Professor Ken McKinnon, restructured AVCC’s President in 1991
SINCE the first issue of the Outlook reached you earlier this year there has been a number of significant developments at the University. Two members of the executive are taking leading roles in Australian higher education, the University's Academic Senate has appointed its first female Chair, and the University Council has re-elected the Hon R M Hope, AC CMG QC, as Chancellor of the University for a four-year term. He has served as Chancellor since 1975.

In addition, a Sydney Centre of the University was opened in July and a Canberra office began operations at the beginning of September. The campus Aquatic Centre was also opened in July – this features a 50m outdoor heated swimming pool, the first in Wollongong.

News of many of these developments is expanded in the pages that follow.

The progress continues.... New courses are being developed all the time: Japanese will be available in 1991 as part of a joint BA/BCom degree, the masters course in journalism has had its first intake of students, the Law Faculty is gearing up to offer joint law degrees plus a Bachelor of Laws (graduates only) next year, and a Graduate Faculty has been established.

New buildings are also being constructed: Stage II of the Illawarra Technology Centre was opened in June and Stage III is under construction, the General Purpose Academic Building is growing rapidly and work on a new General Science Building has also begun. In addition, a multi-storey carpark is being constructed between the Library and the Union. Attached to this will be Stage 6 of the Union.

All this activity, plus annual events such as University Day in May, when the Ethel Hayton Trophy was awarded to Glen Moore, and Open Day in August which drew thousands of people to the campus for a day of information and entertainment.

The University's alumni operation is also developing at a brisk pace. With the appointment of Graeme Gilbert in June as part-time Executive Officer to the Friends of the University, I am able to devote my time more fully to alumni activities. An inaugural reception for graduates, families of currently-enrolled students and anyone else with an interest in the University was held in Wagga Wagga at the end of July. This was highly successful and is reported in this issue.

Work continues on the development of an appropriate database for the alumni operation. This is a major task involving a complex programming process which will enable the various groups within the alumni, e.g. staff, students and others, to be linked.

The Graduates Group has been meeting regularly throughout the year and has undertaken two major projects. One was the secondhand book sale which took place on Open Day and attracted enormous interest. Volunteers worked tirelessly in the weeks preceding Open Day collecting, sorting and pricing books, and their hard work was certainly vindicated by the constant stream of book lovers and bargain hunters on the day.

The other was a Graduation Dinner held on Thursday October 11, the eve of the graduation ceremony. The after-dinner speaker was Senator Michael Baume, Shadow Minister for the Arts, Heritage, Sport and Youth Affairs.

You will also notice that University mementos can now be purchased by mail order. This service to alumni will be expanded in the coming months and if any readers have suggestions as to memorabilia or other services which they would find beneficial, again, please let me know.

I must forewarn you that the University will be changing to a new telephone system in December and this will mean new telephone numbers throughout the campus. The new numbers are not available as yet, but interim arrangements will ensure that callers are redirected to the appropriate person.

As always, the editor and I would be delighted to receive your comments about Wollongong Outlook, and more importantly, about yourself and what you are doing these days. Do remember that the Response Sheet can be completed and returned in no time at all....

Meanwhile, our best wishes for the festive season and a prosperous New Year.

Juliet Richardson
Telephone (042) 27 0249
Facsimile (042) 27 0128
Women professors head Academic Senate
Helen Gamble (left) to Chair Academic Senate and Helen Garnett (right) retains position as Deputy Chair

Alumni working in industry
University graduates work with Telecom and NorTel in the Illawarra Technology Centre

Education in the next decade
Distinguished educator, Professor Ron King, spells out his formulae for future strategic planning

The Friends' Ethel Hayton Award to Glen Moore
Untold hours of volunteer labour in establishing Science Centre acknowledged

Twin accolades for University 4
Alumni profiles 6
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Academic profile – Helen Gamble 18
Geographers research vegetation patterns 19

Remember to complete the response sheet on page 11
Two results of the progress made by the University are marked by the Vice-Chancellor and Principal, Professor Ken McKinnon, being unanimously elected President of the Australian Vice-Chancellors' Committee (the AVCC). And by the appointment of the Deputy Vice-Chancellor, Professor Ian Chubb, to the Chair of the Higher Education Council of the National Board of Employment, Education and Training (NBEET).

Professor McKinnon succeeds the current AVCC Chairman, Professor Brian Wilson, Vice-Chancellor of the University of Queensland, from January 1 next year for a two-year term.

A former Chairman of the Commonwealth Schools Commission and the Australian Commission for UNESCO, Professor McKinnon was elected Deputy Chairman of the AVCC only this year. He is known for speaking out and for his negotiating skills on major issues in higher education and government circles.

Under his leadership the University of Wollongong has emerged as a pace setter for modern universities with enviable achievements in the growth of research activities, university/industry interaction and the development of highly skilled graduates with imagination, flair and initiative.

Professor McKinnon is a member of the International Development Program Board, has forged strong international links both for his university and the higher education sector. He has been a major force behind AARNet, the high-speed academic research computer network now linking university researchers with their colleagues throughout Australia and overseas. He is also Chair of the AVCC Standing Committee on Educational Television.

In welcoming the appointment, Mr Frank Hambly, AVCC Executive Director, said, 'The higher education sector has been through tremendous upheavals in the past two years under the Minister for Employment, Education and Training, Mr Dawkins. Professor Wilson and Professor McKinnon have proved an effective team in negotiations to maintain academic quality in the Australian higher education sector in the period of the Dawkins' reforms.'

The AVCC, which currently represents 26 universities, is expected to have a membership of some 35 institutions by January next year. Professor McKinnon will be the first president of a new, expanded AVCC representing the whole of the higher education sector in Australia.

Professor Chubb replaces Dr Gregor Ramsey, who was appointed Chair of NBEET in February. Since 1986 Professor Chubb has been Deputy Vice-Chancellor and Professor of Biology at the University of Wollongong, before that he was an Associate Professor and Lecturer in Human Physiology at Flinders University.
South Australia; Foundation Secretary of the Australian Neuroscience Society and executive member of the Federation of Australian Scientific and Technological Societies, and a member of the Standing Committee on Research of the Australian Vice-Chancellors' Committee. Professor Chubb was also a member of the Task Force which in 1989 advised Mr Dawkins on amalgamations of higher education institutions.

For the past two years Professor Chubb has assisted the Higher Education Council as a consultant in the Council’s educational profiles negotiations, and has been involved in work on institutional performance indicators and research infrastructure.

The Vice-Chancellor, Professor Ken McKinnon, said, 'Professor Chubb is a very good appointee to the HEC Chairmanship. While the campus community will be very sorry to see him go I am sure there will be general agreement that he has done a first-class job here and that the Federal authorities are lucky to get him.

'He has been an outstanding colleague. He is an enthusiastic, energetic and intelligent innovator and he has a great capacity to engender teamwork and co-operation using insight, forcefulness and charm. He has played a leading role in building the reputation of the University.'

Professor Chubb took up the position of HEC Chair early in September for a five-year period.

A farewell dinner in his honour was held in the Union Hall on September 21.

**Gerard Sutton - New Deputy Vice-Chancellor**

PROFESSOR Gerard Sutton – Pro Vice-Chancellor at the University of Technology, Sydney – has been appointed Deputy Vice-Chancellor at the University of Wollongong. At UTS Professor Sutton was responsible for research, computing services, international programs and continuing education, and he gained a reputation for his managerial and leadership qualities. He was particularly successful in raising the profile and quality of research at UTS and in attracting significant research funding.

Professor Sutton holds qualifications in engineering from the University of NSW and a PhD from the Catholic University of America in Washington.

**Professor Helen Gamble – Academic Senate Chair**

PROFESSOR Helen Gamble – Faculty of Law – was appointed Chair of the University's Academic Senate at the Senate’s July meeting. She thus became the first woman to be appointed to this important role and one of the elite few to be appointed to the senate chair in any Australian university. A profile of Helen Gamble appears on page 18.

