However, our modern detailed knowledge of cell structure dates only from 1949, the year in which the electron microscope became a powerful tool in biological research. Prior to that date it had been impossible to cut sections of tissues thinner than 1-2 μ , and such sections were too thick to be penetrated by an electron beam. In 1949 it was found that, after suitable processing, tissues could be infiltrated with liquid perspex ('shatter-proof glass') and embedded in it by heating the liquid till it hardened. You have all seen plants and insects encased in perspex as ornaments or paperweights. Since 1956 the epoxy resins, especially the commercial glue Araldite, have superseded perspex in electron microscopy because the very thin sections (0.05-0.1 μ) that can be cut from tissues embedded in hardened Araldite are more stable than sections of perspex when viewed in the electron microscope.

Study of these thin sections (cut with glass or diamond knives on special microtomes) has yielded a rich harvest of information in the past twenty years. Detailed information has been obtained about the structure of the sub-cellular bodies (usually called organelles) whose existence had been deduced previously by light microscopy. In addition, other components were discovered whose existence had been but vaguely conceived. Careful study of isolated and partially purified organelles allowed biochemists to show that certain of the chemical reactions carried out by intact cells were confined to particular organelles.

While the process of unravelling the functions of cell organelles has been exciting in its own right, the results obtained forced biologists to recognize that the cell is a unit of both structure and function. Not only are all organs composed of cells, but the properties of the organs are due to the properties of their constituent cells and cell products. Even more important has been the recognition of a second generality, namely, that similar structures carry out similar functions no matter where they are found. Thus, mitochondria (one of the types of organelle) are the major sites of oxygen utilization in all cells that contain them, whether the cells come from brain or liver, leaf or stem, seaweed, fungus or amoebae. These facts have led to the development of a new field of biological inquiry, the field of cell biology. Cell biologists believe that similarities in cell structure are as important as the differences, and that information derived about the functions of organelles in one system may well apply to the same organelles in quite unrelated systems.

The great majority of flowering plants pursue a course of growth and development with which many of us become acquainted as small children. Perhaps you can still remember the fascination with which you first

watched the daily progress of a germinating seed. There emerges from the seed a root and shoot which are both sensitive to gravity, but respond by growing in opposite directions. The root is thrust downwards (positive geotropism) while the shoot curves upwards (negative geotropism). Provided that the shoot is in the light, it undergoes photomorphogenesis, producing leaves and stems that turn green and commence photosynthesis. The shoot commonly branches at its tip, producing new shoots which bear new leaves. The root develops lateral roots, but not by tip branching, for the laterals arise from within the parent root and at a considerable distance from the growing root apex. The roots absorb water and salts that are essential for the continued growth of the whole plant, while the shoot manufactures and exports sugars and vitamins to the roots and to its own growing parts. The cycle is completed when the shoot bears flowers. These structures contain the sex organs, the male stamens that produce the pollen, and the female carpels (or ovaries) that produce the ovules, each with a single egg. Fertilization occurs after pollination and the fertilized egg develops into an embryo, enclosed and shed within the seed.

No family of flowering plants is more important to man than the grasses. The family (the *Gramineae*) includes the cereals (wheat, rice, maize, millet, oats, barley, rye and sorghum) which are the grain crops of the world. Not only do these crops feed most of the world's population, but they also provide man with his chief source of sugar from which, with the aid of yeasts, he manufactures the magic two-carbon compound, alcohol. From the animals that graze the pasture grasses of the sub-tropical and temperate regions of the world, man produces much of his diet of protein and most of the structural proteins (skin, wool, or their products) which clothe and protect him. However, not all of man's relationships with the grasses are happy ones. When they grow in places where they are unwanted, grasses are among the most tenacious of weeds.

In October 1967, the Australian Research Grants Committee awarded me a grant of \$3,000 to initiate a programme of research into three aspects of grasses. This work is being carried out in collaboration with Professor M. J. Canny and Mr P. F. Lumley of the Botany department. In October 1968 this initial grant was supplemented by a large grant of \$41,000, which has enabled us to purchase an Hitachi HU 11E electron microscope, and to add Dr S. Zee to our group as a professional officer. A summary of the three topics that are under study as problems in cell biology is set out below.

(i) *The Germination of Wheat*: Almost without exception, all seeds contain an embryo (which develops into the adult plant) and a food reserve, both of which are enclosed in a protective coat. Grains of cereals are no exception, for they are complex fruits, each containing a single seed. Within the seed lies a highly-developed embryo, consisting of a number of parts (Fig. 1). There is always a shoot apex surrounded by a number of immature leaves that it has produced; the apex and leaves are enclosed in a special organ found only in grasses, the coleoptile. This hollow, cylindrical sheath is sensitive to light and gravity and after germination it

elongates, carrying the enclosed shoot to the soil surface and protecting it from abrasion *en route*. Once the surface is reached, further growth of the coleoptile is inhibited by the high light intensity, and the young shoot bursts through the coleoptile, releasing the young leaves from its confines as they elongate and unroll. The embryo also contains about four young roots which elongate rapidly after germination, ensuring a continuing supply of water for the growing plant.

Like the other members of the Monocotyledons (which includes lilies, irises, orchids, rushes, sedges and the extraordinary 'black boys' or 'grass trees' of our heaths), all grass seeds contain just *one* cotyledon. All members of the other great group of flowering plants, the Dicotyledons, contain two cotyledons, as the name suggests. You have all seen (and eaten) cotyledons in peas, beans and peanuts. Most of the remaining tissue of the grass embryo consists of this single cotyledon, a shield-shaped structure aptly called the scutellum. It is upon this organ that a great deal of our interest and research is centred (see Figs. 1 and 2). Its cells are rich in fats, fat-soluble vitamins, protein and phosphate (and hence the nutritional value of 'wheat germ' which is rich in scutella), but contain no starch prior to ger-

mination. Along one face the scutellum is in intimate contact with the endosperm which, except for its outermost layer, the aleurone layer, consists in the mature grain of dead cells packed almost to capacity with starch and gluten proteins. It is these proteins that determine the quality of flour for baking since the embryo is removed during milling. The cells of the aleurone layer, like those of the scutellum, are rich in non-gluten proteins and free of starch, and are covered on their outer surface by a thick cuticle which is known to be very impermeable, even to sulphuric acid! This layer and the remnants of the fruit coats, protect the mature grain from damage and infection.

The reserves of food, stored as starch, protein and fat in the cells of the scutellum and endosperm, are not available to support the early growth and development of the embryo after germination until they are broken down into soluble sugars, amino acids and salts and transported to the growing tissues. The conversion of the insoluble reserves to soluble nutrients is accomplished during germination by a remarkable series of co-ordinated events. Shortly after the dry seed begins to imbibe water, the tissues of the embryo produce and release a soluble and exceedingly powerful hormone. This sub-



Fig. 1. Photograph of a halved grain of maize. The embryo lies toward the lower, left-hand side and consists of a shoot [s], root [r], and scutellum [sc]. The scutellum abuts the starch-rich endosperm [en] which is enclosed by the aleurone layer [a]. Fig. 2. Longitudinal section, showing cellular detail of the embryo of a germinating grain of wheat. The shoot apex [s] is surrounded by a number of young leaves and these are in turn enclosed by the coleoptile [c], the special organ that guides the shoot to the surface. The lower right-hand corner of the embryo contains a root [r], while the scutellum [sc] makes up most of the rest of the picture.

stance activates the cells of the aleurone and scutellum which produce a number of digestive enzymes. The aleurone cells, and the cells of the scutellum immediately adjacent to the endosperm, secrete these enzymes which digest the starch and protein of the endosperm in a process similar to that by which food is digested in our intestines. The soluble products of starch and protein digestion are absorbed by the cells of the scutellum and exported to the tissues of the developing embryo.

