

MONTAGE

NEWS FROM THE CAMPUSES OF MONASH UNIVERSITY

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June 1992

SAVANT

**Losing sight
of sexism in
the sex forest**



RESEARCH

**More Hoover
than Victa:
the dugong**



FEATURE

**Starting over
in our foreign
country**



Forest fires illuminate the past

Specks of prehistoric pollen and charcoal embedded in the ocean floor off the Great Barrier Reef may rewrite Australia's prehistory.

The surprise discovery of an abrupt change in the fossil pollen record around 140,000 years ago has probably pushed back the time of human colonisation of Australia by as much as 80,000 years.

Dr Peter Kershaw, of the Department of Geography and Environmental Science, believes he has found signs of human disturbance in rainforest pollen patterns in a drill core from the edge of the continental shelf, 80 kilometres east of Cairns.

These signs are the mark of fire on the landscape. Dr Kershaw, one of Australia's leading experts in palynology (the study of fossil pollen) says the environmental changes are evidence that humans were deliberately firing the rainforest.

If he is correct, the known period of human habitation of the Australasian landmass would be more than doubled. The earliest radiocarbon dating of an Aboriginal site in mainland Australia is 40,000 years old. Using thermoluminescence dating, a Kakadu site has been dated between 55 and 60,000 years.

The core, which covers the past 1.5 million years, indicates that around 140,000 years ago a drier type of tropical rainforest in north-east Queensland, dominated by fire sensitive conifers, was subjected to a sustained increase in fire frequency.

Until then Australia's northern rainforests had slumbered in a virtually unchanging seasonal cycle for more than a million years. But around 140,000 years ago the fossil pollen record shows a pronounced and durable shift.

Importantly, Dr Kershaw says the observed patterns of change in fossil pollen, fern spores and charcoal in the drill core cannot easily be explained by climate change. "There is no indication from the global record that the pattern of climate change with the past 150,000 years was any different from that of the preceeding 500,000 years," he said.

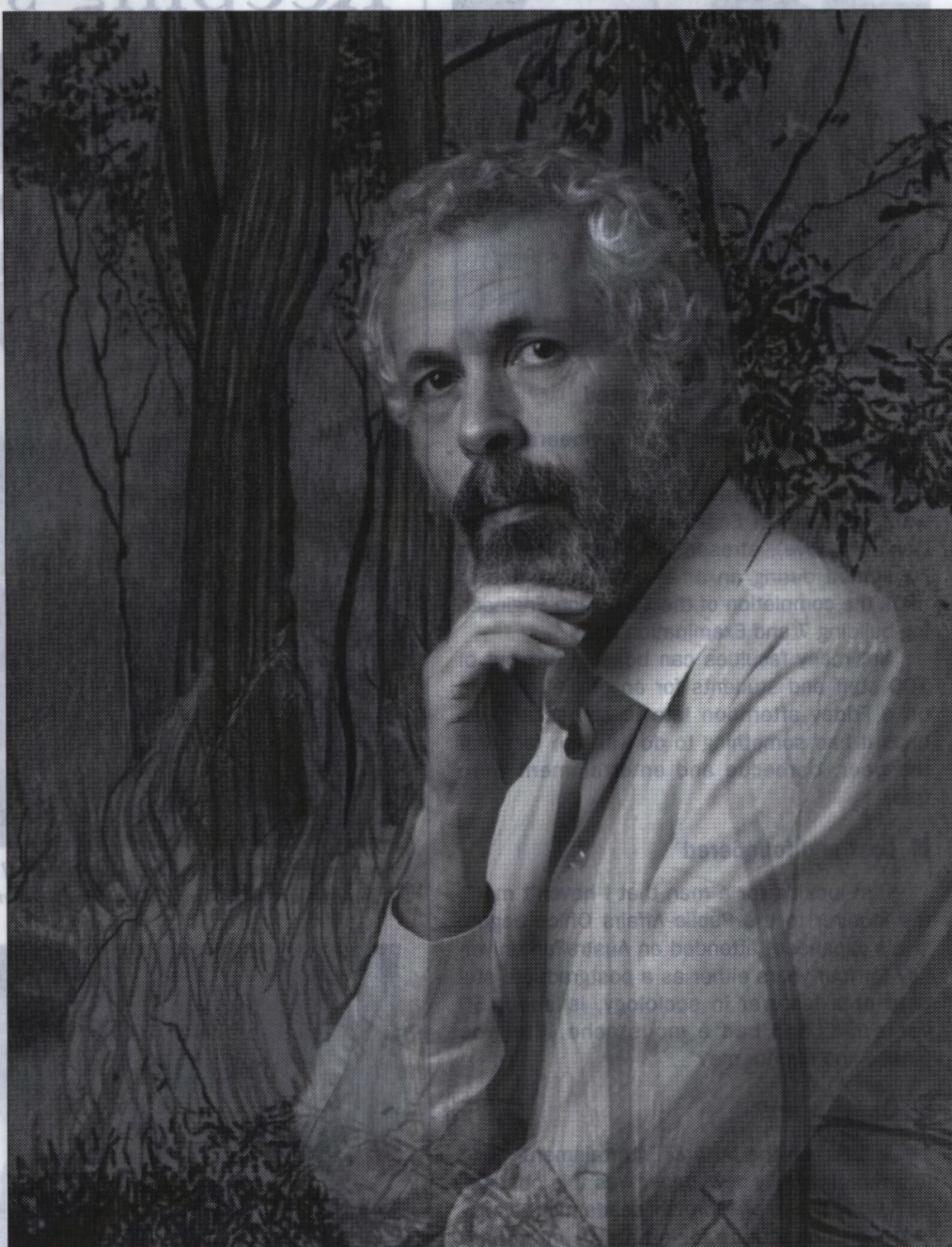
An analysis of the core shows that at some time between 150,000 and 100,000 years ago there was a dramatic decline in Araucarian conifers like hoop pine and bunya pine, that had dominated extensive drier rainforests within the region. Today, these species are limited to small pockets of rainforest within north-eastern Australia.

"The change corresponds with increases in charcoal particles and eucalypt pollen," Dr Kershaw said. "This suggests that increased burning caused the replacement of the drier rainforests by open woodlands."

Later Aborigines are known to have used fire to create such habitats, suited to their preferred game species - kangaroos and wallabies. Dr Kershaw, who believes that the first forest fires were probably accidental, speculates that this practice could have evolved over time. "You don't have to do much to Australia to set it alight," Dr Kershaw said.

The drill core also shows at the same time a pronounced increase in mangrove pollen, consistent with large volumes of sediment being swept down from the coastal ranges as they were exposed to erosion. These sediments would have created a favourable environment for the expansion of coastal mangroves.

Dr Kershaw says the increase in charcoal and decline of conifer pollen most likely began around the height of an ice age 140,000 years ago. "Ice ages produce drier climates, which would tend to in-



Dr Peter Kershaw: the patterns of change cannot easily be explained by climate change.

crease the frequency of fire, but they also cause a dramatic drop in global sea levels," he said.

"Falling sea levels would have exposed land bridges by which early humans in south-east Asia could have reached Australia by crossing only a few, relatively narrow deep water gaps between Indonesia and the Australia-New Guinea land mass.

"Really, there is no evidence in any other continent of this type of sustained environmental transition as response to climate. The Australian record is unique.

"I think it's all fitting together. And the fact that these changes start down on the coast fits in with ideas about Australia being colonised first along its coastal regions." See page 6 for more details.

Illustration: PETER BARTELT Picture: RHONDA JOYCE

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Arts and minds

THE SPIKE



■ Conspicuously consummated

There's no denying that engineers like a party.

Two thousand sausages and 40 gallons of what the Dean of Engineering, Professor Peter Darvall (above), stresses was *light* beer were consumed during an afternoon celebration to mark the completion of the \$6 million Engineering building 7 and Examination Halls.

Not many faculties can boast a turn-out of 700 staff and students for an official function on a Friday afternoon late in semester. Perhaps it had something to do with the fact that the beer, barbecue and entertainment were free.

■ Lost and foundered

"I'm looking for a man that I haven't met", the inquirer to the Public Affairs Office began. "He's Japanese, attended an Australian university for four years either as a postgraduate student or a lecturer in sociology, is about 50 years old, and had a moustache. Can you please find him for me?"

■ But is it art?