The retiring chairman, Professor Ron King of the Faculty of Education, had held the position since 1983.

Professor Helen Garnett, Head of the Department of Biology, retains the position as Deputy Chair.

**Heritage week**

*Teaching the young about the old*

Organised by the Aboriginal Education Unit, Heritage Week once again brought to the Illawarra community an exhibition of photographs depicting Aboriginal people and sites, together with a display of stone artefacts and historical materials supplied by the Illawarra Historical Society.

There were demonstrations of boomerang throwing by Laddie Timbery on the University lawns. And there was Aboriginal singer and songwriter, Bob Randall, who was accompanied by his family in a demonstration of traditional dance.
HISTORY was the logical choice of subject for Heather Spence when she enrolled in a BA degree course in 1983 at the University of Wollongong. As early as fifth grade in primary school, she had been fascinated with Roman history. Over the years this has developed into an interest in archaeology and anthropology.

Heather studied a wide range of history subjects including American foreign policy, Russian, European and Southeast Asian history.

She gained a University of Wollongong scholarship to complete her Honours year and was awarded 1st Class Honours for her thesis ‘Changing Perceptions of Vietnamese Prehistory’.

During the Honours year Heather spent some time in Hanoi, where she worked with several leading Vietnamese historians and archaeologists including Professor Le Van Lan of the Hanoi Department of Archaeology and Professor Tran Quoc Vuong of Hanoi University, both of whom made valuable contributions to her understanding of Vietnamese prehistory.

Heather was recently awarded the 1990 Jamieson Prize for Arts by the Committee of the Australian Federation of University Women - NSW. The Jamieson Prize is awarded to outstanding women students from universities within New South Wales. Nominees for the Jamieson Award are judged on the standard of their academic work and their potential contributions to their field of study.

On completion of her Honours degree, Heather was awarded an Australian Postgraduate Research Award to undertake her PhD. Heather’s thesis topic involves research into British influences on Tibet during the period 1912-1933. Her focus centres on the attempted modernisations during this period by Tsarong II, a senior member of cabinet and a personal adviser to the 13th Dalai Lama. It is not surprising that she chose a topic relating to Tibet. Her interest in more exotic cultures has been a growing fascination since her first overseas travel in her late teens.

After several years working in local government and with CBN Radio and Television in Orange, Heather left Australia again, this time with her husband, Ian, and three-year-old son. For two years they worked in Europe, eventually driving overland to Australia in 1974 in their VW Campervan through Iran and Afghanistan to India, where Heather first became interested in Tibet.

While in India Heather visited Mussoorie, a British Hill Station where a Home for Tibetan Refugees, who had escaped the 1959 Chinese invasion of Tibet, had been established by the Dalai Lama. The Home was run by Rinchen Dolma Taring, the youngest wife of Tsarong II and author of Daughter of Tibet. Heather will revisit Mussoorie later this year and record Mrs Taring’s personal recollections of the political situation in Tibet during the 1912-1933 period.

A growing interest in Asian history led Heather and Ian to visit China in 1976 and, in 1981, Tibet, where they were among the first handful of Australians to see the once-forbidden country. Tibet’s borders have rarely been opened to allow outsiders a glimpse of the unique lamaistic Buddhist culture. Even today, travel within Tibet is restricted.

Heather lived in Turkey for a year while Ian was observing the education system of Turkey. By this time they had three children. On their return from Turkey they moved from the Central West to Wollongong so that Ian could teach in a school with a large migrant population and Heather could go to University. That was in 1983, when she began as a mature-age student.

During her undergraduate years she worked part-time within the University doing research work on a major literacy project for the NSW Department of Education and for the Department of Human Movement doing an evaluation of the Rehabilitation Program currently in operation at BHP Port Kembla.

Heather will leave later this year to spend some time researching in the India Office Library in London. Although she intends to visit Tibet again, much of her PhD research work will be carried out at the Library of Tibetan Works and Archives in Dharamsala, Northern India, where the 14th Dalai Lama has established his government-in-exile.
ANGELA Chan graduated in 1980 with a BA, majoring in Italian and Asian History. She also has a Diploma in Law from the University of Sydney and has completed a course in International Marketing (importing and exporting). After graduating, Angela worked for several years in private enterprise in research and marketing, including managing a consultancy involved with workers' health and safety.

She is now the Managing Director of Australian International Business Consultants, an accredited business migration agency offering a wide range of consulting skills associated with all aspects of business and migration. As an Accredited Agent, the company is authorised to handle business migration applications which are given priority when being processed by the Australian Posts overseas. The company has offices and associated agencies located in Sydney, Canberra, Hong Kong, Taiwan and Japan and in Europe and South America. Australian International Business Consultants also undertakes specialist work in other business and industry migration programs which are designed to respond to shortfalls of labour-market analysis and to enable Australian employers to seek highly skilled personnel from overseas.

Angela also manages an importing and exporting company called Oz Trading Company and is currently the Honorary Secretary of the Australia-China Chamber of Commerce and Industry (NSW Branch) and a Member of the State Chamber of Commerce (NSW).

Of her time spent at the University of Wollongong she says: 'The friendships have proved enduring and continue today'. As far as her studies are concerned, Angela says: 'They were not only professionally beneficial but the dash and verve of lecturers such as Dr Vincenzo Cincotta lit a fire of interest in language and culture'. She adds: 'Looking back at my days at Wollongong, the university has demonstrated itself to be a crucible of ideas which have progressed not only throughout Australia but throughout the world. I sometimes encounter people in my professional life who are graduates of the University and who, like me, look back on their experience with affection and gratitude. The University can only grow and excel throughout the coming years as it continues to develop its range of courses and facilities.'

John Goldring re-elected

PROFESSOR John Goldring, who began duty as foundation Dean, Faculty of Law in June, was re-elected to the executive committee of the Commonwealth Legal Education Association at a meeting held in Auckland in conjunction with the 9th Commonwealth Law Conference.

Professor Goldring gave a paper at the Conference on Possibilities for Commonwealth Co-operation in Legal Education and led a session at a workshop on Continuing Legal Education in Developing Countries, organised by the Commonwealth Lawyers' Association and the Commonwealth Legal Education Association, in conjunction with the Commonwealth Law Conference.
THE Illawarra Technology Corporation has produced some outstanding technological advances and aims to foster creative thinking in harmony with technology. This is nowhere more evident than at the Telecom research centre on campus, where a number of major organisations are making use of Telecom's innovative technology - especially its new Customnet Spectrum telephone system. The system has been especially developed and is being installed by some of the university's own graduates, stationed at Telecom's Customised Software Solutions Centre at the Illawarra Technology Centre.

No fewer than eight Wollongong graduates, from the staff of 17, presently work in the Centre and one staff member is enrolled in an undergraduate degree. The remainder of the staff make the centre truly multicultural, with employees from London, Israel and Sri Lanka.

The Software Solutions Centre, as its name implies, aims to provide companies and businesses with the latest telecommunication technology to fit their needs. It is presently customising the Integrated Services Digital Network (ISDN) which will transfer high-quality information between systems. This replaces the need for modems. It can send pictures and deliver messages as well as be used as a telephone system. The high-speed image-transfer ability could, among other things, see cheques cleared in seconds. Eventually, the ISDN system will be able to act as a mail checkpoint and receive television programs.

Such is the speed of development and implementation that, according to Business Manager Philip Brown, this leading system will be commonplace in Australian homes within five years.

Another application on which the unit is working is the redirection of telephone calls, including 008 calls, to company branches throughout Australia. This would allow companies to become more productive, especially when time-zone changes are involved.

Telecom's pure research laboratories are in Melbourne. Sydney was initially considered for the site for the Customised Solutions Centre. The high cost of accommodation made Telecom look elsewhere. Wollongong's ITC was deemed the perfect choice. The city is close to Sydney. The Centre is located on a campus which is vitally involved in practical applications to modern technological problems. And the University's computer engineering and associated degrees have excellent reputations. The unit is using its own high-tech communication networks to maintain close links with the Victorian centre.