When one considers the commercial importance of these internal changes in germinating cereal grains, it is difficult to believe that they have received so little study and are so poorly understood. For example, starch is synthesized by the scutellar cells after germination, but it is not known whether this starch is synthesized from the sugars released during endosperm digestion, or from the oxidation of the fat stored in the scutellar cells. It is not known how any of the soluble nutrients released from the endosperm are absorbed by the scutellum, or what contribution the protein reserves of the scutellar cells make to this nutrient flow. It is not known how the living cells of the aleurone and scutellum resist the digestive action of the enzymes they secrete, nor how they secrete them. We are studying several of these questions for the changes occurring in the aleurone and scutellum during the course of germination have never been studied using modern methods of light and electron microscopy.

(ii) *The Transport System:* Movement of soluble reserves from germinating grain to developing embryo is just one example of the activity of a transport system that operates throughout all vascular plants. While movement of substances over short distances (a few millimetres) probably occurs by diffusion from cell to cell, long distance transport, which in large trees can amount to many metres, occurs in two specialized tissues, the xylem (wood) and the phloem (bark). In the non-woody parts of all flowering plants, the xylem and phloem are joined to one another either as vascular bundles in stems, petioles or leaves ('veins' of leaves are visible vascular bundles), or as the central cylinder of roots. In the woody parts of stems and roots, the phloem lies outside the xylem, separated from it by a layer of growth, the cambium, which produces new layers of both of these tissues. The seasonal activity of the cambium gives rise to the familiar tree rings, and is responsible for the thickening of woody stems and roots. Thus, all parts of even the largest trees are interconnected by a transport system that links the leaves and shoot tips through the vascular bundles of woody or non-woody stems and roots to the growing root tips in the soil.

The most striking components of the xylem are the tracheary elements (tracheids and vessels). These minute pipes are engineered from the specially thickened cell walls that were secreted by the living cells. At maturity, the living cells die and their contents dissolve; only the walls remain, forming the minute pipes of the tracheary elements. Loss of water from the aerial parts of the plant draws water from the soil into these pipes in the root system, establishing an upward stream of moving water throughout the plant to replace that lost by evaporation. This process is called transpiration and the flow of water, the transpiration stream. The living cells that line the dead pipes can secrete substances to this stream or accumulate them from it, and there is good

evidence to suggest that plants transport a good deal of inorganic and organic matter, including hormones, in this manner.

While some organic matter is moved long distances in the xylem, by far the bulk of the transport of organic matter, and especially of sugar, occurs in the phloem. Sugar is synthesized in the green parts of the plant by photosynthesis and must move over considerable distances to supply the growth needs of the roots. To date, it is not known how this movement of sugar is achieved, but it is known that it occurs about 40,000 times too fast to be due to simple diffusion! It is widely believed that the special cells of the phloem, the sieve tubes, cause this accelerated movement of sugar, but all efforts to preserve the structure of these cells in their active state have met with failure. Sieve tubes have a high internal pressure (as much as twenty atmospheres) and are very sensitive to damage by cutting. Leaves of dicotyledonous plants are very difficult to study because the veins form interconnected networks. A cut anywhere in the system is likely to damage the whole system. We have focused our attention on transport in grass leaves because the veins lie parallel to one another, separated by long narrow islands of green cells. It is our hope to dissect out the vascular tissue without damaging it, so

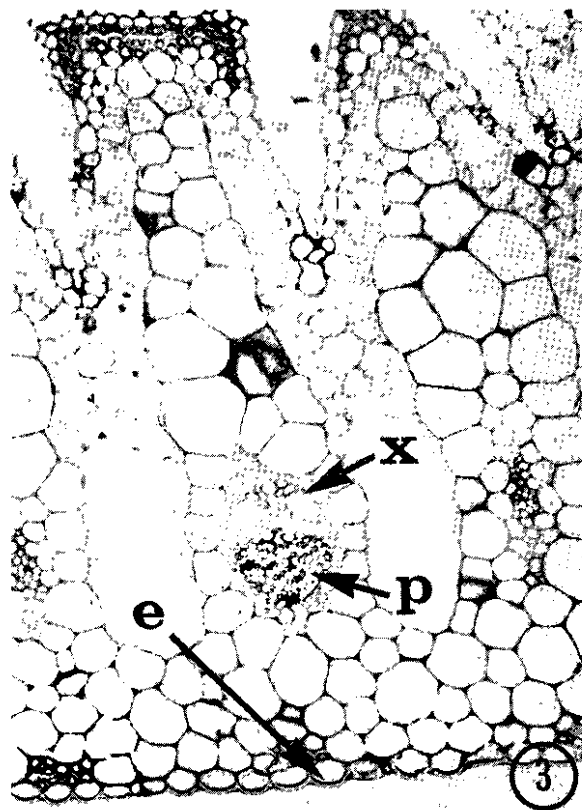


Fig. 3. Transverse section through part of a grass leaf, showing the epidermis [e] which covers the leaf surface. A vascular bundle, containing both xylem [x] and phloem [p] is also seen in cross section

that it can be studied in its functioning state.

(iii) *The Epidermis and Cuticle*: The aerial parts of vascular plants are covered by a continuous layer of cells, the epidermis, whose outer walls are thick and covered with a cuticle (see Fig. 3). The cuticle is similar in properties to a coat of paint, covering the epidermal cells with a thin waterproof skin that acts as a barrier to water loss or entry. The same layer also helps to protect the photosynthetic cells, that lie beneath it, from attack by pathogens. The continuity of the epidermis is interrupted by stomata, pores whose aperture is controlled by the special guard cells that surround them (Fig. 4). When the pores are open, carbon dioxide and oxygen can exchange from the atmosphere with the gas lining the photosynthetic cells, permitting photosynthesis. These same pores allow loss of water vapour when they are open, a loss made good by the transpiration stream. In many plants the cuticle is impregnated with wax which makes it even more waterproof. You will have noticed this waxy deposit on the leaves of young blue gums or cabbages. It is also

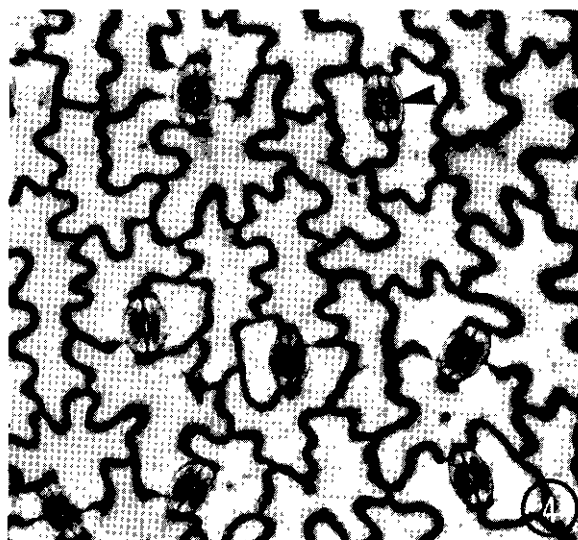


Fig. 4. Surface view of epidermis of a pea leaf, showing the wavy outline of the epidermal cells and the pairs of guard cells (arrow) that line the stomata, the pores through which gas exchange takes place

present as an invisible layer in many unsuspected places. When you polish an apple, it is the wax layer on the apple surface that is responsible for the sheen.