Spotted on the 'Arts & Entertainment' page in a morning daily newspaper was this observation from a senior Monash academic: "It provides an opportunity for artists to interrelate with literary figures in a manner that is not provided by the normal concept of a book."

Now, was the topic art or entertainment?

■ All smoked out

Does anyone want to be in the shoes of the lone smoker who caused the evacuation of the entire Union Building at Clayton campus a few weeks ago? The Union is a smoke free zone.

NOW & THEN

25 YEARS AGO

More than 15,000 people visited Monash's first Open Day on 25 June.

An estimated 4000 cars squeezed into the Clayton campus grounds, and the *Monash Reporter* commented that the scramble for information resembled a Myer's sale.

15 YEARS AGO

Extraordinary growth in the number of mature age students entering universities and colleges, prompted a study by the Higher Education Advisory and Research Unit. In 1970, 5.5 per cent of new students were over 25 years of age; by 1976, this figure had risen to 13.5 per cent.

5 YEARS AGO

Zoology students fitted radio transmitters to 10 Phillip Island fairy penguins with to find out whether they had adequate food supplies. The project, funded by the State Government's Penguin Protection program, was set up after autopsies revealed that large numbers of penguins washed ashore in 1984 had died of starvation.

THIS MONTH LAST YEAR

Almost 30,000 eligible applicants failed to gain a place at higher education institutions in 1991, according to a survey by the Australian Vice-Chancellors' Committee (AVCC). This represented an increase of 40 per cent compared to 1990. In Victoria, 18 per cent missed out.

Keeping study in the family



Four generations of the Burke family circa 1992. Back row (from left) are Sophie, Antony and Paul. Seated (from left) are Nina McCarthy (holding three-week-old Julien), Anna, their mother Joan and grandmother Nina Millman.



Ian Rutherford and Wendy Crock (nee Rutherford) have more in common than being brother and sister. At a Monash graduation ceremony recently, Ian was awarded his PhD for his work on the channel form and stability in the River Murray, while Wendy completed her PhD on the reproductive biology of native orchids.

Photo: REMBRANDT'S CAMERA

Graduating from university is quite an achievement. But to have five members of one family graduate from the same university is extraordinary.

When Mr Paul Burke, of Ashwood, graduated from last month, he was the fifth member of his family to be awarded a Monash degree.

Mr Burke, who graduated with a Bachelor of Arts in sociology, was beaten to the chancellorial handshake by siblings Nina (Bachelor of Science, 1984), Anna (Bachelor of Arts, 1988), Sophie (Bachelor of Arts, 1991) and Antony (Bachelor of Arts, 1987).

"It has just turned out that we all studied at Monash, and obviously it's a record we are quite proud of," elder brother Antony said.

Postgraduate education appears to run in the family as well. At Monash, Paul is continuing his studies with a Masters in Social Theory and Sophie is undertaking a Diploma in Archives and Records Management. Anna is studying for a Masters in Industrial Relations at Melbourne University, and Nina, a Graduate Diploma in Occupational Hazard Management at Ballarat University College.

Their mother Joan, a primary school teacher, completed a Graduate Diploma in Teacher Librarianship from Melbourne State College in 1981.

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Switchboard team makes right connections



These are the faces belonging to those familiar voices from the Clayton campus switchboard.

The five switchboard operators direct and connect the business and private telephone calls for more than 3000 academic and general staff at Clayton every day. During peak times, this amounts to about 25 calls every minute – or 1500 calls an hour.

Senior telephonist Mrs Jean Lobb says “the operators hold the attitude that if you treat callers nicely, they’ll be courteous in return”. She says com-

plaints and abusive callers are very rare, but strange requests (that must be treated seriously) are common. The most disconcerting part of the job is during examinations, when bomb threats are frequent.

In recent years the switch-board has been entirely computerised. When a call comes in, the operator has only to type the name of the person required, and the full name, title, location and extension of that person will appear on the operator’s screen.

Clayton campus switchboard operators (from left) Mrs Pam Casey, Miss Deb Chappel, Mrs Lobb, Mrs Helen Smith and Mrs Jan Dunlop.

Uni research review affirms expert input

Research decisions should be made as much as possible by those involved in particular projects, a wide-ranging internal policy review has found.

“The role of research administration should be to provide the environment in which efforts of researchers can flourish,” the report of the Research Review Committee into the policy structure and administration of research at Monash said.

“Research administration should not be designed to manage, to control or to direct the research efforts of the staff who are employed, wholly or partly, to do research in the university.

“Decisions affecting individual researchers and research teams should be made as close as possible to the research by those who understand the research area and who know the capabilities of the people involved.”

University Council last month accepted the report of the eight-member committee, which recommended that a full-time deputy vice chancellor be appointed to oversee research at Monash. The committee, chaired by Professor Louis Waller, was set up in July last year in response to academic staff concerns about research management, and departmental and research funding.

“Within the constraints of limited resources, the research administration of the university will be judged as successful to the extent that it supports the efforts of researchers, enables the provision of resources and the environment that facilitates successful research,” the report said.

“We specifically reject any model of research administration that places a research ‘manager’ in a position of authority over those charged with the responsibility of carrying out research. Such management models are not seen as appropriate to the climate of free intellectual enquiry that characterises a great university.”

While asserting the “basic principle” of decision-making by those close to the research, the report said that, in practice, these decisions would be made at the faculty, department or centre level. “The role of central research administration should not be to make, or to influence those decisions, but to facilitate their making and their execution,” it said.

A central structure was needed to meet research requirements that went beyond those that could be met within faculties or departments and to determine questions of policy that affected the university as a whole.

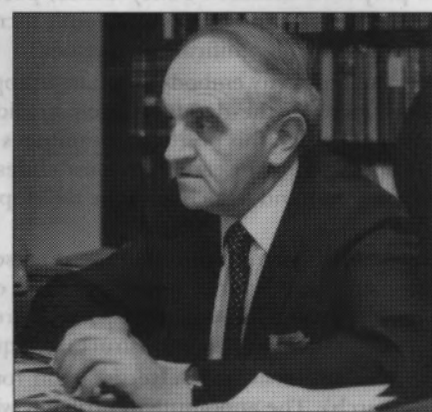
“In particular, such a structure would be concerned with maximising the resources available within the university to the faculties for research, with achieving a fair and equitable allocation of those resources, and with increasing the level of support obtained by Monash researchers from sources outside the university,” the report said.

“Efforts to achieve these three aims simultaneously clearly have the potential to lead to stress and conflict within the university, and it is another important role of research administration to provide a forum for the resolution of such conflict. Such a forum, if it is to be successful, must demonstrate by its actions that it values quality research in all fields of knowledge that fall within the university’s range of activities.”

The committee sought submissions from inside and outside the university. Twenty-eight universities responded to a survey of how research was managed in other institutions.

One hundred submissions were received from academic staff, student associations and general staff involved in research administration. Specific information about research management was sought from the deans and associate deans (research) of the faculties.

Continued overleaf.



Professor Louis Waller.



Photo: RHONDA JOYCE

Animal technician, Ms Jo Brown, holds the goose in question.

Take a good gander at this limping goose

Drivers, visitors and wildlife lovers will be familiar with the limping goose in the Jackson Memorial Park.

Her ungainly step, grazing in the hectares of parkland on the Clayton campus, has caused so much interruption to the Animal Services unit with concerned phonecalls, that animal technician Mr Cris Bustow decided to settle the matter once and for all.

With a fistful of food in one hand, the determined tech spent two weeks in his own time coaxing the bird, catching her, freeing her from the clutches of her protective monogamous mate and taking her back to the centre for investigation.

After close examination, Director of the Animal Sciences Centre, vet Dr Tony James, found that the limp resulted from a previous broken leg, probably caused by a fox attack.

Since then the break has healed and knitted so well that resetting just above the hock (a goose’s ankle) would

only cause the bird more pain. As it is, a goose spends only 20 per cent of its time grazing on dry land, making a stressful operation harder to justify.

The three geese that live on the lake are for decorative purposes. The Animal Centre houses two other geese, which are used for blood donations to the medical faculties for research into viruses.

This pair live in close-to-natural surroundings, which the technicians hope will encourage the hatching of the centre’s first goslings in the Spring.

The Animal Sciences Centre breeds animals for research in the faculties of medicine and science. Dr James said the animals were well looked after by the centre’s 19 animal technicians. Other animals bred at the centre include mice, rats, rabbits, guinea pigs, poultry, dogs, cats and sheep.