Alumni at the Centre

PHILIP BROWN. Philip could not have been happier that Telecom chose Wollongong as its base. He grew up in Wollongong and graduated from the University in 1982 with a Science degree, majoring in Biology and Geography. Before he joined Telecom, he worked in the Geography Department, did odd jobs and even worked at the uni bar. Wollongong at the time was in recession, so Philip had little choice of jobs. Finally, he joined Telecom as a clerk and began commuting to Sydney. Despite appearances that his biology background has no relevance to Telecom work, Philip says the analytical ability learned at the University helped him immensely. Telecom, too, recognised his potential. After undertaking in-service training, he was promoted to national manager of account customers. This meant 'watching over' such organisations as GIO, AVCO and major banks. Finally he decided that commuting was no longer an option. He is well content that his new position is Wollongong based.

DAN CUNNINGHAM. Dan was born and bred in Wollongong. He joined BHP as a trainee in 1980. In 1986 he graduated with a degree in Electrical Engineering. His work at BHP entailed control computer functions and equipment in the Port Kembla plant. He joined Telecom in April and says he enjoys working with leading-edge technology.

ANDREW ZAHRA. Andrew grew up in Wollongong and graduated from the University in 1990 with a double degree in Maths and Computer Science. In 1985 he joined BHP as a trainee in computer programming. His growing interest in telecommunications led him to join the unit in April.
AND TELECOM

RICHARD SCOTT. Richard hails from the Camden area and has been working for Telecom for 15 years. He began as an apprentice technician and worked up from there. In 1982 he began studying Computing Science on a part-time basis and graduated in 1989. He moved to Wollongong in 1985 so he could continue his studies. He joined the new unit on 11 December 1989 – the day it opened.

ERICKA LOVELL. Ericka is the Centre’s mixture of the technical and social worlds. She has lived in Wollongong for 17 years and graduated with a BA in Human Geography in 1983. She studied computing science as a component of her degree and she is presently studying for a postgraduate diploma in Computing Science. Ericka started with Telecom as a clerk in the Sutherland office, transferred to Wollongong and then moved back to Sydney to join Telecom’s Information Systems Division. She then worked for a year with the Roads and Traffic Authority in its computer users support office. She was happy to begin working back in Wollongong when the new unit opened. Ericka considers she is lucky to be working in the two areas she knows and enjoys best: people and computers.

RODNEY KNIGHT. Another Wollongong person, Rod graduated in 1988 with a first-class honours degree in Computer Engineering. He has just completed a Masters Degree with honours with a thesis on Versatile Ways of using Telecommunications Networks. He worked with Uniadvice and Telecom to write the thesis. Rod started work with Telecom as a cadet in 1986 and worked with the organisation until 1989 when he went to Uniadvice and then to the Advance Telecommunications Research Group at the University. He too has experienced commuting during a year in Sydney between 1988 and 1989. He says that he now enjoys working so close to the University, which offers a pleasant environment as well as the centre for expertise in telecommunications.

FRANK MARZANO. Frank, too, hails from Wollongong. In 1984 he joined Telecom as an apprentice technician and spent several years working in Sydney before transferring back home. In 1988 he won the State Apprentice of the Year title. He completed a diploma in Electronics last year and this year is enrolled in a computing science degree which he is completing part-time.
By relaying information and messages, Northern Telecom (NorTel), also located in the United States, France and Great Britain, has its way she will be back, except that 'she' will be a computer.

NorTel has committed $37 million in Australia for research and development of Computer Engineering. The managing director/consultant is Professor Hugh Bradlow, of the Department of Computer Engineering.

Since NorTel is working in a highly competitive sphere, the staff are naturally reluctant to go into detail about their work. The four are part of a team, researching and preparing to introduce a combined software/hardware package which will link Apple Macintosh personal computers to the telephone. In short, the computer will be capable of receiving messages, passing them and act as an answering service, switchboard operator/secretary.

The group hopes to release this new package by the end of next year. Eventually the system will be able to be linked to other personal computers.

DAVID EVANS (Research and Development Engineer, Scientist) moved from Lithgow in 1978 to Wollongong to work for BHP. He studied Metallurgy at Wollongong University and later completed a graduate diploma in Computing Science. During his ten years at BHP he worked mostly with the continuous slab caster department, where he was involved in the development of computer systems that handled many of the facets of slab caster operations. He then went to work for Computer Sciences of Australia where he designed and programmed software for the RAN Seahawk helicopter project. He is currently studying for an honours Masters in Computing. He joined NorTel in May. David is married to Marina Evans, another Wollongong graduate. They have a two-year-old daughter, Lyndal.

STEPHEN NICHOLSON (Research and Development Engineer). Stephen began studying Physics in 1983 and then moved to Computing Science. He graduated in 1987, fitting in two-years' worth of psychology subjects as well.

During his undergraduate degree, Stephen taught and interpreted sign language at Wollongong TAFE. After his graduation he began tutoring in the Computing Science Department in 1987. Between 1988 and 1990 he was a professional officer in the department. Today he is undertaking a Masters degree (part-time), although he is currently having a break. Stephen's other love is drama. He has been a member of the Duckpond Drama Society on campus since 1988 and has written and acted in a number of performances. One of his long-term goals is to be an author of science fiction and fantasy works. He began working with NorTel in May. Although having little previous experience with telecommunications, he is enjoying the work and finding it a stimulating challenge.

CONAL WALSH. Conal originally lived in Sydney, matriculating from Trinity Grammar in 1983. During 1984 he was involved in the design and implementation of a microcomputer system on a contract basis. He moved to Wollongong from Sydney to study Computer Engineering and completed his degree with honours in 1990. During his period of study he worked on a contract basis with IBM, and with other companies, preparing software and hardware projects for mainframe and personal computers. Since 1987 he has been systems engineer for the Canberra Management Conference, an organisation concerned with a series of annual corporate salary surveys. He has also been a major influence in the development of the Australian-designed Applix 1616 computer system, designing an operating system and writing a graphics package. Conal completed his engineering thesis in 1989 under the supervision of Professor Hugh Bradlow. This association led Conal to join NorTel in January. He now works for NorTel full-time and supports limited contractual work in his spare time.

Conal's extracurricular activities during the past few years have included water skiing, Ishinryu karate and Scuba diving. He is a life member of the University Union and Sports Association and is newsletter editor of the university's Scuba club.
Inaugural alumni reception in Wagga

The first reception for graduates organised by the Alumni Office took place in Wagga Wagga on Monday July 30.

This occasion offered an opportunity for the University not only to re-establish contact with some of its former students, but also to welcome the families of currently-enrolled students. The reception coincided with the Tertiary Awareness Day for years 11 and 12 students held the following day in Wagga, and many guests were prospective students at undergraduate and postgraduate level.

The evening was a great success with more than 40 people attending from Wagga and the surrounding areas. One family came all the way from Hay, more than three hours’ drive away.

Staff members from Charles Sturt University, Riverina, were also present. Several Wollongong graduates are now employed there including Bernadine Cantrick-Brooks and her husband David (see picture) who are keen to set up a regional Wollongong alumni group, based in Wagga.

Pro Vice-Chancellor, Professor Lauchlan Chipman, hosted the evening and Juliet Richardson (Alumni Officer), David Fuller (Manager, Planning and Marketing) and Liz Hilton (Schools Liaison Officer) also attended.

The Mayor of Wagga, Alderman Pat Brassil, was presented with a copy of the recently-released book Wollongong – Spirit of Achievement, signed by the Vice-Chancellor and Wollongong’s Lord Mayor, Alderman Frank Arkell.