The epidermis and cuticle have been very difficult to study by electron microscopy because the same properties that make them ideal protective layers render them difficult to infiltrate with Araldite, or to cut into thin sections. New techniques, introduced in 1967, seem to have solved these problems and we are now engaged in an intensive study of the epidermis and cuticle during growth and development of grass leaves. Since this layer is ultimately responsible for minimizing water loss from aerial plant parts, it is essential to understand its structure and composition and the way it is formed.

I believe that the power of the cell biological approach is demonstrated by the fact that one small group of workers can hope to contribute usefully to these appar-

ently unrelated problems. The truth of the matter is that the techniques and approaches found useful in one project will assist the rate of progress upon the other projects, for so many of the technical problems to be overcome in this research programme are common to all cell biology. It is my hope that this approach will rapidly advance our understanding of man's most important group of crop plants.

SPORTS CENTRE PUBLISHES BOOKLET

A booklet on the emergency treatment of sports injuries has been produced by the committee of the Monash Sports Medicine Centre. It illustrates the value of the inter-disciplinary approach to sports medicine.

The booklet was produced for the Sports Association by the members of the Sports Medicine Centre in order to meet a community need.

With the aid of a grant of \$1,500 from the Rothmans National Sport Foundation to cover the cost of publication about 20,000 copies have been printed. These are being distributed free throughout the Commonwealth.

It is hoped that the booklet will provide simple practical information for anyone who may be asked to give first aid for sporting injuries, when trained medical or first aid people are not present.

Mr A. H. Toyne, the secretary of the Australian Sports Medicine Association, said: 'The booklet's main value is that it shows untrained people how to give expert first aid.'

BAKER INSTITUTE—Continued

system work. Others, however, are more closely directed towards the solution of practical problems; for example, a study of the changes in cardiac muscle when it is deprived of its blood supply and the time scale of these changes. This has direct application both to the technique of heart transplantation and to coronary artery obstruction, for both conditions involve the deprivation of cardiac muscle, in whole or in part, of blood supply.

Still other cardiovascular projects, such as the long-term study of the appropriate methods of use of various drugs which control high blood pressure, have an immediate value to patients.

The high international reputation gained by the Institute pays tribute to the contributions of many workers, especially to the work of Dr Paul Fantl in connection with the clotting of blood, and the resultant improvement in the treatment of haemophilia and excessive clotting; to the work of Dr Winifred Nayler for her studies in the behaviour of cardiac muscle cells and the role of calcium and of drugs which react with it, which has established a basis from which workers in other countries have set out, and to the work of the present director, Dr Thomas Lowe, on the control of body fluids in relation to heart failure, and on the identification and study of kinecard.

RESEARCH INTO ULTRA-HIGH-SPEED MACHINING

or

THE FACTS ON THE MONASH CANNON

By G. Arndt, Lecturer, Department of Mechanical Engineering

For quite some time now rumours have circulated through various sections of the community that not only is Monash University a collection of militant intellectuals, but that it is even developing its own defence facilities: that it has built a bunker and has its own cannon! No doubt the revolution will start soon!

This article was written in an attempt to refute most of these rumours and to expose the existence of such a fiendish weapon on campus — this is one rumour that is in fact true. A gun-driven experimental facility is presently being developed at this University as part of a research project in the department of Mechanical Engineering under the supervision of Mr R. H. Brown, senior lecturer, who has recently returned from the U.S.A., where he was on study leave. The project, which was made possible by financial support from the Harold Armstrong Memorial Fund, consists of a study of the deformation and behaviour of metals when cut or deformed at extremely high speeds, in excess of 500 feet per second, which corresponds to the lower limit of an 'ultra-high' machining speed range. However, before delving into particulars, some background information may put the project into perspective.

Background

The development of supersonic flight, of satellites and space exploration, and the continuing search for stronger, more reliable engineering materials have resulted in a variety of new high-strength metals such as alloy steels, which have become increasingly difficult to transform into the required shapes. This inadequacy provided the stimulus for an intense search for new manufacturing processes which took place in several machining research centres throughout the world after the second world war and, particularly, from the early 1950's onward.

The results of some of these research efforts are seen today, in manufacturing industry, as the 'modern' machining processes. They are based on machining principles which differ radically from conventional ones. They include the melting or vaporization of metal by an electric arc or an electron or laser beam, the chemical and electro-chemical removal of metal under accurately controlled conditions, the erosion of brittle materials by a tool vibrating at ultrasonic frequencies (to which the reader may have been already subjected in the dentist's chair). And they include the deformation of metals under the action of extremely high energies, such as may be obtained during the detonation of an explosive charge, and at very high speeds. A characteristic of the latter processes is the change, during manufacture, of the mechanical properties of the work material. The principle of high-speed and high-energy deformation, or of either, is used in a family of processes commonly referred to as High-Energy-Rate Forming (HERF), a somewhat misleading term since either the energy or the deformation rate may be quite low, the other quantity only being 'high'. This family includes cold forging, explosive fabrication (using high explosives or explosive

gas mixtures), electro-hydraulic forming, magnetic pulse forming, and pneumatic-mechanical high velocity forming. In all of these processes the behaviour of metals at very high strain rates plays an important role, particularly if theoretical predictions of their behaviour under such conditions are to be made. However, little is known at present about material properties at very high strain rates, so that a fruitful avenue for research presents itself.

The high-speed processes mentioned above all involve forming of the workpiece (that is, a shape change without a volume change), and not removal of a part of the workpiece by a cutting tool as in metal cutting, which forms the basis of the major portion of manufacturing processes today. However, there is no apparent reason why it should not also be feasible to cut metal at very high speeds, provided a suitable means of performing such an operation can be devised. This idea is supported by pilot studies of ultra-high-speed machining performed by the Lockheed Aircraft Corporation in 1960,¹ and by Polosatkin *et al.* in Russia.² Both of these groups used small fire-arms to shoot workpieces of short length past stationary cutting tools. They demonstrated the feasibility of the experimental method, but provided no definitive understanding of deformation phenomena occurring in metals at very high rates of strain.

The Cannon

This, then, was the basis for the decision in July 1966 to develop a test facility at this University which would allow such phenomena to be studied in detail. Its aims are the achievement of impact and cutting speeds of up to 8,000 feet per second (based on considerations of the speed of propagation of stress waves), of the ability to take continuous cuts over a workpiece length of 8 feet, and the provision of adequate instrumentation and safety features to enable a thorough study of the ultra-high-speed deformation process.

The most important item in a test facility of this nature is the driving means. Amongst various possibilities for accelerating a piece of metal to a speed of 8,000 feet per second (approximately eight times the speed of sound in air) magnetic fields and 'accelerating tubes' using either conventional propellants or the so-called light gas gun principle were considered. However, cost and safety considerations, as well as preliminary discussions with various authorities from both the Armed Forces and the Defence Standards Laboratories, left no doubt that the best and most convenient driving means could be based on a modified and proven artillery cannon. The thought of installing such a device on campus was reckoned to induce apprehension in the minds of some. But, happily, the facts of the matter, thoroughly presented and studied, dispelled doubts.