Faculty to be reorganised

The Faculty of Professional Studies will not exist in its present form from the end of 1993.

The Vice-Chancellor, Professor Mal Logan, has outlined a proposal to the Academic Board in which departments and schools in the faculty will be relocated. All existing departments, schools and programs would be maintained, he said.

He said the Caroline Chisholm School of Nursing probably would become a School of the Faculty of Medicine following the integration of the Gippsland schools into the university's faculty arrangements. The Department of Applied Psychology may also move as a result of the current review of psychology.

"The Faculty of Professional Studies will continue until 1 January 1994, allowing about 18 months for extensive consultation," Professor Logan said. "Professor Richard Snedden will remain as Dean until then."

"It should be noted that this leaves open the possibility of a reconstituted Faculty of Professional Studies or School of Professional Studies being developed at a future date."

Professor Snedden, in conjunction with other senior members of the university, would be responsible for the reorganisation of the faculty's schools and departments. Professor Snedden would continue as a member of the university's senior management.

A review of the teaching of art and design already is under way. The review committee will make recommendations about the future location and organisation of the School of Art and Design, presently a part of Professional Studies, and the School of Visual Arts at Monash University College Gippsland.

The community services area – which covers the departments of Social Work, Welfare Studies and Police Studies – would be reviewed in the second half of this year.

The place of librarianship will be examined early next year. This review would assess the Graduate Department of Librarianship, Archives and Records and its relationship to other related units within the university.

Computer network links campuses at speed of light

State-of-the-art computer technology being installed by the Monash Computer Centre will allow high-speed networking between university departments and campuses.

Twenty-five per cent of Monash departments on all campuses – including hospitals and medical centres – already are connected to the Ethernet computer network, which will rationalise computer services and allow faster communication. By the end of the year, the Computer Centre says that 60 per cent of departments will be using the network.

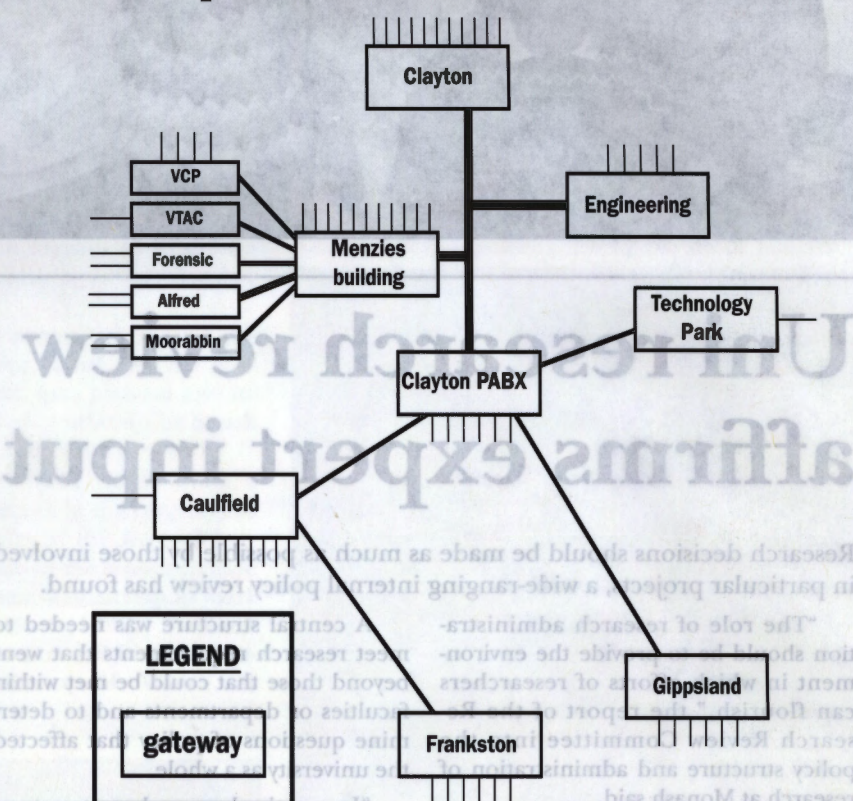
Most buildings on Clayton campus have already been connected to each other by optical fibres that allow high-speed data transfer while maintaining electrical isolation, which reduces the risk of lightening or storm damage. The Computer Centre has allocated funds to install one network point in every department, with each faculty required to fund additional points to link into the network.

The centre's maintenance engineering manager, Mr Bruce Seaman, said the networking facilities would mean departments could rationalise computer resources and communicate with each other instantly. Networking computers through the Ethernet program would increase inter-campus capacity, he said.

Other benefits are that:

- the network can make some of the library's services accessible to individual workstations. The library catalogue is already available and soon some of its CD-ROM databases also will be accessible.
- by loading software onto a network file server, individual copies of the software no longer have to be purchased for each workstation. The number of licences may be reduced to the maximum number of simultaneous users of that software. As well as cost savings, the amount of disk storage required by each department, and the time spent installing, maintaining and upgrading software is reduced.

The Monash computer network



Supplied by John Mann, Computer Centre

- sharing expensive peripherals, such as printers, is made easier through networking
 - using the network-based facilities of electronic mail, electronic news, fast file transfer and file sharing, internal communication over several campuses can be improved
- Microwave links between Clayton, Frankston and Caulfield campuses will also be introduced as part of the Computer Centre's up-grading of computer facilities. The existing links between Clayton, Caulfield and Frankston campuses are lines leased from Telecom.

These will be replaced by fibre optic cables.

Monash is also connected to other universities and research organisations through the Australian Academic and Research Network (AARNet) which, in turn, is connected to a similar networks overseas. These networks provide access to more than 40,000 host computer systems within Australia and 700,000 around the world.

AARNet is funded directly by the AVCC member universities, ARC and CSIRO, so there are no service charges to individual researchers or departments using this resource.

Research Deputy V-C to seek more funding

From previous page

The committee's main recommendations are that:

- a full-time deputy vice-chancellor (research) be appointed. This position, reporting directly to the vice-chancellor, should have the same status as the deputy vice-chancellor position, advertised in January;
- the deputy vice-chancellor (research) chair a research committee consisting of associate deans (research) from each faculty, nominated by faculty boards, and one representative from the Monash Postgraduate Association. The proposed committee will be a standing committee of Academic board;
- one of the first tasks of the deputy vice-chancellor (research) would be to attract funds from Commonwealth government sources to promote the participation in research activities of those staff members who have not previously had the opportunity;
- faculties take positive steps to provide relief from teaching, on a competitive basis, for staff members requiring time to pursue research;
- recently established faculties seek out and invite outstanding international scholars to visit them;
- outside studies program regulations be revised to allow staff members to use the program for study towards higher degrees;

- the Monash Research Fund be reintroduced with funds at least at its previous level;
- small grants and research travel grants be made available by the university, and access via electronic media to library materials on different campuses be increased.
- collaboration with CSIRO be continued, but its conditions be monitored by a proposed Research Policy Office, postgraduate grants-in-aid for conference travel be continued and significantly increased, and the research travel fund be continued and significantly increased;
- the university embody its strategic approach to research in the proposed appointment of the deputy vice-chancellor (research) and in the proposed liaisons between this position, committees and faculties, and each faculty address its approach to research responsibilities and its research management plant, bearing in mind principles to be developed by the proposed Research Committee;
- Monash attempt to gain more representation on ARC panels, devote funds – with specific reference to the purchase of large equipment – to the dollar-for-dollar matching of ARC grants, and address as a matter of urgency its policy approach to meeting the infrastructure requirements of its research activities.

The university will advertise soon for a permanent deputy vice-chancellor (research). The appointment probably will be made from early in 1993.

Medical students dispense with lessons

Third year medical students from Monash are mixing theory with practice as part of their new course curriculum.

Last month, 160 students visited pharmacies for practical, hands-on experience for their clinical and community skills training unit. The students spent a half a day in pharmacies to observe how different medication was used, to familiarise themselves with over-the-counter drugs and carry out case studies.

Senior Community Medicine lecturer at Moorabbin, Dr Michael Kidd, said the practical component of the course provided students with valuable experience. "The pharmacy visits allow students to receive as much practical experience as possible and gives them a much stronger knowledge base to work with," he said.

"The visits are common for all first, second and third year medical students, who also undertake clinical contact visits and case study projects as part of the practical training for their course."