Other receptions for alumni in 1990 included one in Canberra on September 17 and another to be held in Kuala Lumpur, Malaysia, on November 24. Any alumni living in Malaysia who have not received a personal invitation to this reception are asked to contact Juliet Richardson, Alumni Officer, University of Wollongong, PO Box 1144, Wollongong, NSW 2500.
This is a note of caution more than it is doomsaying, for there is much that can be done. John Dawkins, as Commonwealth Minister for Education, has produced two sound, interconnected moves: the first is a better basis for articulating all levels of education to each other and to the continuing education needs of the workforce, the second is the encouragement of a partial enterprise base in educational institutions. (Some other moves in the Dawkins era may be less sound, but this is not the time to dwell on them!) Other moves in prospect include a nation-wide push for a quality upgrade of the teaching profession.

For now, I want to concentrate upon a different move which, if properly envisioned and managed, could contribute significantly in this awkward chess game. The key to understanding the major trends in education through the next decade lies in recognising the need to integrate formal education as taught in schools, colleges and universities, with informal, incidental and packaged education. We might not see all the significant changes worked through the innovation processes of adoption and widespread diffusion to the mature stage before the year 2000, but the foundations should be clearly in evidence. This integration, or blurring of the lines, between what is formal and what is not will come through three main trends, individually of immediate importance to schools, colleges and universities yet, collectively, so significant that we must focus a good deal of our strategic planning energy in their direction.

**Trend 1: Commercialising of Education**

There is little doubt that an opportunity now exists for corporations or private institutions to sell skills with immediate vocational application, for profit. In a muted way, this has happened for a long time - from secretarial colleges in the 1950s to the Informatics Institute in 1990. Only one, relatively simple, change is required to make increasing the scale and scope of commercialised education more worthwhile for entrepreneurs and investors; the linking of demonstrated market need with credible certification and awards that are capable of bearing marketplace scrutiny.

We can expect to see some of these courses and their associated awards operating in direct competition with courses, both long and short, offered by the traditional educational institutions. Others will be offered in collaboration with publicly-funded institutions. The Dawkins era has already been important in this regard, for the public’s perception of education is now so ripe for change that it should be possible for commercialised education to be reputable and sustainable at all levels and for all age groups of learners. Notably, the institutions of public education can now feel encouraged to become joint venturers with the private sector.

**Trend 2: Distance Education**

The technology already exists for elements of many university subjects and courses to be offered off-campus to students through on-line or satellite facilities and public or sub-carrier radio stations and television channels. Currently, the Commonwealth distributes funds to universities on the basis that only designated institutions will operate as distance education centres (DECs). The political and economic reasons for the decisions taken thus far need not concern us here as much as the sophistication of the technology and the combined wit of staff and students. We have almost reached the stage at which, if staff and students have access to the technology and choose to make the necessary arrangements, distance education could become a feature de facto in every university regardless of the de jure position announced by the Commonwealth. It is unlikely that distance education only through traditional correspondence courses will hold up for much longer at university level.

Participation and retention rates in the upper secondary school have long been a concern of State and Commonwealth ministers of education. Lack of relevance of the curriculum, inappropriate social organisation of the school environment and competing attractions away from the school are among the reasons often cited for dropping out by early leavers. The Australian Capital Territory, Tasmania and South Australia have already tried post-secondary colleges after Year 10 and have seen real progress. It is, in my view,
only a matter of time—but certainly within the decade—before one of these colleges or, indeed, a secondary school finds an effective organisational structure for conducting at least part of its curriculum with students at home, in offices or in clubs.

**Trend 3: Pre-packaged Educational Programs**

Walk into any video shop and you could be looking at the place where you will be able to buy educational packages ranging from a tutorial mathematics computer program for a 4-year-old or a trade certificate syllabus in micro-circuitry to a university subject kit in psychology or anatomy. Pre-packaged educational programs and syllabuses that can be taken off the shelf as retail store purchases or rentals are only as far away as the universities and publishing houses that can put time, people and money into the burgeoning video-disc technology. One of the obvious consequences of this and related technologies will be a much enlarged education packaging industry. Video-disc databases, television-performance lectures, interactive computer program tutorials and even some field trip kits for practically orientated science subjects will become commonplace.

For the universities there exist the twin challenges of obtaining and re-skilling staff to enter all these areas and of managing the high investment/long return time problems that will characterise the business side of these enterprises. Joint ventures, both between the universities themselves and between universities and corporations involved in the manufacture and sale of the related technology, are the most likely means by which comparative advantages can be shaken out and costs amortised in an acceptable way.

Continuing education in the form of professional and trade re-licensing needs also to be taken into account in these challenges. If there is to be a clever country, up-to-date knowledge and skills must become an expectation and a demand from within the general community, industry and government. Australians have for too long accepted the notion of educating for a just-departed past. In order to develop a sense of national conviction about the notion of educating for the future, we need first to have a much heightened sense of awareness about what that means in practical terms. Continuing education requirements and attractive ways of presenting opportunities for lifelong learning can in themselves be major stimulants.

Finally, where do the teachers and teaching stand in all this? All teachers, whether in primary school or in university will need to become more effective teacher-diagnosticians, expert at tracking the learning processes of students and assisting students in optimising peak moments and opportunities in learning. This expertise will need to include helping learners to develop and to utilise effectively a repertoire of cognitive strategies. Given all the money spent on education and given all the experience that we have in teaching people, it seems incredible that these are still among the things that we don’t do very well.

Educating and training teachers to get much closer, in a more informed way, to the learning processes of students and to the environmental conditions that motivate learners is one of the abiding challenges that must be met. In the next decade, we will need effective teachers more than ever.

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**The author**

The author of this article, Professor Ron King, is a lifelong and distinguished educator. He is Head of the School of Learning Studies in the Faculty of Education at the University of Wollongong and he was for seven years—the years of the University’s strongest period of growth—Chairman of the Academic Senate. His reputation in the field of psychology was highlighted by his being chosen to chair the XXIVth International Congress of Psychology, with 4,500 participants, the largest discipline-based international conference held during the Bicentenary year.

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**University’s Research Report 1989 – 1990**

The University’s Research Report has in the past been praised both for the quality and variety of the research programs and projects it has described and for the quality of its production. The issue for 1989-90 follows the example of its precursors and is confident of similar accolades.

This latest issue features an extraordinarily striking, full-colour front cover. Provided by Bill Zealey and his astrophysics research group in the Department of Physics, the cover illustration depicts the Great Nebula in Orion. This great cloud of luminous gas is excited by thousands of young stars. It is one of the major sites of star formations being studied by astronomers in the Physics Department. The ‘false colour’ photograph was obtained using the Department of Physics’ fully computer-controlled 16tn telescope. A PC/AT and PCVISION plus digitiser were used to process the image.

Produced by the Academic Services Branch within the University, the Research Report runs to 92 pages plus cover. It features 32 programs, illustrated by half tones and line drawings, and over 40 research projects—the work of small groups or individuals working outside the programs. The section covering research publications runs to 24 pages as compared with 21 last year—a factor reflecting the increasing emphasis both on research and on publishing research findings.

Outlook readers may obtain copies of the Research Report by writing to Mr Peter Wood, Manager, Academic Services, The University of Wollongong, PO Box 1144, Wollongong NSW 2500, telephone (042) 27 0943.
STUDENTS leaving Australia's secondary education system must be able to cope with a rapid rate of technological transformation of the workplace and of society in general.

The University of Wollongong's Centre for Technology and Social Change (TASC) has just completed a national survey of Australian secondary students for the Department of Employment, Education and Training, to determine their levels of awareness of, knowledge about, and attitudes towards, new technologies. The survey instruments were piloted in the Illawarra and then administered to government, Catholic and independent schools across all states in Australia, using a stratified sample to examine a range of socio-demographic factors.

Barbara Lepani, the Director of TASC's Technology and Human Resources Program, who wrote the report, said that the survey findings show that, in general, Australian students have a low level of awareness and understanding of new technologies and their impact on the economy. Awareness is evident only where new technologies are encoded in readily visible consumer products such as computers, telecommunications and other micro-electronics goods.