Initial negotiations for the acquisition of such a gun, with the Department of the Army and the Defence Standards Laboratories, went very smoothly, perhaps be-

cause a test facility of this nature might reveal information having relevance to the science of ballistics. These discussions, during which it was somewhat reassuring to learn that under Victorian law no licence is required for firing a cannon since it is not a 'concealable' weapon, eventually resulted in the acquisition of a Q.F. 40 mm 'Bofors' anti-aircraft equipment from the Army.

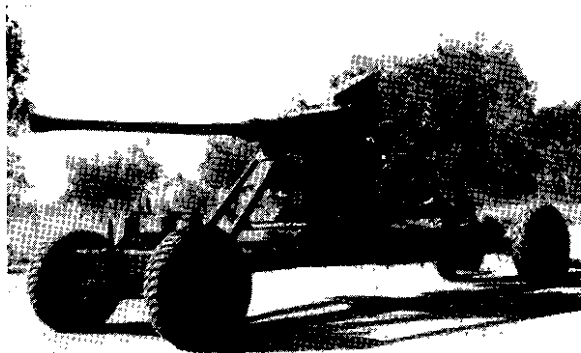


Fig. 1. The cannon in its original state

In order to investigate what design modifications would be needed to increase the standard muzzle velocity of approximately 2,800 feet per second of this gun to the value required, a detailed study of the internal ballistics of the gun was made.³ This indicated that projectile speeds ranging from approximately 1,000 to 8,000 feet per second are attainable theoretically, for projectile weights ranging from 1.5 to 0.2 lb, with barrel pressures not exceeding those found in normal service, provided that the length of the barrel is approximately doubled, the rifling grooves are removed, and the size of the explosive chamber is increased.

The Bunker

The satisfactory solution to the gun problem raised the next question: where is it to be put? Alternatives such as the Army proof range at Compton Vale near Bendigo and the D.S.L. proof range at Maribyrnong were considered. Visits were made to these ranges as well as to the Army Ordnance Depot at Bandiana near Wodonga, with the purpose of gaining some notion of the operational aspects involved. At Compton Vale various test firings from an identical gun were witnessed, and information concerning gun noise and projectile deceleration distances, when shot into sand, was collected. In considering the merits of these alternative locations on the one hand, and of the Monash campus on the other, little reflection was needed to show that the ideal location was on campus, or rather below campus, inside an underground bunker. Cost is thereby minimized and operations are made convenient through direct access to the rather sophisticated instrumentation and the elimination of communication problems.

A bunker was designed and several times re-designed with the assistance of the University architect, to satisfy all the authorities who could in any way contribute to, or were by law required to approve, the passage of the plans for such a building. The Department of Mines (Explosives Branch), the Defence Standards Laboratories, the Department for the Army, the Health Department,

the Melbourne Metropolitan Fire Brigade, Oakleigh Shire Council, and of course the Monash Safety Committee were all parties to the final design. Construction of the bunker and a control hut annexe was completed in December 1968. The brick-concrete bunker is located approximately 200 feet east of the engineering heavy laboratories, it measures 34' long by 10' wide by 8' 6" high, and has 3-phase power available. Together with



Fig. 2. The finished product

the remote-control hut it represents a unique test facility, suitable not only for the present purpose, but also for other physical tests in which remote control is desirable for reasons of safety.

Needless to say, many safety features are incorporated into the test rig: it is completely isolated from the out-

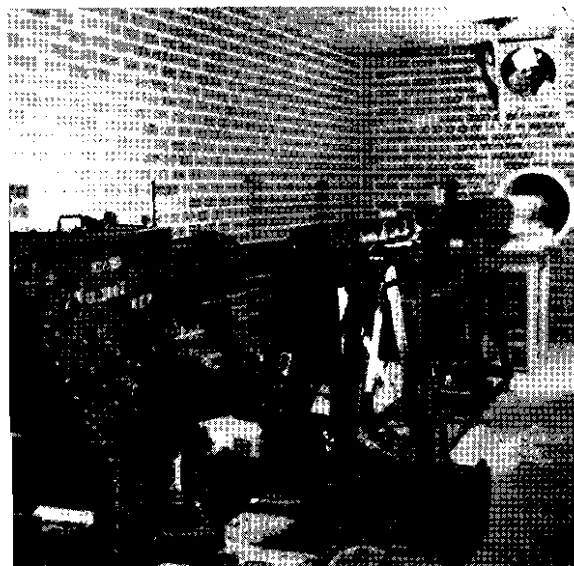


Fig. 3. Inside the bunker

side world during a test shot, and stringent safety measures are observed during a firing test.⁴

The first test firing, which took place on 13 (for luck?) October this year, went very successfully, and unnoticed by most. It was delayed for a number of technical and

PRIZE SHARED BY STAFF MEMBER

A member of the Monash Medical faculty, Dr Frederick Hocking, this year shared an international prize awarded to psychiatrists. This prize, which was awarded for the first time this year, is the Gutheil-von Domarus Prize sponsored by the American Association for the Advancement of Psycho-Therapy.

Dr Hocking's entry was based on a thesis entitled *Human Reactions to Extreme Environment Stress*, for which he was awarded a Doctorate of Medicine by Monash in 1968. Much of the thesis is devoted to tracing the case histories of 312 former inmates of Nazi concentration camps.

The prize was shared between Dr Hocking and Professor H. Garner, professor of Psychiatry at the University of Chicago.

ENGINEERING TEACHING INNOVATION

Monash's Mechanical Engineering department has devised an 'authentic involvement scheme' to improve teaching of final year design. This combats limited campus facilities by enabling design students to work for one term with industrial companies. In 1969 several local companies provided current design problems which were posed to groups of three students. For the six problems chosen, the companies' project engineers led seminars with the class outlining requirements. Student teams were then given responsibility for finding a solution.

organizational reasons, such as the intricate machining of the gun barrel, the manufacture of the recoil take-up station, the test section, the decelerator, the explosives magazine, and of various projectiles, firing controls, etc. Last but not least the provision of the numerous safety devices, including fences and warning notices, took its share of time. With all these obstacles overcome it was satisfying to note that the gun in its isolation did not obtrude, even with noise, on its peaceful surroundings during firing. It should perhaps be stressed that the length of 8 feet of the projectile track is the only part of the 26 feet of the trajectory that is not fully contained. Flight of the projectile over this partly-exposed length of 8 feet is itself constrained by guide ways.

Minor modifications are as yet required before the complete test system is fully operational. By that time test shots are planned at irregular intervals, and should not exceed three to four per day — hardly enough to start a revolution!

¹R. C. Vaughn, *Lockheed Aircraft Corporation — Ultra-high-speed machining. A.M.C. Technical Report 60-7-635 (1), June 1960.*

²G. D. Polosatkin, V. D. Kusnetsov and M. P. Kalashnikova — *The study of cutting processes at very high speeds. Fizika Metallov i Metallovedenie 10 (3), 425, 1960.*

³G. Arndt — *A review of internal ballistic theory. Its application to a high-speed explosive drive. M.A.M.L. Report, No. 4, Monash University, July 1968.*

⁴G. Arndt — *Report on technical and safety aspects of proposed ultra-high-speed cutting arrangement at Monash University. Department of Mechanical Engineering, November 1967.*

MANNIX PLANS FOR 225 STUDENTS

The blessing and official opening of Mannix College by His Grace, Archbishop Knox, took place on Friday 28 February 1969. This residential college, for male students of Monash, was the first college to be affiliated with the University.