Dr Kidd said changes to the course structure to integrate the theory and practical components had given the course more balance.

"It makes sense to combine theory with practical," he said. "When students are learning about the anatomy of the heart, for example, to complement that learning and understanding, they are then given practical training in clinical settings."

The Department of Community Medicine and the Victorian College of Pharmacy (Monash University) are working together closely to ensure the practical elements of the course are emphasised.

"We are both working towards the common goal of ensuring that students receive the best possible training and are given every chance to gain practical experience," said Dr Kidd.



Third year medical students Ms Kate Martin and Mr Mark Alter at the Union Pharmacy.



In the ESR laboratory are (from left) Dr Don Hutton, Mr John Finch, Mrs Gillian Finch Inskeep and Dr Gordon Troup.

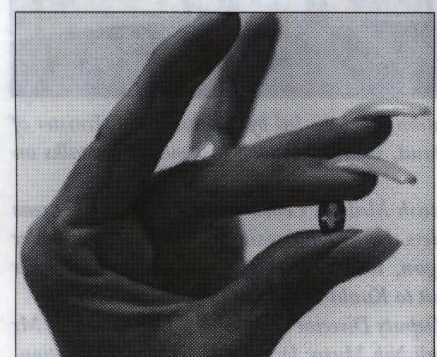
No stone left unturned...

A US gem dealer has travelled to Monash in search of the answer to a gemmological poser: does she own a rare, natural sapphire or just a common, synthetic stone?

Mrs Gillian Finch Inskeep, of Lanka Gems in California, has enlisted the aid of Drs Gordon Troup and Don Hutton, world experts in identifying synthetic stones using electron spin resonance (ESR) spectroscopy.

Her visit to the Physics department last month may be her last chance to prove that a five-carat *paparadscha* ('lotus blossom') sapphire she bought in Sri Lanka nine years ago for more than \$30,000 is the real thing.

The stone was originally certified as genuine by the Gemmological Institute of America (GIA). On later presentation, it was declared synthetic: the GIA refused to accept that it was the same stone. Other commercial gem laboratories have since declared the stone natural - but to no avail.



The stone in question, held by its owner.

To sell the stone in the US, Mrs Inskeep needs the GIA stamp of approval. This is now unlikely because she recently won a damages claim against the institute over its statement that there had been two stones. Mrs Inskeep's reputation as a gem dealer was left intact.

However, this still leaves the identity of the stone in question and that's where Drs Troup and Hutton come in. ESR is useful in cases such as this one, where traditional examination by microscope may prove inconclusive.

Dr Troup met Mrs Inskeep last year at a GIA international symposium, where he was first asked if the ESR technique could be used to tell natural and synthetic *padparadscha* sapphires apart.

Subsequent tests, reported in *Research Monash* in April, confirmed that the method could be used to identify the natural gemstones by the irregularities in their crystal structure, or by detecting the 'fingerprint' of other elements in the crystal.

And the results? Unfortunately, Dr Troup says, that has to wait until they are published in a forthcoming scientific journal article. In the meantime, Mrs Inskeep has given more than \$2000 worth of sapphires, garnets and zircons to the department for its continuing ESR research.

Increase external VCE English testing: review

The only way to raise community confidence in VCE English was to raise the level of external assessment to 50 per cent, a Monash report has recommended.

The university's VCE English task force, while largely supporting the VCE curriculum, found significant community concerns about its assessment methods.

"While it may be the case that some of these concerns grow out of a less than full understanding of what is involved, the task force found that some of the concerns were well founded," its report to the Vice-Chancellor, Professor Mal Logan, said.

"Broad public confidence in VCE English and in appropriate university admission procedures is essential. There is a need to guarantee that all areas of English study are subject to external processes of standards maintenance."

"We do not mean a reversion to the limited value pen and paper tests of the 1950s, especially the comprehension and 'clear thinking' style of test mooted in some quarters. We would want to avoid the kind of test where students have to respond to an unseen piece of text of subject matters they have not studied and where they lack adequate context and background."

The Victorian Curriculum and Assessment Board (VCAB) has set up a working party on VCE English in response to pressure from Melbourne University for a review of English assessment.

Melbourne, which has called for a rise in external assessment from 25 per cent to 50 per cent, has threatened to hold its own entrance tests, and wants the board to drop the oral common assessment task.

The Monash submission recommends changes to three of the four VCE English common assessment tasks. It says:

- the oral task should remain in place, but be subject to external verification procedures;
- parts of the presentation of an issue task should be supervised and a large random sample be assessed by markers other than the teacher;

- the study of texts task should present fewer text choices, incorporate 'easier' texts for classroom introduction and assessment, and introduce an additional writing task on two studied texts.

The task force said that VCE English was perceived by many as a substantial improvement in the teaching of English and that the university was reassured by the widespread support for the curriculum.

"Within the English departments at Monash among first year tutors there is a consensus of opinion that, if there has been any discernible change in the performance of students, it has been in the direction of improvement," the report said.

Applauded

Course components emphasising the development of higher order reading, writing, oral language and information processing skills were to be applauded and retained.

It noted that the position taken by some universities on VCE English were at odds with the attitudes of their English departments. However, it said these positions were supported widely in "certain other departments of those universities".

On admission procedures, it acknowledged the potentially inflationary nature of grades, given the vastly increased number of candidates attempting the VCE.

It recommended a grade average of 'C' or better in English was a suitable indicator of a desirable level of language competence for the demands of higher education.

The task force comprised Professor Leo West, Professor Robert Pargetter, Professor Ian Rae, Ms Margaret Gill, Dr Heather Scutter, and Mr Gordon Taylor.

Firing the landscape and the imagination

When did humans first colonise Australia? Many prehistorians now accept that it was about 60,000 years ago, but new evidence may show that the first Australians arrived as much as 80,000 years earlier.

From page 1

Two decades ago, the late Australian National University palaeoecologist Dr Gurdip Singh argued that a transition from fire-sensitive to fire-tolerant vegetation 130,000 years around Lake George, near Canberra, was also caused by humans.

He believed that a pronounced increase in charcoal in sediments from Lake George, accompanied by the replacement of a casuarina-dominated forest by eucalypt forest, resulted from humans firing the forest to create habitat suited to preferred game species, such as kangaroos and wallabies.

His theory was greeted with scepticism, in the absence of any archaeological evidence that humans had been in Australia any longer than about 30,000 years. But in the two decades since then, radiocarbon dating has extended the threshold for human colonisation of Australia back to at least 40,000 years in mainland Australia, and 36,000 for Tasmania.

Some prehistorians believe these radiocarbon dates substantially underestimate the true age of such sites, because they are at the limit of resolution for the technique: even slight contamination by younger carbon can make samples appear thousands of years younger than they really are.

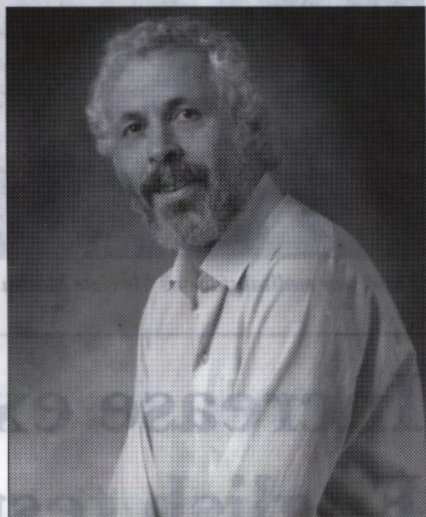
Because carbon dating can be very unreliable beyond about 35,000 years, prehistorians have lacked a way to date Australian sites that, on the evidence of their geological setting, appear to be considerably older.

Using a new application of a new technique called thermoluminescence dating, Australian National University prehistorian Dr Rhys Jones has derived a tentative age of 55 to 60,000 years for human habitation of a rock shelter in Kakadu National Park.

Many prehistorians now accept Dr Kershaw's evidence that a similar change from fire-sensitive rainforest to eucalypt forest which began about 38,000 years ago around Lynch's Crater, on the Atherton Tableland inland from Cairns, was caused by humans deliberately firing conifer-dominated rainforest.

The much earlier date from the off-shore core implies that the change may have taken place gradually. The sample resolution of the core is too coarse to determine the rate of change in coastal environments but it is possible that it occurred over many thousands of years.