TASC argues that technology refers not just to artefacts (hard technologies), but any systematic or purposeful organisation of knowledge to extend human capacity, such as methods of organising - people, information, capital resources and power structures (soft technologies). In fact, TASC research on technology strategies and innovation indicates that it is these soft technologies which are critical to successful organisational performance in the contemporary environment.

Ms Lepani sees students of the future needing expertise in creativity and risk-taking to give them the courage to take each day as an education experiment and experience - a pattern of lifelong learning. She maintains that they have to be prepared to enter a business and commercial world where creativity and flexibility in breaking the boundaries of established perceptions, assumptions and expectations will be at a premium.

Learning strategies, management methods, methods of group integration and teamwork, visioning, mental reframing and cross-cultural understanding and communication are as an essential part of technological preparedness as knowing how to use a computer. These new skills have come to be called enterprise skills, and constitute the third passport to workforce performance, adding to academic credentials and vocational skills.

Detailed findings of the survey will be available with the publication of the report. However, one significant finding of the report is the importance of gender in determining students' exposure to artefact-based technologies, and their attitudes to technology. The TASC report argues that the reconceptualisation of technology to include the soft technologies should make a significant contribution to overcoming this gender bias.

Ms Lepani says that technological transformation will have as profound an effect on our assumptions about the best ways of designing and delivering public education as it has had on our assumptions about the world of commerce and industry. In line with recent trends for a major reform of the education system, this transformation calls for a new education architecture, a complete rethink of the whole institution of schooling. This parallels the way in which technological transformation has led to a new factory architecture, a new culture of work practices, management methods and organisational processes.

The survey of Australian students will provide base-line information about the customers of the education system, the students themselves, to complement information collected through the national curriculum mapping exercise. These projects of the Australian Education Council are designed to help Australian educators redesign the education system to increase the preparedness of Australian students for the 21st century.

Contact: Barbara Lepani, Director of the Technology and Human Resources Program, TASC, Illawarra Technology Corporation. Telephone (042) 268866.
COGNITIVE SCIENCE GRADUATE PROGRAM BEGINS 1991

FROM 1991 the Postgraduate Program in Cognitive Science at the University of Wollongong will offer candidates with a strong first degree and relevant interests and experience the opportunity to engage in a broadly based and scientifically orientated program of coursework and research in Cognitive Science. Cognitive Science is a designated National Priority area of the Australian Research Council.

A full range of courses on offer with a common entry program can, depending on the background and interests of each candidate, lead to a Graduate Diploma or Pass Masters for two semesters of full-time study, or to the research degrees of Honours Master of Science (Cognitive Science) - two years - or the PhD degree over three years. The transdisciplinary and integrated program draws on the expertise and interests of a large number of staff from five separate faculties of the University (Science, Health and Behavioural Sciences, Informatics, Arts and Education).

On offer in 1991 will be the core courses Introductory Cognitive Science and Cognitive Science Research Design Project, and four specialised courses will be available: Artificial Intelligence and Neural Computing; Cognitive Psychology; Computational Neurobiology and The Brain and Movement. In even years these latter four courses will be alternated with Computer Vision; Contemporary Philosophy of Mind; Construction of Knowledge and Early Language and Linguistics. Masters and PhD research work can start as early as the beginning of the second session 1991 for appropriately qualified applicants.

The program is designed to provide a strong training equally for those intending to develop industrial and commercial applications of Cognitive Science research findings, and for those seeking superior academic qualifications upon which to base further teaching and research in an area with strong anticipated employment growth.

Further information and a brochure setting out details of the courses, and providing scholarship and other information on the program and the University are available on request from the Coordinator, Associate Professor Peter Burton, tel: (042) 270505, fax: (042) 270151, email: pgb@wyvern.cs.uow.oz.au.

ASIAN LANGUAGES AT WOLLONGONG

TWO important developments in the teaching of Asian languages have taken place at the University. First, Bahasa Indonesia/Bahasa Malaysia is being taught this year for the first time at 100-level. The course has a dual focus on oral communication (listening and speaking) and the development of competence in reading and writing. Throughout the course the language is related to its socio-cultural setting. The course provides linguistic competence in the language's national variants as spoken in both Indonesia and Malaysia/Singapore/Brunei. There is extensive use of the language laboratory, and cassettes linked directly to the texts used by students are made available for loan by the department for individual practice in students' own time.

The University has also been given a substantial grant from the National Priority (Reserve) Fund to develop Indonesian in relation to teacher training and in-service courses for teachers. The department is repeating a course it provided last year for students in the Department of Education who wish to go to Indonesia or Malaysia for their teaching practice (see article on page 16) as well as providing courses for teachers who wish either to learn Indonesian from scratch or to refresh their knowledge of the language.

A period of residence in Japan will also be incorporated into the course, which will focus both on Japanese language and on history and culture. The University is aware that a five-year course and a period in Japan will demand a high degree of commitment. The Department of Languages is therefore raising scholarship funds, in the first instance to enable students to travel.

Thirdly, the Department of Languages already teaches French and Italian at all levels, as well as Spanish at 100-level. The new developments mean that the University will in future be able to offer not only a wider range of languages, but a range which is balanced – European and Asian – and is therefore better able to satisfy the needs of students.

Good news is that thanks to the generosity of the Spanish Government the University is now able to offer a three-year minor sequence in Spanish for 100-300 level.
Completing part of their practice teaching requirements in a foreign school which teaches English as a second language is one option available to Bachelor of Education students at this university. Schools in Malaysia, Fiji, China and New Zealand have provided places for students since the program began in 1981. Last year, student groups visited Malaysia and Fiji.

It is believed that for students to be immersed in and engaged with a culture for a period is fundamental to the development of positive attitudes towards that culture. An overseas practice teaching experience in a culture with contrasting values, beliefs and lifestyle enables students to compare their own school system with one which is very different. And of course the range of opportunities to explore the richness of another culture is enhanced because the students are part of an official teaching group.

As well as the benefits which accrue to individual students from such a program, there are obvious commercial advantages which are gained at minimal cost to the university. The program establishes a very high positive image of the university in the host communities. Participating students meet their own expenses.

Malaysia

Practice teaching for Wollongong students began in Malaysia in 1981 in the state of Penang and continued there for some years. In 1988 and 1989, Malacca was the teaching centre. In 1989, 37 students taught in local primary and high schools, located in the town centre of Malacca and in contiguous rural areas.

In primary schools the focus was on the teaching of English but in a wide range of contexts - including music, physical education, art and craft. Experiences ranged from formal grammar and comprehension activities to very informal lessons, often with a strong Australian flavour.

In secondary schools, English and physical education were the areas of concentration. All students participated in 'core-curricula' or after-school activities, returning to the schools for two hours in the late afternoon.

Pupil response was universally strong and positive. Management or discipline problems were almost non-existent. The Malaysian pupils' written English was of a high standard, but there was a wide variation in their ability to communicate orally in English. Pupils in town schools were generally better able to speak and understand English.

Before departure, lecturers and many of the students completed an introductory course in Bahasa Malaysia offered by the Department of Languages.

Hospitality was extended to the staff and students in a variety of ways. Many were invited into people's homes and so were able to experience traditional Malay, Chinese and Indian food and customs. Teachers often took individual students on outings, and a half-day tour of the major points of historical interest in Malacca was arranged for the whole group by the Department of Education. For the previous two years the program has enjoyed the privilege of a state banquet hosted by the government of the State of Malacca and attended by senior members of the State Legislative Council.

Lecturers and students were involved in many educational activities beyond practice teaching. Lecturers presented a variety of studies and workshops as an
inservice program for Malaccan teachers. Students assisted in the presentation of coaching clinics on tennis, athletics and basketball. Each of the sessions was attended by between 30 and 50 teachers and principals from across the State of Malacca.

In 1989, the lecturers and students participated in a novel event. At the invitation of Malaccan sporting and tourism authorities, the university party joined the Governor of Malacca, the Chief Minister and members of the Legislative Assembly in a VIP division of a bicycle fun ride around Independence Square. This event and the participation of the Wollongong party were reported prominently by the local and national media.