Situated at the main entrance of the University, in Wellington Road, Mannix College will eventually accommodate 225 undergraduate and graduate students. The college is named in honour of the late Archbishop Mannix.

In the course of his address Archbishop Knox said: 'Amongst the students forming the foundation group there are some twenty from Asia. This is surely an aspect that would have given much satisfaction to Archbishop Mannix.'

He went on to announce that His Holiness, Pope Paul VI, had named Sir Michael Chamberlin (first Deputy Chancellor of Monash) a Knight Commander of the Order of Pius. This honour was conferred in recognition of the contribution made by Sir Michael to the Church and to education.

The Archbishop also announced that Dr Colin Clarke, presently director of the Agricultural Economics Research Institute at Oxford, had accepted the position of director of an institute which will carry out research on matters relating to education and population. This institute, which was instigated as a result of a recent papal encyclical, will be located near the college.

Other speakers at the opening ceremony were: The Victorian Minister for Education, Mr L. H. S. Thompson, the Federal Minister for the Army, Mr P. R. Lynch, the Provincial of the Dominican Fathers, Very Reverend J. J. O'Rourke, O.P., and the Chancellor of Monash University, Sir Douglas Menzies.

A. L. JONES RADIOCHEMICAL LABORATORY

The radiochemical laboratory on the first floor of the chemistry building has been named the A. L. Jones Radiochemical Laboratory, after the late Dr Albert Leonard Jones, a senior lecturer in that department from 1964 to July 1968.

In his letter recommending that the laboratory be named in memory of Dr Jones, Professor Swan, then acting-chairman of the department, wrote:

'Dr Jones joined the Chemistry department in 1964 and was entirely responsible for the teaching of radiochemistry, for setting up the radiochemical laboratory, and for designing and supervising the practical work done therein by undergraduates. His personal research involving several graduate students also made extensive use of the radiochemical facilities.

'Dr Jones was a greatly admired and respected member of the Chemistry department staff. His sudden death in England late last year while on study leave was a great loss to us all and I am supported by all of my colleagues when I request that some permanent memorial be made to him in the Chemistry department. In view of his very close association with the radiochemical laboratory we think it would be fitting if we were allowed to name this room after him'.

THE SECOND INTERNATIONAL CONFERENCE ON SYSTEM SCIENCE

By Dr A. B. Gardiner, Lecturer, Department of Electrical Engineering

In January 1969 ten members of the Electrical Engineering department were invited to attend the Second Hawaii International Conference on System Science which is organized by the department of Electrical Engineering and the Information Science Program of the University of Hawaii, supported by the United States Air Force Office of Scientific Research and the Office of Naval Research and run in co-operation with various sections of the Institute of Electrical and Electronics Engineers.

The scope of the conference is deliberately wide, ranging from the theoretical extremes of Information Theory to the detailed practicality of Process Control.



Monash party which attended the 1969 conference. From left to right: Messrs R. H. Masterman, N. H. C. Marshall, D. J. King, J. R. Coles, I. A. Wright, Dr A. B. Gardiner (party leader), Messrs G. K. Cambrell and A. V. Cameron

It is always hoped that the inter-disciplinary mixing at the conference will be of great benefit to those who attend.

This year ten papers were accepted from Monash. Eight of the authors were able to attend the conference. They were Dr A. B. Gardiner and Mr G. K. Cambrell, lecturers; Mr R. H. Masterman, senior teaching fellow; and research scholars, Messrs A. V. Cameron, J. R. Coles, D. J. King, N. H. C. Marshall and I. A. Wright. Dr K. K. Pang and Mr K. P. Dabke were unable to attend.

Monash gave travelling grants to allow us to travel to Sydney and the U.S. Air Force flew us from Sydney to Honolulu via Christchurch and Pago Pago. The aircraft was a C141 Starlifter jet transport which flies once weekly from Los Angeles to Perth servicing U.S. installations including Antarctica. This method of travel is not recommended to sufferers of claustrophobia as the passenger section has only two windows. The hostess duties were performed by two six-foot master sergeants.

Owing to faulty navigational equipment, a scheduled twenty-four-hour stay in Christchurch lasted four days. This allowed some of the party to see New Zealand's mountain country. An interesting day was spent at the Electrical Engineering department of Canterbury Uni-

versity. The timing of the flight meant that we arrived in Honolulu two days before the conference began, which allowed us the opportunity of having a good look around the University campus and to have discussions with faculty members there.

The three-day conference was attended by over 300 people from a number of countries. Other than U.S.A. and Australia, there were representatives from Canada, Mexico, France, Japan, India and New Zealand. Amongst the notable figures attending were S. S. L. Chang, R. S. Busy, R. E. Kalman, B. Kinariwala, A. P. Sage and M. E. van Valkenburg.

Over 200 short papers were presented in the three days in six parallel sessions. Since the papers were short and the closing date only two months before the conference, a good deal of up-to-date information on current research was presented. This was supplemented by tutorial and discussion sessions, with some of the leading figures and by a good deal of personal contact.

The social event of the conference was a reception in Court. Hula dancers danced and Hawaiian guitars played as the sun set over Waikiki Beach.

After the conference, there was time to see more of the Island of Oahu, on which Honolulu is situated, which is a good example of an old tropical volcanic island. On the nearby island of Hawaii, the volcanoes are still very active. The main industries of the island are tourism, pineapple farming and supporting the vast military complex which includes Pearl Harbour and six separate military airfields.

Another group has been invited to attend the third conference to be held in January 1970. It is hoped that they too will benefit greatly from the trip.

Thanks should be given to the University of Hawaii for inviting us to attend, to Monash University for supporting us and to the U.S. Air Force who made it possible for us to attend.

DIRECTOR OF SOUTHEAST ASIAN STUDIES INSTITUTE IN SINGAPORE

Professor J. D. Legge of the Monash History department left Australia in May this year to take up the position of director of the Institute of Southeast Asian Studies in Singapore. He succeeded Professor Harry Benda, an American scholar from Yale University, who had been director of the Institute since its inception in 1968. The position is for twelve months.

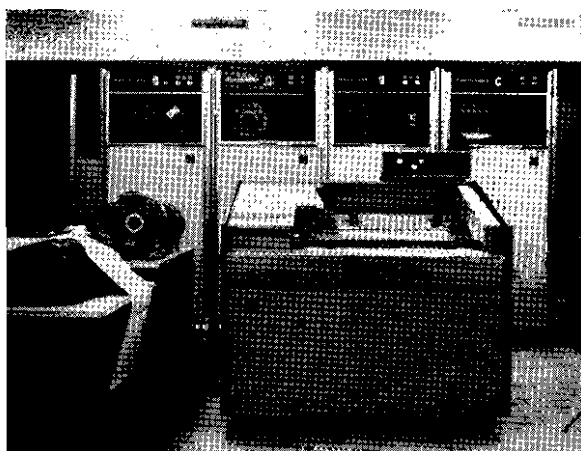
A graduate from the University of Melbourne and a Doctor of Philosophy from Oxford, Professor Legge has been with Monash since its foundation in 1961. He is the author of five books and a large number of articles. His particular field of interest is modern Indonesian history.