The evidence from the more detailed Lynch's Crater record certainly indicates that the replacement of araucarian forest by eucalypt woodland around the site took a long time, about 120,000 years. Why this occurred much later than on the coast could be explained partly by initial inhabitation of coastal areas.



Dr Peter Kershaw

This fits in with many archaeologists' ideas of coastal colonisation. The transition may also have been slowed by the prevalence of generally wet interglacial conditions between about 130,000 and 80,000 years ago.

Dr Kershaw says that the vegetation changed and stabilised in new assemblages, distinctly different from those that had preceded them.

"The original vegetation patterns never returned, and the rainforests of north-eastern Queensland have seen no change of comparable magnitude in the past 100,000 years," he said.

The fossil pollen types and fern spores in the drill core represent only a small, skewed sample of the full spectrum of species that grew in the tropical rainforest. However, once these biases are understood, it is possible to infer the composition of the prehistoric rainforests in which these conifers and ferns grew, using modern assemblages as a guide.

Dr Kershaw says that most rainforest flowering plants are pollinated by animals or insects and tend to have limited dispersal ability. Conifers and ferns, which have wind-blown or water-borne pollen or spores, are over-represented in the drill core because they disperse more widely, finding their way into rivers and streams that drain into the coastal waters of the area.

The drill core, obtained last year by the international Ocean Drilling Program, was analysed by Dr Kershaw and Dr Merna McKenzie, of the Centre for Palynology and Paleoecology, in collaboration with Dr Andrew McMinn of the Institute of Antarctic and Southern Ocean Studies, University of Tasmania.

Mr Frank Peerdeman of the Research School of Earth Sciences at the Australian National University, Canberra, provided age control by tying changes in the composition of marine organisms in the core with the well-documented global marine stratigraphy.

"One reason we went off-shore in the first place was because the pollen record can be reliably dated," Dr Kershaw said.



The Vice-Chancellor, Professor Mal Logan, with PhD student Ms Catherine Morrison and research fellow Dr William Ahlers at the opening of the new ICP-MS facility.

Laser facility installed

A state-of-the-art trace analysis facility for science and industry has been set up by the three major Melbourne universities at Monash.

The Departments of Earth Sciences, Chemistry, Geography and Environmental Science, Chemical Engineering and Materials Engineering at Monash, and the Geology departments at La Trobe and Melbourne universities have contributed to the purchase of a new laser instrument, which will allow new applications of the inductively coupled plasma mass spectrometer (ICP-MS) method.

The laser system, which allows high-sensitivity trace element analysis of solid materials, has been installed in the Victorian Institute of Earth and Planetary Sciences' (VIEPS) Trace Analysis Laboratory in the Earth Sciences department. In conventional ICP-MS analysis, samples are analysed in a water solution.

Laboratory director Dr David Lambert said the instrument would allow the new, rapidly-developing ICP-MS technique to be applied to a wide range of analytical problems; both commercially and in research. The trace analysis laboratory would offer its services to outside users on a commercial basis.

"It can deal with chemical analysis of rocks and minerals, waters, industrial products, environmental and forensic materials," he said. "Indeed, it

is suitable almost any substance which requires cost-effective elemental characterisation."

The instrument can detect traces of 0.1 to 100 parts per billion by weight for many elements by counting ions of samples according to their charge-mass ratios.

"ICP-MS is ideal for analysis of the rare-earth elements, platinum-group elements, and gold in geological and industrial applications," Dr Lambert said, "and elements such as lead and uranium in industrial, environmental and medical monitoring. The technique can also measure isotopic ratios, so it can be used in isotopic tracer studies of geological and environmental processes."

The new instrument is housed in a clean instrument suite that receives HEPA-filtered air. An ultra-clean chemistry suite, funded by the ARC, Earth Sciences and the Science Faculty, has also been set up to carry out preparation of samples.

In addition, a research scholarship – funded by the maker of the laser instrument, VG Elemental – has been established. PhD student Ms Cathy Morrison is investigating the fundamentals of the process and applications in geochemistry and materials science.

Malaysian education group visits



A high-ranking delegation of Malaysian education officials, led by the country's Minister of Education, Datuk Amar Dr Sulaiman Haji Daud, visited Monash last month for talks on links between the two countries.

The 12-person delegation inspected the Monash Medical Centre and other research areas before holding private talks with university leaders. During his visit, the Malaysian minister invited the Vice-Chancellor, Professor Mal Logan, to take part in further talks on higher education joint ventures during a reciprocal visit to Kuala Lumpur later this year.

Pictured during discussions are (from left) Deputy Director of Teachers' Education II, Mr Sri Nusa; Deputy Secretary General I, Tuan Haji Nik Musa; Director-General of Education, Dato' Asiah; the Minister and the Vice-Chancellor.

RESEARCH

MONASH

Preying on passive plants

While literature glorifies the contest between hunter and hunted in the animal world, it hardly ever mentions the timeless contest between another type of predator and a prey that cannot escape.

Dr Clare McArthur has been looking into the subtle defence mechanisms of plants.

Insects and a range of mammalian grazers and browsers prey on plants. And since plants cannot run away, they use other defences against predatory animals.

When you look around, there's no doubt that many plant leaves aren't being eaten. These plants are defending themselves with chemicals. Dr Clare McArthur, a postdoctoral researcher in the Department of Ecology and Evolutionary Biology, is interested in how Australian plants defend themselves against marsupial herbivores, and how the animals cope with the plants' chemical weaponry.

The role of pungent eucalypt oils in deterring leaf-chewing animals is well known, but Dr McArthur has focused on a more subtle group of defensive compounds called tannins, which are abundant in woody plants but not in grasses. Studies of North American placental herbivores have shown that grazing animals cannot cope with high levels of tannins in their diet, but some browsing animals thrive on a high-tannin diet.

Dr McArthur is studying four marsupial plant-eaters: two small members of the kangaroo family – the grazing parma wallaby, *Macropus parma*, and the red-bellied pademelon, *Thylogale billiardieri* – and two leaf-browsing possums – the brushtail, *Trichosurus vulpecula*, and the ringtail possum, *Pseudocheirus peregrinus*.

Her aim is simply to see if Australia's marsupials follow the same pattern as the placental herbivores of North America, in which browsing animals like the moose and deer seem to cope much better with dietary tannins than grazing species.

Dr McArthur says there is still debate over the role of tannins in the leaves of woody species. Some scientists believe that they are no more than passive by-products of photosynthesis,

rather than an active biochemical defence against insects and mammalian browsers.

But tannins are also known to bind to proteins in the diet, making them difficult to digest for insect and mammalian herbivores. Rather than trying to poison ones predators, it may be more efficient to starve them by depriving them of the plant protein they need to construct their own tissues.

Dr McArthur says tannins belong to a class of compounds called phenolics, which are constructed in multiples of a basic hexagonal ring of carbon atoms with an OH (hydroxyl) group attached. Carbon rings are very stable, and require considerable chemical energy to break; this is energy that must be supplied by the animal's digestive enzymes.