At the conclusion of practice teaching the group was able to travel to other centres in Malaysia, including Kuala Lumpur and the east coast town of Kuantan. Short stays were also made in Bangkok and Singapore, so that students were exposed to three contrasting Asian cultures.

It is felt that student teachers who participate in this program will prove to be a valuable resource for implementing curriculum developments in primary school Asian Studies, in teaching aspects of Asian history and culture in secondary school curricula and in ESL education.

For 1990 the Ministry of Education in Kuala Lumpur has approved the continuation of the program in Malacca, and the beginning of a new teaching centre in the State of Kelantan at Kota Bharu, on the north-eastern coast of Malaysia. Students will be able to choose between these two centres.

Fiji

The first practice teaching group in 1982 taught in the Sigatoka valley. Subsequent groups in 1984, 1986 and 1989 were based in the Lautoka/Nadi district in Western Fiji. Most students have taught in urban schools but some have experienced a rural school, such as Lololo, while others have worked on the isolated Yasawa islands.

In 1989, 25 students taught in primary and secondary schools. The Bachelor of Education (Primary) students have generally taught a Year 6 or 7 class, concentrating on teaching English. They have also been able to teach a range of subjects across the curriculum.

Students in secondary schools have taught English, History, Mathematics, Physical Education and Health. While the classes are large and resources often scarce, Fijian pupils are co-operative and friendly. A pleasant culture shock has been the children's exemplary behaviour and enthusiasm for learning. Our students have been welcomed as special guests in the schools by parents, pupils and teachers. Invariably they have been farewelled at special parties on their last day at the schools.

Generous hospitality has also been a feature outside our school involvement. Many students have been billeted by host families and so have experienced at first hand the diverse culture of Fiji. Some have been invited to Hindu weddings as members of 'their family'. On each visit, the groups have visited a Fijian village and enjoyed the songs and dances of the traditional meke and the welcoming bowls of yagona or kava.

Close links have been established with Ministry of Education officers in Suva and Lautoka. On each occasion, an orientation program focusing on Fijian culture and aspects of the curriculum has been arranged by the Principal and staff of Lautoka Teachers' College. This program enables our students to meet their counterparts and mix socially with them at cultural evenings where superb Fijian singing and dancing are matched by energetic Australian bush dances.

Our students have been involved in a variety of activities outside formal school commitments, including excursions, fund raising activities and coaching a variety of sporting teams such as rugby union, soccer, hockey and netball. Wollongong staff have organised seminars and workshops on teacher education and the writing process, sharing their expertise with staff, teachers and students at Lautoka Teachers' College.

At the end of the practicum, students have enjoyed a holiday in Fiji. Some have travelled around the main island, while others have sampled fun in the sun on holiday island resorts during Fiji's winter when it is frequently 24 deg C.

The Ministry of Education gave approval for the continuation of the program in 1990. It is hoped that in the future a reciprocal visit from Lautoka Teachers' College may be organised.

Sean Perry wins prestigious BHP-Utah Scholarship

SEAN PERRY, second-year mining engineering student in the Department of Civil and Mining Engineering, was found to be the best practical mining engineering student from all over Australia and won a $4,000 BHP-Utah Iron Ore Division Scholarship for Mining Engineering for 1990.

Sean worked as a student trainee at the Mount Newman mine during the summer of 1990 where he impressed his superiors by his keen interest, hard work and motivation. In order to recognise Sean's achievement, a lunch was organised by Mrs Janice Menegé, Superintendent, Recruiting and Development, BHP-Utah Minerals International, Perth, at the Union Bistro, where he received the cheque for $4,000.

MBA Gong for the Gong

A PRIZE for the best of the best from five MBA schools in NSW was awarded for the first time by the Institute of Management Consultants in Australia, NSW chapter, in June. Bruce Cox, a Wollongong student who graduated with a Bachelor of Commerce and is a management accountant for BHP, won the MBA Student of 1989 award.

Triple winner

A THIRD award-winning student was Gareth Cooper. Winner of three major awards for excellence, Gareth's prizes were donated by AJ and I Waters (this he shared with Jacqueline Mifsud, another honours student), the Geology Society of Australia (NZ Division) and the CRAE Mapping Prize, awarded by CRAE Exploration Pty Ltd. Gareth's aim is to follow a career as a structural geologist.
HELEN GAMBLE

The University of Wollongong's new Academic Senate Chair, Professor Helen Gamble, is a trailblazer - although she mightn't compare herself to one. She became the first woman to occupy the Senate Chair in July, after moving to Wollongong in 1989 to become foundation Professor of the new Law School.

Helen Gamble has been head of the NSW Law Reform Commission and is still a part-time Commissioner. She is Commissioner-in-charge of the references on Dispute Resolution and the Torrens Title Assurance Fund and she is also chair of the Youth Justice Project - which has been inquiring into the NSW youth justice system.

Australia saw a phenomenal push for more equality for women in the workforce. By 1975 some 40 per cent of the law graduates from ANU were women.

Helen Gamble says she was never overly enthusiastic about her law degree. 'I sat through most of it with varying degrees of boredom until jurisprudence. Jurisprudence she loved and, from that time in her first year, she decided she wanted to study children's courts. Even when her Masters degree was completed she chose for her thesis topic the sentencing of young offenders.

She also enjoys teaching family law and is vitally interested in court policy and administration. With these interests she was more than delighted to work on the Youth Justice Project. Since 1987 there have been numerous changes in youth justice; many of them have been severely criticised. The Youth Justice Project, which Helen Gamble chaired, involved representatives from many different organisations: family and community services, social workers, lawyers. She was surprised that so many people from such diverse backgrounds could be very much of one mind.

There is a deal of rhetoric coming from government bodies and organisations that families are responsible for an increase in youth crime. Yet, despite the breast beating, nothing is really being done to help families with legal problems.

'The project looked at a wider social policy on the basis that if one accepts that family life can influence behaviour then families facing problems and difficulties must be assisted and supported. The project concluded that families should be involved in a range of services including the cautioning of juvenile offenders and that the family should be counselled and assisted rather than children alone.'

Above all, the Kids in Justice Report gives practical, cost-effective policies for governments, government instrumentalities and aid organisations to implement.

'The report did, however, leave out two topics - Court and Legal Services - feeling there was more work to be done in those areas.' Many of the report's recommendations are likely to be implemented. Helen Gamble considers this shows the success of the year's work.

Ten weeks were recently spent abroad investigating another major interest: court policy and administration. During this study tour Professor Gamble visited England, Canada and the United States, spent two weeks in Hong Kong and one month in Colorado at the Institute of Court Management. Overall, the tour was aimed at finding ways of achieving an economic efficiency and balance while not denying people justice. She believes that Australia can deliver a better system which is more accessible and more economically efficient.

Naturally, studies of court policy and administration have led to investigation into several methods of determining sentences and meting out justice. 'Despite its shortcomings, our system of justice, based on the English system, is the best. All things considered, we don't do too badly. Of course there are some outrageous examples of bad justice - and there always will be. But the English system (which allows juries and which holds that a person is innocent until proved guilty) is rather like a Rolls Royce - very expensive but most people want one.'

Professor Gamble's views on law and its relationship to society are also evident in the University's Law School. The School aims to provide an interdisciplinary method of study, encouraging students to ask questions and look outside the law for answers which affect legal judgements and procedures.