Before he took up his duties as director in August, Professor Legge spent three months travelling throughout Indonesia where he did research for a history of Indonesian nationalism.

NEW COMPUTER OPERATING

The University's computer centre has now been using a new Burroughs B5500 computer since the start of May 1969. Monash is renting this American-built system from its manufacturers. The rental costs are covered by the revenue received by the centre for computing and consulting services carried out for affiliated organizations and from funds that would otherwise have been spent on manual methods of accounting and data processing on the campus. The computer is the first of its kind to be brought to Australia.

The centre, with a staff of forty has, as well as the B5500, one large and several small computers. It provides facilities for the teaching of computer-based tech-



The Burroughs Computer

niques for Monash students and for use in research work by staff and graduate students. The department which makes greatest use of the centre is the Chemistry department, with its work on the theoretical calculations of the electron structure of the molecule.

At present the centre does up to 800 different jobs a day, and by the end of 1970 it is hoped that it will handle 1,000 per day.

Among the other programmes being done in the centre are:

- Research on the analysis of electro-cardiograms and other medical data;

- Analysis of design in engineering;

- Analysis of language (at present several million words are being processed from Indonesian newspapers to produce a basic vocabulary for Indonesian teaching);

- The computing of surveys in social sciences and the geo-physical field; and

- The recently-developed application of computer programming for school timetable planning. It is intended to test this in some Victorian schools next year.

When the computer was first installed it was thought that the centre's operating hours would be reduced. However, this did not happen because the number of jobs the centre was required to do increased.

THIRD ANNUAL ECONOMICS LECTURE

The third annual Monash Economics Lecture was delivered this year by Professor Harry Johnson on Monday 8 September. His lecture was entitled 'International Monetary Crises'.

Professor Johnson, a distinguished international economist, holds chairs in two universities --- the London School of Economics and the University of Chicago. During September he was Visiting Professor with the Economics department at Monash.

The Monash Economics Lectures are jointly sponsored by Monash, the Chartered Institute of Secretaries, and the Stock Exchange of Melbourne.

The first lecture in 1967 was given by the late Mr Harold Holt. In 1968 the chairman of the Tariff Board, Mr G. A. Rattigan, was the guest speaker.

SYMPOSIUM ON SEXUAL BEHAVIOUR

The Monash University Medical Undergraduate Society and the Public Affairs Committee of the Monash Association of Students held a public symposium on 'Sexual Behaviour Today' on Wednesday 11 June 1969.

Speakers at the symposium were: Mrs Beatrice Faust of the University of Melbourne; Dr Denis Pym, chairman of Sociology at La Trobe University; Mr Gavin Sinclair, a lecturer in psychology at the University of New South Wales; Mr Richard Walsh, editor of the magazine *POL*, who spoke on literary censorship; Mr Rex Mortimer, a graduate student at Monash; Reverend Ted Noffs, of the Wayside Chapel; Father Don Burnard, chaplain to the pre-Cana Conferences; Dr D. Sawyer, a health education officer from the Burwood Teachers' College; Dr Stan Gold, a psychiatrist at Prince Henry's Hospital; and Mrs Sue Hancock, of the English department at Monash.

The symposium was chaired by Dr Tony McMichael of the Monash department of Social and Preventive Medicine and Mr Stewart Fleming, a Monash medical student.

Members of the symposium sought to define current patterns of sexual behaviour, and to explain and evaluate these patterns. It concluded by offering suggestions for possible kinds of sex education which could be adopted.

CONFERENCE OF SOCIOLOGISTS

The Sociological Association of Australia and New Zealand held its annual conference at Monash on 23-24 August this year.

The programme for the conference was divided into 'medical' and 'general' sections. The former section included papers on a 'Survey of Attitudes to Mental Health' by Mrs G. Graves of the Mental Health Research Institute, and 'The Deserted Mother in Victoria' by Dr J. Krupinski, also of the Institute.

Among the speakers in the 'general' section were Dr H. Mol and Miss D. Phillips of the Australian National University. Dr Mol spoke about 'Religion and Class in Australia', and Miss Phillips about 'Successful Assimilation: Italians in Rural Victoria'.

ECONOMISTS SPEAK AT TRADE CONFERENCE

The International Trade Conference was held this year at Monash, commencing on 11 September for three days.

Thirteen papers were delivered or circulated, several by internationally-eminant economists, during the course of the conference.

The following economists participated: Dr Max Corden, Dr H. D. Evans, Professor H. G. Grubel, Professor F. H. Gruen, Professor H. G. Johnson, Mr N. F. Laing, Dr P. Lloyd, Professor I. A. McDougall, Professor J. D. Pitchford, Dr R. H. Snape and Dr L. R. Webb.

GREAT HALL — *Continued*

life backwards. It was a most fortunate choice, I'm sure, to have the appointment of Sir Robert endorsed by the Cabinet and by all those associated at that time with the development of Monash.

'I think it most appropriate that the Great Hall should be given the name of Blackwood Hall because it is over the last decade that the giant strides of advancement have been made, and if there is any difficult period for a school or university it is surely the first decade of its development.

'There have been difficulties, difficulties of finance, difficulties of administration, difficulties of site development, but they have all, I believe, satisfactorily been overcome.'

The Minister emphasized the necessity of such a hall in any educational institution.

'The activities of a university', he said, 'can become so much more varied and diversified with a hall of this nature, and this is particularly important in the case of Monash because it is named after a man whose career was diversified and who contributed so much to so many different fields.'

In his response to Mr Thompson, the Vice-Chancellor, Dr J. A. L. Matheson, spoke of the laying of the foundation stone as a very moving occasion for members of Monash. In the course of his address he said:

'The original plans of the University, which were developed under Sir Robert Blackwood's chairmanship of the Interim Council, looked forward right from the very beginning to what was then described as — and still is — a forum with a double line of buildings with the Great Hall at the end of it. And this was, of course, regarded in the early days as being something that would take quite some time to accomplish, and now we are at the point of that accomplishment. In order to bring it about a great many people have been involved. We had to raise a considerable sum of money to make it possible, and an enormous number of people contributed either with time or with funds or with both to make it possible.

'We believe that when this building is complete it will be a tremendous asset, not only to the life of this University, and indeed of the surrounding neighbourhood, but also to the architecture of this city.'

Dr Matheson concluded by saying that the Blackwood Hall would be a magnificent addition not only to Monash, but also to the facilities of this part of the city.

LAW SCHOOL AWARDS FIRST LL.M.

Monash Law school awarded its first degree of Master of Laws to a woman graduate from the University of Melbourne, Mrs Ann Lahore, who is a lecturer in law with the University's Law faculty, took out her degree at a graduation ceremony on Wednesday 11 December 1968. In 1970 her husband, Mr James C. Lahore, will also join the staff as a senior lecturer in law. Since Mrs Lahore gained her Master of Laws, two further Master's degrees have been awarded by the Law faculty to Mr Allen B. Afterman and Mr Ross A. Sundberg. Both of these degrees were conferred at graduation ceremonies which were held at the University early in 1969.



Mrs A. Lahore

In 1968 the faculty of Law completed its first full programme for the combined degrees of B.Juris. and LL.B. The first students admitted in 1964 graduated at a ceremony in May 1969.