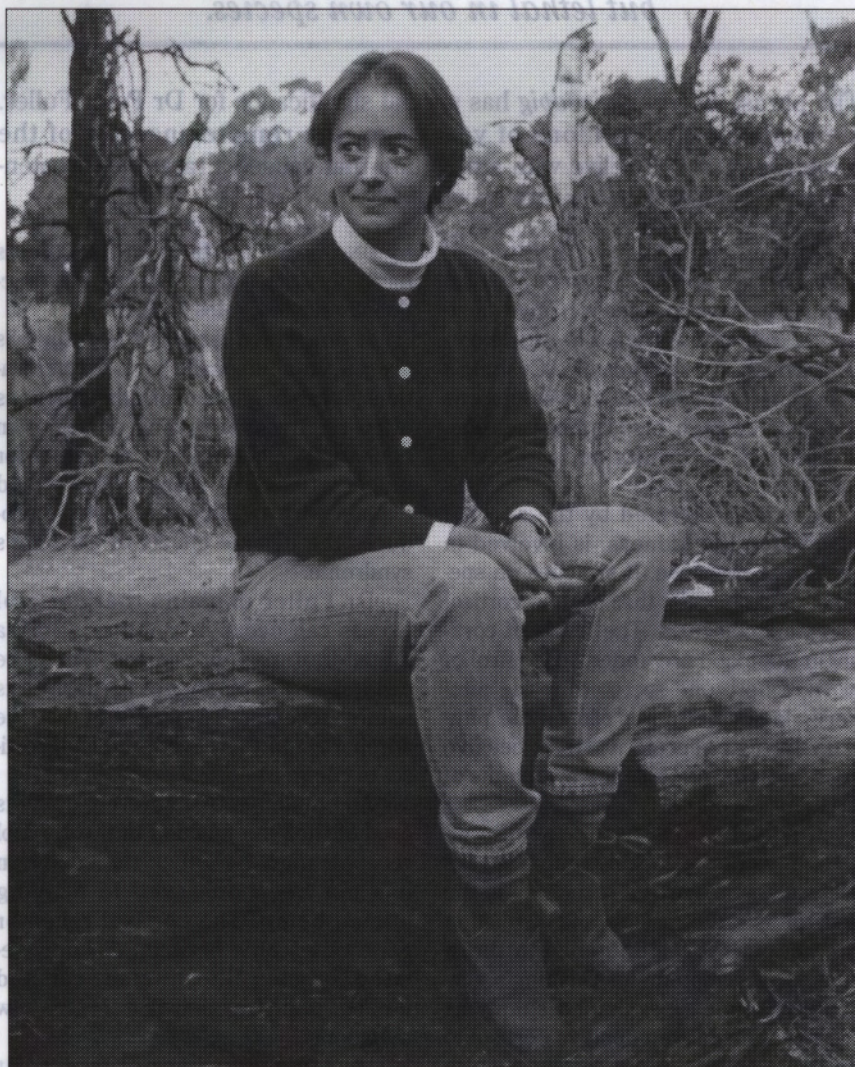
Tannins in the leaves of the domesticated camellia from which tea is made impart the astringent taste of black tea; when milk is added to the tea, the milk proteins bind to the tannins, neutralising the bitter taste. This same protein-binding behaviour operates to the detriment of herbivores trying to extract dietary proteins from tannin-laced leaves.

Scientists have noted that the tannin content of plant leaves varies seasonally: when nitrogen is freely available and the plants are growing rapidly, tannin levels decline; when nitrogen is less abundant in the soil, tannin levels rise. However, this may simply be the plant's way of sequestering carbon that it cannot use, as the ratio of carbon to nitrogen in its tissues increases.

This would support the idea that tannins are passive secondary metabolites, rather than defensive compounds. But if this is the case, Dr McArthur asks, why don't grasses have tannins as well? She finds the second hypothesis more plausible: against certain herbivores, tannins are effective antifeedants, implying that there may have been natural selection for high tannin levels in some plant species.

Dr McArthur tried to place all four marsupial species in the study on a dry standard diet. To this diet, she added measured quantities of a tannin called quebracho, that is derived from the leaves of a South American tree species, *Schinopsis*.

She experienced some problems: while the pademelons, parma wallabies and brushtail possums accepted the dry food, the ringtails proved fussy and would only eat it wet. Wetting the food pellets caused the quebracho tannin to



Dr Clare McArthur: "marsupial digestion... is something of a black box."

oxidise, altering the way it binds proteins. Dr McArthur solved the problem by adding a well known anti-oxidant – vitamin C.

By comparing the level of protein excreted by each species compared with that on a tannin-free diet, Dr McArthur confirmed that like North America's grazing species the parma wallaby and, to a lesser extent, the pademelon don't cope well with dietary tannins.

But in the brushtail and ringtail possums, the quebracho tannin had no effect on their absorption of protein. It was to be expected that browsers like the two possums would be able to cope with the tannins in their leafy diets. The question is: how?

The next step, Dr McArthur says, is to take samples of saliva from all four species and compare them for the presence of salivary proteins that may prevent the tannins binding leaf proteins. These species may be using a similar strategy to North American deer, which produce special proteins in saliva that bind tightly to tannins and prevent them binding to plant proteins.

Dr McArthur says there are other interesting aspects to explore that may throw light on why Australia's marsupial browsers only choose the leaves of certain tree and shrubs species, or often select only younger leaves. If a browser can counteract the tannins in its diet at low cost, perhaps the amount of fibre becomes the most important factor in its selection of particular leaves.

It may be significant, she says, that brushtails and ringtails ferment their food in the hindgut, whereas the parma wallaby and pademelon are foregut fermenters. Maybe the possums degrade the tannin, which has a toxic cost.

"When tannins are broken into smaller phenolic compounds, they no longer bind proteins, but the new compounds can cause tissue damage if they are absorbed," she said. "The trade-off may be that this toxic cost is outweighed by the benefit of getting extra protein."

"I was thinking that this may be the case with Australia's possums and with species like the koala and greater glider, which exclusively eat eucalypt leaves containing very high levels of tannins and other phenolics."

"It would be interesting to look at the wombat, which is a grazing animal with hindgut fermentation. Since I expect that being a grazer is more important than being a hindgut fermenter, I would expect the wombat to be affected by tannins."

"Some insects have high midgut pH level, and they produce surfactants, which have a detergent-like action that prevents tannins binding to proteins. Possums may also be producing surfactants in the hindgut."

"Really, we're just beginning to look at these things. Marsupial digestion in relation to tannins is something of a black box, and we don't know what physiological adaptations have been made to cope with dietary tannins."



The red-bellied pademelon.

Tracking the human guineapig

The key to understanding a rare, life-threatening disease may be locked within the genetic code of the guineapig. Researchers are using recombinant DNA technology to track down a mutation, benign in this common domestic mammal but lethal in our own species.

The phrase *human guineapig* has special significance for Dr Peter Fuller. He suspects that millions of years ago, the remote ancestor of the guineapig learned to live with a mutation that causes a rare, life-threatening genetic disease in our own species.

At the Prince Henry's Institute of Medical Research at Monash Medical Centre, his research team is investigating the role of the steroid hormone cortisol, which in excess causes Cushing's syndrome – a disease with symptoms that include high blood pressure, obesity, spinal deformity and excessive hairiness.

Cortisol, secreted by the adrenal gland atop the kidneys, is involved in the stress response. It switches on specific genes in cells that contain cortisol receptor molecules. The levels of cortisol in the blood are under the control of ACTH, a hormone secreted by the pituitary gland. If a tumor causes the pituitary to over-secrete ACTH, excessive cortisol levels produce the symptoms of Cushing's syndrome.

Cortisol exerts tissue-specific effects. It works by locking onto a special molecule – the cortisol receptor – in the cells of its target tissues and regulating the action of specific genes in those cells. The symptoms of Cushing's syndrome cannot be explained simply as the result of an oversupply of cortisol to its target cells; above a certain concentration, cortisol can begin to affect non-target cells in which gene activity is normally regulated by other corticosteroids related to cortisol.

Evolution is a frugal designer. The 100,000 odd genes that occur in the basic mammalian genome group into families; and families of genes group into superfamilies, according to shared themes in their DNA code and functional similarities in their encoded proteins or enzymes.

Many times in evolutionary history, genes have been duplicated. Mutations then arise independently in the two genes. In time, the slow accumulation of single-letter changes to their DNA code can produce subtle changes in the biochemical activity of their encoded proteins.

The cortisol receptor gene belongs to the steroid receptor superfamily. As these genes evolved from an ancestral gene, reciprocal mutations must have occurred in the genes for their natural receptors.

In these superfamilies, gene-duplication events over tens – even hundreds of millions of years – have spawned an entire dynasty of genes that are related

by DNA sequence but whose proteins have been recruited to new, but functionally related, roles in the body.

If one glucocorticoid hormone is present in abnormally high concentrations, it can begin to usurp the functions of its relatives, switching on genes in non-target cells that carry receptors for glucocorticoid hormones. This would explain why an excess of cortisol produces the diverse effects of Cushing's syndrome.

Dr Fuller explains that cortisol excess can occur by another route: a mutation in the cortisol receptor gene can impair the binding of cortisol to its natural receptor. The result is that the adrenal gland then over-produces cortisol to compensate.