'Good technical lawyers are not really good lawyers at all, unless they have a wider understanding and appreciation of the social, philosophical and economic constraints of society and the ways in which law can be interpreted and implemented. And this is the aim of the new law school. There also has been a softening of the law, since women became more involved in the legal profession.' Indeed, Professor Gamble says, the law can benefit from women's perspective and women make good criminal lawyers because they usually are willing to think about problems and investigate alternatives.
The impact of Aboriginal burning on the Australian vegetation has been a matter of debate for several decades but we still do not fully understand the extent to which vegetation patterns observed by the non-Aboriginal invaders were an artefact of human activity. And yet knowledge of past changes is fundamental to well-planned future management strategies. Part of the problem has been to mesh two very different scales of analysis; contemporary ecological studies focus on observing the impact of fire over several years or decades, while fossil pollen and charcoal analyses are usually inferring change over thousands of years. Lesley Head and Toni O'Neill of the Department of Geography are attempting to remedy this problem by drawing on two further lines of evidence, Aboriginal knowledge and remotely sensed data.

The study is centred on Marralam Outstation in the East Kimberley. It is one of a number of small areas excised from pastoral leases throughout the Northern Territory to provide living areas for Aboriginal communities. The focus on fire has developed from a wider project being undertaken by Lesley Head and Richard Fullagar (archaeologist at the Australian Museum, Sydney) on Aboriginal land use and resource exploitation in the East Kimberley from prehistoric times to the present. Work has been funded by the Australian Institute of Aboriginal Studies and the University of Wollongong.

In the East Kimberley there are two main fire-using groups. Aborigines returning to their traditional country as part of the outstation movement use fire for hunting, access and to 'clean up the country'. White pastoralists, who can give details of specific fires identified in the field by talking to Aborigines and pastoralists, who can give details of specific fires identified on the imagery. They are also mapping fires observed in the field, and monitoring vegetation on a variety of soil types and with different fire histories. It is hoped that, by building up this information over several years, a detailed picture will emerge.

Preliminary analysis of the satellite imagery shows Aboriginal fires to be less extensive in their impact than some bушfires and control burns started by aerial incendiaries. They may however be more frequent throughout the year. Vegetation results show that in most areas sampled there is a lack of diversity within the ground/shrub layer. Whether this is due to millions of years of poor soils, thousands of years of Aboriginal burning, or a hundred years of European grazing are questions that Lesley and Toni are attempting to answer.
REVOLUTIONARY USE FOR SEWAGE SLUDGE

For the past three years, a revolutionary method of smelting, invented by Professor Howard Worner, CBE, has been researched at the University. The work has been done through the Microwave Applications Research Centre (MARC), supported by the Water Board, ELCOM and BHP. Patented protection for the technology has been sought.

In earlier work on the invention, low-rank coals, peat and sawdust were used as the fuels and chemical reductants in 'composites' made by briquetting or otherwise compacting those carbonaceous materials with finely particulate iron ores or the iron-rich but rarely used dusts produced in steelworks.

The composites are smelted in special furnaces to produce molten pig iron and usable slag. In the case of the steelworks by-product dusts, there is a third useful product - zinc oxide - which is used in pigments, rubber fillers and pharmaceuticals.

One of MARC's consultants, John Matyear, suggested that it would be interesting to see if sewage sludge could replace part or all of the carbonaceous components in the composites. Preliminary experiments indicate that this is the case. But of equal interest and potential is the discovery that when the steelworks by-product dusts or sludges are mixed into screened raw sewage, almost instantaneous chemical reactions occur which cause the iron-rich dusts and undesirable components of the sewage (solids, heavy metals and possibly even the pathogens and PCBs) to settle rapidly as a relatively heavy sludge.

It appears that a number of 'ingredients' in the steelworks dusts contribute to this remarkable result. Be that as it may, the clear effluent shows promise of being suitable for re-use or disposal as may be appropriate.

Mix sewage and iron-rich dusts - and get iron, slag, zinc oxide and oils

Postgraduate courses 1991

The University of Wollongong will be offering a wide range of coursework Masters programs in 1991. The programs, which will include a number of new courses in addition to many of the existing courses, have been designed to meet stringent new guidelines in line with the implementation of Stage 2 of the University's Research Management Strategy.

Stage 1 of the Strategy, which was implemented from the beginning of 1989, concentrated on the research work of academic staff and research students through the establishment of Research Programs. In Stage 2, the emphasis has been placed on the coursework offerings of the University with the objective of providing postgraduate opportunities to educate the intellectual leaders in the community at large, in the professions and in the various fields of teaching and research by exposing students to the forefront of knowledge in their chosen field in a systematic and logical way. This has required academic units to thoroughly review their current offerings and develop them into coherent Postgraduate Programs which will require superior intellectual achievement for accomplishment so emphasising the key role of the University in providing the community with leadership.

Full details of the range of courses offered will be found in the Postgraduate Calendar, which will be available in November.

Application forms for any of the Programs may be obtained from the Student Enquiries Office or by telephoning (042)27 0927.

THE University of Wollongong has an enviable record in forming close links with business and industry, highlighted by the representatives from commerce and the community who commit energy and time to the University. The University is firmly committed to a balance of theory and up-to-date practice in its professional courses.

Establishment of Centres in Canberra and Sydney is further evidence of the University's commitment to stronger links with appropriate professions and the community, and to making its academic programs and expertise more accessible.

Shared facility

The Sydney Centre will be a shared facility between the University of Wollongong and the Illawarra Technology Corporation, the University's fully-owned technology transfer, training and consulting company. It will be a base for particular aspects of professional development programs, especially in the areas of legal and management education. The Informatics Institute, which is a training unit of the Illawarra Technology Corporation, is also located at the Sydney Centre and provides high quality professional training in information technology and computer applications.

In addition, the Centre will provide offices for consultants from the Illawarra Technology Corporation.

In the future, it will also be an accessible information centre for prospective Sydney and other New South Wales students.

The Canberra office will offer a course information centre for prospective students, secretarial support for staff visiting Canberra and an office for the consultancy activities of the Centre for Technology and Social Change (TASC) which operates from the University's Illawarra Technology Corporation.
ANZAAS conference to be held at the University of Wollongong in 1991 to focus on 'Illawarra Innovations'

The Australian and New Zealand Association for the Advancement of Science (ANZAAS) will hold its first conference to concentrate on the research activities of a specific institution at the University of Wollongong on February 11 and 12 next year. The first day will be for ANZAAS members and other interested persons while the second day has been reserved for high school science students.

The conference, held in conjunction with the University, will be called 'Illawarra Innovations'. It will focus on some major research and development activities of the University and local industry. The idea for the conference arose after the Director of the University's Resources Division, Professor Howard Worner, gave a paper on microwave technology at a conference attended by executives of ANZAAS. It was established that the amount of leading edge and innovative research being undertaken in the Illawarra warranted a special joint conference with ANZAAS.

Dr D J O'Connor, the Executive Director of ANZAAS, said that the association had adopted the policy of holding short conferences at regional centres in conjunction with local educational institutions and industries. "Because of its own development and status, and the importance of the Illawarra region to the industrial and commercial development of NSW, the University of Wollongong is uniquely placed to host such a conference," he said.

For more information contact Brenda Weeks, Conference Co-ordinator, University of Wollongong, telephone (042) 27 0945.
Pre-dating Australian occupation

GEOGRAPHERS IN ‘NATURE’

STATE-of-the-art thermoluminescence dating techniques have been used by Richard Roberts, of the University of Wollongong, and Rhys Jones and Mike Smith of the Australian National University, to age sand grains in the oldest known sandstone human shelter in Australia.

The Minister for the Arts, Sport, the Environment, Tourism and Territories, Mrs Ros Kelly, said the rockshelter was one of Australia’s most exciting archaeological discoveries. Confirmed at 50,000 years old, it is in the Kakadu area.

Research results published in the prestigious scientific journal Nature show that people lived at Malakunanja, a campsite at the base of the Arnhemland escarpment, at least 50,000 years ago and maybe even 60,000 years ago. Mrs Kelly said, ‘This discovery has created a new benchmark for dating the arrival of people on the Australian continent.’

Previously, the oldest known age for human occupation in Australia was dated at 35,000 to 38,000 years, in sites in southwestern New South Wales and Western Australia. Commented Mrs Kelly, ‘Significantly, this newest discovery was made in an area which has been recognised internationally as one of the most important archaeological regions in Australia.’