THE FRIENDS OF THE MONASH UNIVERSITY LIBRARY

Since the active life of the association began in August 1968, the Friends of the University Library have held regular meetings to hear talks on subjects of general interest to library and book lovers. Dr H. H. R. Love has spoken on 'Swift and his Publishers' — a lecture which was published along with a catalogue of the library's collection of Swift and Swiftiana; Dr D. F. Mackenzie has spoken on the 'History of the Cambridge University Press' and Associate Professor W. Kirsop on the 'Libraries and Collectors in Europe in 1967'.

With the completion of the current library building it is hoped to hold exhibitions as well as lectures.

The Friends of the Monash University Library have several functions, one of the most important being to advise the library about books worthy of collection and how these may be obtained. They aim to provide a bridge between the library and the rest of the University, and between the library and the community. Part of their intention in providing this bridge is to publicize the University library's interest in acquiring valuable and important books. The association also makes donations to the library.

VISIT TO JAPAN

Associate Professor J. H. Smith, of Monash's Physics department, left for the University of Tokyo in September this year to spend three months as the out-going Fellow for 1969/70 under the Leverhulme Trust Fund Interchange Scheme.

UNIVERSITY STAFF

SECOND CHAIR OF POLITICS

In October 1968 Dr Herbert Feith, a reader in the department of Politics at Monash, was appointed to the University's second chair of Politics.

Professor Feith graduated with honours in history and political science from the University of Melbourne in 1950. Later he was awarded a Master of Arts degree.

He was employed as an English language assistant in the Indonesian Department of Information, Djakarta, from 1951-1953. He returned to that Department in 1954 to study Indonesia's 1955 election, and then travelled widely in Indonesia in mid-1957.

From 1957-1960 he studied at Cornell University and obtained a Doctorate of Philosophy in the department of Government. He held the position of Fellow of the Rockefeller Foundation from 1958-1960. Then, after two years as a research fellow at the Australian National University, he came to Monash in 1962.

Professor Feith is the author of several books on Indonesia, including his work, *The Decline of Constitutional Democracy in Indonesia*, which was published in 1962.

Currently, Professor Feith, in conjunction with Mr J. A. C. Mackie, a reader in the departments of History and Politics at Monash, is carrying out research into the 'Political and administrative dynamics of post-Sukarno Indonesia'.

Professor Feith was born in Vienna, emigrating to Australia in 1939. He is married and has three children.



Professor H. Feith

Professor Z. F. Oliverius

CHAIR OF RUSSIAN

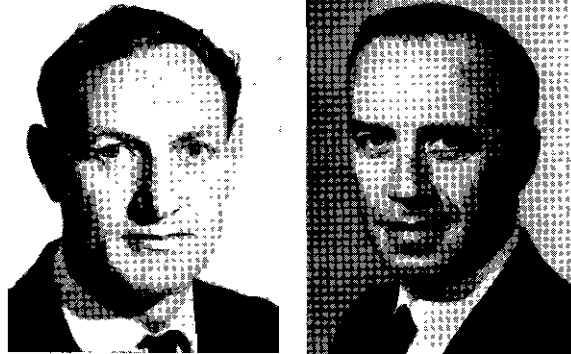
Dr Zdenek F. Oliverius holds the chair of Russian in the faculty of Arts. He took up the position in December 1968. Before he came to Monash, Professor Oliverius was professor of Russian in the Pedagogical faculty of Charles University.

For the past eight years he has conducted courses in Russian over the radio in Prague. In 1959 he spent some time at the Moscow University and Moscow Academy of Sciences taking a course in Russian. He is a Doctor of Philosophy and Candidate of Sciences from Charles University, both of which were awarded in 1966.

Professor Oliverius's research interests lie in the fields

of modern Russian phonology, modern Russian morphemic analysis, the statistical analysis of modern Russian sentence structure, and language laboratories. He has published about fifty books and papers on the Russian language and on methods of teaching Russian to non-Russians. They have been written in Russian, Czech and French.

He is married and has one daughter.



Professor I. A. McDougall

Professor D. E. Allan

EIGHTH CHAIR OF ECONOMICS

Professor Ian Alistair McDougall came from New Zealand to occupy a new chair in the department of Economics in January 1969. This appointment increased the number of chairs in that department to eight.

Prior to his appointment at Monash, Professor McDougall was head of the department of Economics at Massey University.

In 1957 he graduated M.A. with honours from Canterbury University, New Zealand. Later he was awarded a Doctorate of Philosophy by the Australian National University for a thesis, *Non-traded Goods and the Pure Theory of International Trade*. His major interest is in the field of international economics.

He spent 1958 as a Fulbright Scholar at Duke University in the United States, and in 1964 he was a Visiting Fellow at Nuffield College, Oxford.

Professor McDougall has written a number of articles on tariffs. In 1967 he was editor of the *New Zealand Economic Papers*. Currently, an introductory macro-economic text written by him is being prepared for publication. He is at present engaged in preparing a text on international trade.

Professor McDougall is married and has three children.

SIR HAYDEN STARKE CHAIR OF LAW

Monash's fourth chair of Law, which bears the name of a distinguished Justice of the High Court, Sir Hayden Starke, is occupied by Professor David Ernest Allan. Professor Allan came to Monash from the University of Tasmania, where he held the position of dean of the faculty of Law.

Born in England, he graduated Bachelor of Arts with first-class honours in law at Trinity Hall, Cambridge, in

1950, and took out his Master of Arts in 1955. While at Cambridge he won the Henry Bond Prize for Roman law and the Trinity Hall Prize.

From 1950-1953 he was a student of the Middle Temple and was called to the English Bar in 1953. He was awarded the Blackstone Pupillage Prize (Middle Temple) in 1953 and the Harmsworth Scholarship (Middle Temple) in 1953-1956.

Professor Allan lectured at technical colleges and the Manchester College of Commerce until 1957, when he spent two years at the Law Society School in Blackpool lecturing in Legal System, Criminal Law, Contract and Constitutional Law.

In 1959 he came to Australia. Until 1963 he was a senior lecturer in law at the University of Western Australia. He moved from there to take the chair of Commercial Law at the Victoria University of Wellington, New Zealand, before his appointment at the University of Tasmania.

Professor Allan has been a member of a number of Law Reform Committees in Australia and New Zealand.

His major fields of interest are Commercial Law and Contract, Equity, and Legal History. In 1968 he published a research project on Contract Law for Asian countries. He has also published a book and a large number of papers. Currently he is carrying out research on 'Development financing in Asia'.

Professor Allan, who is married and has three children, took up his appointment in January 1969.

SECOND CHAIR OF MEDICINE

Professor Barry George Firkin was appointed to Monash's second chair of Medicine, located at Alfred Hospital. He took up the position at the start of first term this year.

Professor Firkin graduated from the University of Sydney as Bachelor of Science (Medicine) with honours in 1952. Later, in 1954, he was awarded the degrees of Bachelor of Medicine and Bachelor of Surgery with honours.

During the years 1955-57 he was a research fellow at the Clinical Research Unit, Royal Prince Alfred Hospital, Sydney. From there he went to the University of Washington as fellow in Medicine with the department of Medicine. He returned to the University of Sydney in 1961, where he was senior research fellow in the department of Medicine until 1963. He held the position



Professor B. G. Firkin



Professor J. N. Crossley

of director of the Clinical Research Unit at Royal Prince Alfred Hospital concurrently. He remained in the latter position until his appointment to Monash.

In the years immediately prior to his coming to Monash he was, also, associate professor in Medicine at the University of Sydney and Visiting Medical Specialist at the Repatriation General Hospital, Concord.