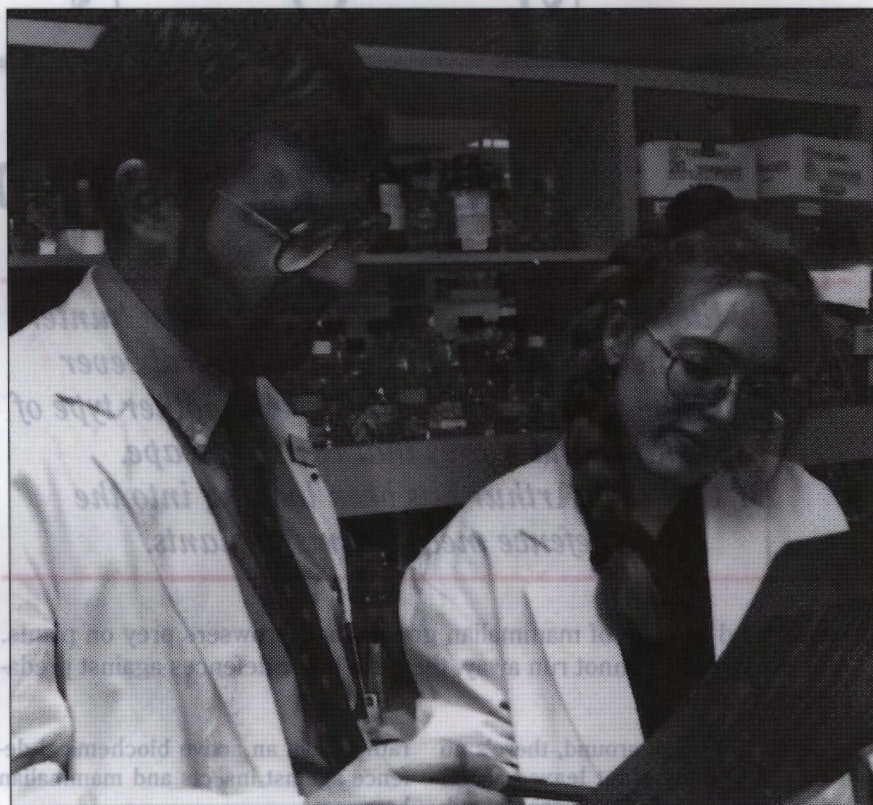
Any mutation that severely disrupts or abolishes the function of the cortisol receptor must be lethal: the condition has not been observed in a living human being. The cortisol receptor gene varies little between distantly related species like human, rat and mouse, implying that it tolerates few mutations.

But guineapigs are different. Dr Fuller says the guineapig lives quite happily with an ancient mutation in its cortisol receptor gene; one that causes its cortisol to be permanently elevated to levels high enough to produce Cushing's syndrome in human beings.

Ms Cristina Keightley, a PhD student in Dr Fuller's research team, believes she has identified the mutation, and has produced persuasive evidence that the very same change in the DNA code may underlie the rare genetic disorder that, in humans, produces cortisol resistance.

Mr John Hodgson, a Monash medical student working in Professor John Funder's laboratory at Prince Henry's Hospital in 1976, contributed to the discovery that the guineapig cortisol receptor is different from that of other mammals. He discovered that, compared with rat and mouse cells, guineapig cells were highly resistant to dexamethasone – a more potent, synthetic mimic of cortisol.

They suspected the guineapig's high cortisol levels, and its apparent resistance to cortisol and dexamethasone, lay in some fundamental difference between the guineapig cortisol receptor



Dr Peter Fuller and PhD student Ms Cristina Keightley.

and that of other mammals. Defining this difference at a genetic level was beyond the scope of the research techniques then available but recombinant DNA technology has made the answer accessible.

In an elegant mix-and-match experiment, Ms Keightley has traced the defect by combining modules of the guineapig and human genes. Most mammalian genes, including the cortisol receptor gene are modular in structure: they comprise segments of DNA called exons, which code for different domains of the protein, separated by non-coding DNA sequences, known as introns.

Cellular mechanisms edit the instructions from the gene to remove the unwanted introns. In the cortisol receptor code, this process brings together coding exons that specify three different domains within the complete receptor protein.

The cortisol receptor, like all intracellular receptors, has a mid-region that binds to DNA; a large domain which binds the steroid; and, on the other side of the DNA-binding domain, a region involved in regulating genes.

Reasoning that the guineapig's cortisol resistance probably originates in the cortisol-binding region of the receptor, Ms Keightley focused on this domain. Using the remarkable DNA-amplification technique called the polymerase chain reaction, she was able to isolate and sequence the DNA code of this domain from the guineapig, and to compare this to the code for the rat, mouse and human genes.

In the rat and mouse, the DNA code of the cortisol-binding domain more closely resembles that of the human gene than that of the guineapig gene. Ms Keightley believes the differences arise from single-letter changes in the DNA code of the cortisol receptor gene.

The mutation of interest alters a coding triplet from TGC to TGG, with the result that a molecule of tryptophan is substituted for cysteine in the amino acid chain from which the protein is assembled. The researchers believe that this subtle change alters the shape of the receptor protein in the crucial domain that binds cortisol, so that the guineapig receptor binds cortisol much

less efficiently than the cortisol receptors of other mammals.

Ms Keightley has been able to confirm that this is the case by substituting the DNA encoding this region of the guineapig gene for the corresponding region of the human gene. Cells making the resulting hybrid human-guineapig receptor protein are resistant to cortisol: conforming to the guineapig, rather than the human pattern.

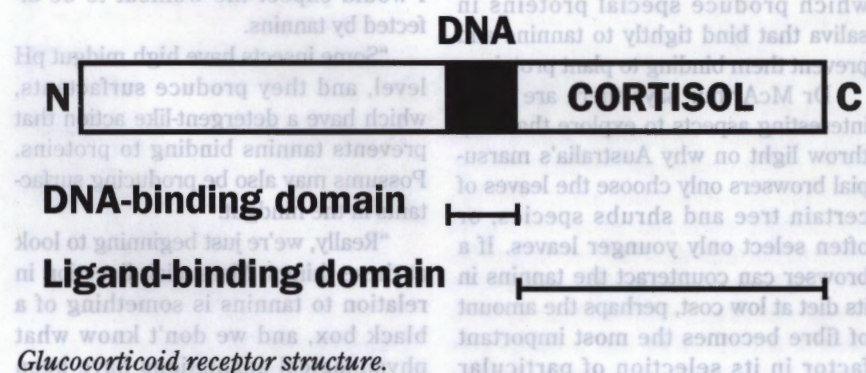
She has put the cysteine back into the guineapig gene and has shown that cortisol binding is restored. The reciprocal experiment, in which the tryptophan is put into the human gene, is currently being performed. If cells containing this hybrid gene are resistant to cortisol, then the significance of the mutation would be put beyond any doubt.

The results so far support early findings, based on comparative studies of DNA and proteins, which indicate that the guineapig may be misclassified as a rodent. Most taxonomists divide the world's 2500 odd species of rodents in the order Rodentia, into three sub-orders: sciuriforms (squirrels and chipmunks), myomorphs (including rats, mice, voles and lemmings), and hystricomorphs (Old World and North American porcupines, large South American rodents like the capybara and coypu, and the guineapig).

Some biologists are now suggesting that the guineapig, despite its physical resemblance to rodents, is sufficiently distinctive (even within its own hystricomorph sub-order) to be elevated to its own order, the Caviomorpha. In the course of attempting to determine the basic mechanisms by which corticosteroids bind to their receptors, Dr Fuller and Ms Keightley seem to have defined a fundamental biochemical difference between guineapigs and other rodents – and other mammals.

That difference may help illuminate the evolutionary radiation of the world's rodents. Dr Fuller is attempting to obtain DNA from other hystricomorph rodents, supposed relatives of the guineapig, to see if they have the same cysteine-to-tryptophan substitution in their cortisol receptor proteins.

Continued on Research Monash 4



Vacuuuming underwater pastures

The dugong is a bizarre creature, seemingly caught in evolutionary midstream and living in a changing, unforgiving environment. The findings of a recent study at Monash are likely to change Australia's conservation strategy for this gentle marine mammal.

In physical appearance and choice of habitat, it would be difficult to find two more dissimilar mammals on Earth than the koala and the dugong.

But Dr Janet Lanyon has studied both, and found some striking parallels between the tree-going browser and the seagoing grazer. Dr Lanyon, who studied koala nutrition in her Honours year in the Department of Ecology and Evolutionary Biology, switched to dugongs for her PhD.

The research was jointly supervised by Dr Gordon Sanson at Monash and Professor Helene Marsh of James Cook University, Townsville. Dr Lanyon sought to determine why dugongs breed so infrequently and erratically when they appear to live amid plenty in their watery world.

A monotypic species in the genus Dugong, the dugong is one of only four species in the mammalian order Sirenia. Its closest relatives are the three extant species of manatee, and Stellers sea cow, an arctic species hunted to extinction last century for its oil-rich blubber.