Human artefacts such as stone tools and grindstones were first discovered at the Malakunanja site in the early 1970s and charcoal within the sandy rockshelter deposits were aged between 18,000 and 20,000 years old. Perplexing questions remained, however, about the age of stone artefacts which were found deeper in the sandy soil, but where charcoal was missing. Since charcoal was absent, conventional C14 radiocarbon dating could not be used to determine the age of the older artefacts.

Thanks to Richard Roberts, Rhys Jones and Mike Smith, it was possible to age sand grains from the lower sandy deposits, using the latest thermoluminescence dating techniques.

The Minister said she was pleased that such a significant finding was a true collaborative effort among researchers, supported by the traditional owners of Kakadu National Park, the Australian National Parks and Wildlife Service, the Office of the Supervising Scientist and Pan Continental Mines Pty Ltd.

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GLEN MOORE WINS ETHEL HAYTON AWARD

MANY alumni might by now be aware, because of the publicity generated, that Mr Glen Moore, lecturer in the Department of Physics, was this year winner of the Ethel Hayton Award, presented by the Friends of the University for major work between the University and the community. The award was made for his remarkable feat in establishing the Science Centre, of which he is the Director, at Campus East. The story goes like this.

Early in 1989, the Faculty of Science embarked on an ambitious program to build an interactive Science Centre. The University allocated 700 square metres of floor space in a Nissen hut at the newly acquired Campus East, a former Fairy Meadow migrant hostel, together with a $30,000 Challenge Grant to develop Stage 1 of the Centre.

Challenge it certainly was, for not only did the building require much more than that to bring it to a condition where the exhibits could be housed, but that sum made no contribution to the cost of the exhibits which are the raison d'être for the Centre. That it was possible in July 1989 to invite Barry Jones, the then Minister for Science, to open the Centre officially is a remarkable tribute to the dedicated effort of Glen Moore.

It would not have been possible if Glen had not already built strong support within the community for his concept of an interactive Science Centre. This support is now manifest in a centre which contains working exhibits whose commercial value exceeds $500,000, installed in a stimulating environment - a centre which is attracting 2,500 visitors, each month.

More than 50 companies and many more individuals have contributed to this remarkable achievement. It is certainly a very direct measure of community involvement in a project initiated by the University. There are other continuing aspects of community involvement in this project from which additional benefits are expected to flow.

Both locally and nationally the number of students enrolling in science courses is well below the number required to provide for the needs of Australia if the country is to maintain, let alone improve, its relative standing as a developed economy. To attract more students to science we have to excite the curiosity of children about the whys and hows of many everyday applications of scientific principles. It is to meet this need that interactive science centres were conceived.

The Ethel Hayton Award was presented to Glen Moore by the Chancellor, The Hon. R M Hope, AC CMG QC, on University Day in May. The Occasional Address was given by Clem Lloyd, Foundation Professor of the Graduate School of Journalism, who chose as his theme Elections, Politicians and Journalists.

The following staff members received acknowledgement for 25 years of service: Associate Professor David Anderson, Faculty of Education, Dr Jim Campbell, Department of Biology, Ms Jane Cook, Faculty of Education, Kenneth McLean, retired Associate Professor, Department of Electrical Engineering and Associate Professor Colm Kiernan, Department of History and Politics (who qualified for the Award in 1989).

National Centre for Research Policy

THE FEDERAL GOVERNMENT has announced the establishment of a National Centre for Research Policy, to be headed by Professors Stephen Hill and Ron Johnston at the University of Wollongong.

To be funded initially at the level of $1.2 million over three years, the Centre aims to support more effectively and manage the national research effort.

It will focus on ways of strengthening Australia's considerable research capabilities and making Australia more economically competitive, while safeguarding and strengthening environmental and social resources.

The Centre will determine the direction Australia should take in developing research, technology and education strategies in order to achieve the goal of becoming a 'clever country'.
Illustrious graduate addresses Union 25th Annual Dinner

T HIS year is certainly one for the University Union to celebrate. Not only is it the 25th anniversary of the opening of Stage 1 of the Union Building (since when stages 2 to 5 have been built and Stage 6 is currently under construction), but on August 31 the Union also held its 25th Annual Dinner. Always a popular event, the dinner was a gala occasion, with festive balloons and a huge anniversary cake. The band Cassy and the Bossabats provided excellent music throughout. The dance floor was packed. A highlight of the evening was the address by one of the University's best-known graduates, Dr Karl Kruszelnicki. After receiving his primary and secondary education in Wollongong, Karl studied science in the late 1960s at the then Wollongong University College. He later completed a Master of Biomedical Engineering at the University of New South Wales and a Bachelor of Medicine and Bachelor of Surgery at the University of Sydney.

Karl has worked in a variety of fields ranging from film maker, car mechanic, road manager and taxi driver to scientific officer, physicist and doctor. In recent years he has become a well-known media personality, appearing regularly on television and radio. He has written and presented the ABC radio program 'Great Moments in Science'. He also presented the opening television series 'Quantum', on the ABC. He has written several books and is a regular monthly columnist and reporter, and is also an inveterate traveller, covering 12,000 kilometres of outback country with his family in 1989.

Karl has the ability to make the fantastic ordinary and the complex understandable and those present at the 25th dinner were delighted. It is with great pride that we remember Karl's roots in Wollongong. It is with great joy that we welcome him back home whenever he visits.

Nony Salasoo

Mr Nony Salasoo, a former lecturer in the Department of Metallurgy (now Materials Engineering) passed away on 19 August 1990 after a long illness.

Nony was born in Estonia in 1928, and came to Australia as a refugee from war-torn Europe in the first wave of post-war immigrants. He became an active member of Australia's Estonian community, supporting the preservation of the Estonian heritage and culture in Australia. Ill-health forced Nony to retire early in 1986. In his long period of association he made many friends within the University and in industry. He is very fondly remembered by Engineering graduates as a popular and dedicated teacher. The University extends its sympathy to Nony's family and loved ones.

UNIVERSITY OF WOLLONGONG
MEMENTOS

The following items may be ordered by completing the form below and returning it with your cheque or money order to:
The Alumni Officer, University of Wollongong,
PO Box 1144, WOLLONGONG NSW 2500

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
<th>Cost</th>
</tr>
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<tbody>
<tr>
<td>Tie (navy blue)</td>
<td>17.00</td>
<td></td>
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<tr>
<td>Scarf (navy blue)</td>
<td>25.00</td>
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<tr>
<td>Wall plaque* (15 x 18 cms - Coat of Arms mounted on varnished wood)</td>
<td>40.00</td>
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<tr>
<td>University Video* (13 minutes - VHS or PAL or other formats upon request)</td>
<td>18.50</td>
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<tr>
<td>Bookmark (leather)</td>
<td>4.00</td>
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<tr>
<td>Poster: aerial view of University</td>
<td>3.50</td>
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<tr>
<td>Beer glass*</td>
<td>5.00</td>
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<tr>
<td>Lapel badge</td>
<td>3.50</td>
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<tr>
<td>Teaspoons: gold- or silver-plated (specify)</td>
<td>4.00</td>
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<tr>
<td>Key ring</td>
<td>6.00</td>
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<tr>
<td>Sticker with University Crest</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>T-shirt: Royal blue/navy/black/white*</td>
<td>11.00</td>
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</tr>
<tr>
<td>Polo shirt: Navy/sky blue/red/white*</td>
<td>26.00</td>
<td></td>
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<tr>
<td>Sweatshirts: Royal blue/turquoise/pink/white/lemon/apricot/black*</td>
<td>26.00</td>
<td></td>
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</table>

Please specify size

Total: A$......

NB Postage and packaging is included, but for those items marked with an asterisk (*) please add A$5.00 for overseas orders.

I enclose my cheque/money order payable (or if overseas, bank draft drawn on an Australian bank) to 'The University of Wollongong' for A$...... for the items indicated above.

Signature

Address

Postcode Country

Telephone: Work Home