He is a member and fellow of several medical associations, and in 1967 was the Australian Councillor to the International Society of Haematology.

Professor Firkin's major research interest is in the field of haematology.

SECOND CHAIR OF PURE MATHEMATICS

Monash appointed Dr John Newsome Crossley to the second chair of Pure Mathematics; he took up this position on 16 May this year. Professor Crossley who, prior to his new appointment, was a lecturer in mathematical logic and fellow of All Souls College, Oxford, came to Monash for a short while in 1968 as Visiting Lecturer.

In 1960 Professor Crossley was awarded an honours degree in mathematics at Oxford. Later, in 1963, he was awarded a Doctorate of Philosophy for a thesis entitled *Some Problems in Mathematical Logic*.

He held the position of Merton Tutorial Fellow in Mathematics at St. Catherine's College, Oxford, from 1963 to 1965.

He went to Cornell University in 1966 and to the University of California, Los Angeles, in 1968 as Visiting Associate Professor.

In 1968 the Association of Symbolic Logic appointed him to their Council.

He is currently developing the theory of recursive equivalence types of algebraic structures.

Professor Crossley's wife, Dr Stella Ann Crossley, is also at Monash as lecturer with the department of Psychology. They have two children.

CHAIR OF PSYCHOLOGICAL MEDICINE

Monash appointed Professor Wallace Ironside to the new chair of Psychological Medicine, which is situated at Prince Henry's Hospital. He took up the position on 19 May this year.

Immediately prior to his appointment at Monash, Professor Ironside had been Foundation Professor of Psychological Medicine at the University of Otago medical school since 1962. During this time he was also chief of Psychiatric Services for the Otago Hospital board, and a member of the Board of Censors of the Australian and New Zealand College of Psychiatrists.

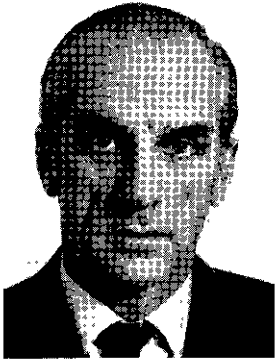
Professor Ironside, who received his medical training at the University of Aberdeen, served with the British Army from 1941 to 1946. In late 1943 he was appointed medical adviser in mountain warfare for the British Central Mediterranean Forces.

He was senior lecturer in Psychiatry at the University of Leeds from 1949-1952. Then, in 1952, he first went to Otago as a senior lecturer in Psychiatry.

He was awarded a Fulbright Research Scholarship in 1959, and was appointed assistant professor in Psychiatry at the University of Rochester, New York, in 1960.

Professor Ironside's research interests are in infant behaviour disorders with their implications for child development, family structure and dynamics, and their possible relationships to later psychiatric illness.

He is married and has two daughters.



Professor W. Ironside



Professor W. H. Scott

SECOND CHAIR OF ANTHROPOLOGY AND SOCIOLOGY

Professor William H. Scott has been appointed to the second chair of Anthropology and Sociology in Monash's faculty of Arts.

At present Professor Scott is professor of Sociology and chairman of the department of Sociology, Government and Administration at the University of Salford. He also holds office as chairman of the International Committee for Social Research in Industry, and chairman of the Sociology of Work Committee for the International Sociological Association. His main areas of research are industrial sociology, industrial relations and industrial management. He has written ten books and published numerous articles and reviews.

Professor Scott's teaching experience has been extensive at undergraduate and graduate levels in both the University of Liverpool, where he was awarded a Doctorate of Philosophy, and the University of Salford. During 1968 he was Visiting Professor at the Massachusetts Institute of Technology.

Professor Scott, who is married and has two children, is expected to take up his Monash post in December.

FIFTH CHAIR OF LAW

The number of chairs in Monash's faculty of Law has increased to five with the appointment of Professor Gerard Nash to a new chair in Law. Professor Nash currently holds the position of dean of the faculty of Law and Foundation Professor of Law at the University of Papua and New Guinea.

He graduated Bachelor of Laws with honours from the University of Melbourne in 1956 and in 1957 he took up appointment as a lecturer in law at the University of Tasmania, where he was awarded a Master of Laws degree. He then went into practice as a member of the Victorian Bar until 1962 when he joined the University of Melbourne as senior lecturer in legal studies. In 1964 he came to Monash as senior lecturer in Law. He held the office of sub-dean of the Monash faculty of Law in 1965 and 1966 when he was appointed to his present chair of law at the University of Papua and New Guinea.

Professor Nash is a member of the legal education committee of the World Peace Through Law Center, a member of the Council of the University of Papua and New Guinea, and has been legal editor of *The Australian Accountant* since 1962. Between November 1967 and February 1968, under the auspices of the Carnegie

Corporation of New York, he visited law schools in Africa to discuss problems of legal education and university administration.

Professor Nash's special interests are criminal law and aspects of commercial law. He has written a book, *Paul's Justices of the Peace*, and numerous articles for legal periodicals.

Professor Nash, who is married and has a young family, is expected to take up his post at Monash in July 1970.

CHAIR OF EDUCATION

The third woman to be appointed to a chair at Monash is Dr Marie D. Neale, who has accepted a position as professor in the faculty of Education.

Dr Neale, who is currently a senior lecturer in Education at the University of Sydney and an honorary clinical psychologist at Royal Alexandra Hospital for Children, Sydney, will take up her appointment at Monash early in 1970.

She graduated Master of Arts with honours at Auckland University in 1945, and at the same time completed a Diploma of Education.

In 1946 she went to Britain on a graduate scholarship at the University of Birmingham where she was awarded a Diploma of Psychology and then a Doctorate of Philosophy for a thesis entitled: *A Factorial Study of Children's Reading Ability*.

While in England she held posts as a lecturer at the University of Birmingham, a research fellow at Birmingham University's Institute of Education and as clinical psychologist at the Monyhall Hospital, Birmingham.

She has held her current posts in Sydney since 1961. Last year she was a Visiting Professor at the University of California.

Dr Neale's major research interests are in the fields of exceptional development, children's learning, guidance, communication disorders, patterns of talent and disability, and reading tests. She has published a book and numerous papers, and has also made a film as part of a research record about the effects of an 'art and movement' programme upon a group of children.

Dr Neale is married and has two children.



Professor M. D. Neale



Professor P. Musgrave

CHAIR OF EDUCATION

Dr Peter Musgrave, at present a senior lecturer in Sociology at the University of Aberdeen, has been appointed to a chair of Sociology of Education, in the

faculty of Education. This appointment will increase the number of chairs in the faculty to six.

Born in England, Dr Musgrave graduated as Bachelor of Arts with honours at Cambridge in 1949. He took out his Master of Arts degree in 1954, and completed a Postgraduate Certificate in Education in 1956.

After five years as a school teacher in London, he became a lecturer and then senior lecturer in Education at Homerton College, Cambridge. In 1964 he was awarded a Doctorate of Philosophy by the University of London for a thesis on the British and German iron and steel industries. During 1965 he was head of the

Education department of Bede College, University of Durham. He has been with the University of Aberdeen since 1966.

The main area of Dr Musgrave's personal research within the sociology of education is the relationship between education and the economy. He is at present engaged in a project on occupational choice.

Dr Musgrave has published, or has had accepted for publication, six books and about twenty papers.

Dr Musgrave, who is married and has two children, will take up his position at the start of 1970.