Improbably, the sirenians are distantly related to the elephant and the rock hyrax. There is almost no fossil record to indicate when the ancestors of the dugong left the land to graze the seagrass pastures of tropical and subtropical Australia, South-East Asia and eastern Africa, and the species seems in no immediate danger of extinction. However, details of its biology and ecology remain sparse.

Dr Lanyon says the dugong, like the koala, is a highly specialised herbivore. It shares with the koala a number of unusual digestive features including a prodigiously long digestive tract for its size. Professor Marsh has measured the total length of one dugong's intestines at 46 metres – of which 30 metres was large intestine.

At an aquarium in Jakarta, Dr Lanyon fed a captive dugong some small, harmless plastic beads in its normal diet of seagrass. They took between six and seven days to complete their transit. This gives the dugong the slowest gut passage yet measured in a mammal, with the exception of the sloth, and followed closely by the koala.

Like its remote cousin the elephant, the dugong is a hindgut fermenter, relying on billions of microbes in its enormously long hindgut to digest its almost exclusively seagrass diet. Dr Lanyon

was intrigued by the animal's feeding technique. Dugongs make only brief dives during feeding, rarely longer than a minute, and detail of what goes on is often obscured by clouds of silt billowing around the animal's head.

During a minute-long feeding run, the dugong cuts a swathe through the seagrass up to 10 metres long and about 15 centimetres wide, removing more than 80 per cent of the plants – rhizomes, roots and all. By studying its highly distinctive head and jaw structure, the morphology of its palate and tongue, and its dentition, she was able to determine that the dugong operates more like a Hoover rather than a Victa. The mouth works almost like a conveyor belt, drawing in seagrasses almost constantly, and passing them back into the digestive tract.

In the front of the mouth, are a pair of large opposing horny pads, the lower surface of which has hundreds of backward-pointing bristles. The muscles of the broad mouth and lower jaw seem to be adapted for a suck-and-grip action that keep a stream of seagrass moving into the oral cavity behind it. The tongue is short, and covered with coarse bumps called papillae; the upper palate is also endowed with papillae, and opposition of these structures may also grip and move the food.

Hindgut-fermenting herbivores like elephants and horses generally have complex, durable teeth to finely macerate their diet of leaves or grasses and hence liberate high levels of cell contents to be absorbed across the small intestine before fermentation occurs. The dugong's teeth, in contrast, are the softest of any mammal, devoid of enamel, and have no crown structure.

They are obviously not designed for durability, and Dr Lanyon believes that they are hardly used at all for chewing; an inference she draws from the species' isolated position in a graph which indexes body weight against total tooth-surface area. The dugong has the lowest dental-area index of any herbivore – marine or terrestrial. Its teeth are reduced to small, cylindrical pegs in the jaw. In addition, microwear analysis indicates that much of the adult tooth row is non-functional.



Dr Janet Lanyon with a dugong skull.

The species may be on its way to dispensing entirely with its teeth. In some ways, teeth seem to be almost superfluous because the blades of seagrass – particularly the dugong's preferred species – fracture readily during grazing. These frequently selected seagrasses are very soft, low in fibre, and brittle because of high turgor pressure in their cells.

The ingestion process moves large quantities of seagrasses into the mouth. The soft mouth parts, including the horny pads, crush the easily fracturable seagrasses. The dugong has developed an efficient method of food ingestion, suited to processing large quantities of seagrasses during its short dives. Unlike terrestrial herbivores, the aquatic dugong doesn't have time to chew, and so dispenses with this process.

Where the faeces of most terrestrial herbivores usually have high levels of undigested fibres, those of the dugong have a powder-fine structure when feeding on its preferred seagrass species. These seagrasses consist of low cellulose and lignin: the length of time in the gut permits near-complete digestion.

The dugong's preferred diet consists of two species of seagrass – *Halophila ovalis* and *Halodule wrightii*; it also eats, but apparently does not like, a relatively fibrous seagrass, *Zostera capricorni*. It was in studying the dugong's dietary patterns that Dr Lanyon gained important insights into the erratic breeding behaviour of the species.

Unlike temperate seagrasses, tropical species grow in complex, mixed pastures, in which any of these three species (or others) may dominate. What may seem to the observer to be abundant, lush pastures of seagrass may consist largely of unpalatable and indigestible seagrass such as *Zostera*. A dugong forced to eat an almost exclusive diet of this seagrass would probably slowly starve.

The dugong's feeding style does not permit it to select its preferred species from mixed pastures. Any new conser-

vation strategy must pay close attention to the composition of the seagrass pastures.

Superimposed on this spatial variation is a pronounced seasonal variation in seagrass growth patterns. The preferred species *Halophila* and *Halodule* grow mainly after the beginning of the wet season, when rivers are flushing nutrients into the coastal waters. During the dry season, their biomass may fall to between 25 and 50 per cent of the wet-season figure.

Coupled to this drop in abundance is a significant drop in nutritional quality. The interyear variation in seagrass abundance and quality is also considerable. Professor Marsh has shown that a female dugong may not breed until she is 15 to 17 years old. Gestation of the single young lasts 13 to 14 months, and lactation can last from one-and-a-half to more than two years.

The changeable environment, through its impact on seagrass growth, determines whether and when females will breed. The young are usually born at the end of the dry season, between September and November, and a dugong calf will eat its first solid food between December and February. This coincides with the time when seagrasses are growing vigorously and producing the high levels of nitrogen that are needed for protein synthesis by both female and baby.

Female dugongs of breeding age have calves only once every three to seven years, with a mean birth interval of five years: an indication of the uncertainty of the environment, and the large metabolic demands placed on the female during her long pregnancy and lactation.

If the wet season is late or brings insufficient rain, or if the climatic phenomenon known as the El-Nino/Southern Oscillation causes the water temperature to be cooler than usual, the productivity of coastal waters can decline dramatically, and female dugongs

Continued overleaf



During feeding dugongs cut a swathe through the seagrass bed.

Cloning eucalypt forests

Australia's montane eucalypt forests contain the tallest, fastest-growing trees in the world and produce superb timber. If trees with superior genetic characteristics could be cloned and grown in plantations, productivity would be dramatically increased.

Natural forests always contain a small percentage of elite trees that grow faster or exhibit superior growth characteristics, disease resistance or pest resistance. These trees are a precious genetic resource.

The forestry industry knows of these trees, and would like to establish large numbers of them in managed plantations. The problem is that mature eucalypts are very difficult to clone using conventional techniques.

A technique called micropropagation has been successfully used to clone many different species of timber trees around the world. It involves taking very young shoots or buds and growing them in special nutrient media containing plant hormones that induce root growth from rapidly dividing meristem tissue.

But mature specimens of the main species of interest to the Australian forestry industry – the shining gum *Eucalyptus nitens*, mountain ash *E. regnans* and bluegum, *E. globulus* – lose their capacity to form roots as they approach maturity. Shoots from seedlings will regenerate roots, but without growing the seedlings to a reasonable stage of maturity, there is no way of determining whether they will have the superior characteristics of the parent trees.

Mr Richard Harrison, a PhD student working in Professor John Hamill's laboratory in the Department of Genetics and Developmental Biology, has begun a research project which will use recombinant DNA technology to enable eucalypts to be cloned efficiently using micropropagation. Mr Harrison, a dedicated conservationist, graduated with first-class honors in botany from La Trobe University last year.

The research project, which recently received a \$701,000 grant under the Department of Industry, Technology and Commerce's Industrial Research and Development scheme, draws together research expertise from academia and private industry. It is supervised by Dr Stephen Chandler, of the Collingwood-based biotechnology company, Calgene Pacific. At Monash, genetics graduate Ms Assunta Pelosi works with Mr Harrison as a research

assistant, while the Calgene team consists of Dr Chandler, a postdoctoral research fellow and two graduate research assistants.

Under the IR&D grants scheme, three forestry companies ANM Forest Management, APM Forests and APPM Forest Products have matched the Commonwealth grant, taking total funding for the project to \$1.42 million over the next three years.

Most Australians are aware that many eucalypts have juvenile foliage as seedlings. As the trees grow, the juvenile foliage is lost, to be replaced by the typical long, elongated leaves of the mature tree. The project will focus on shoots from the juvenile foliage, which retain some capacity for cell division.

Professor Hamill says there are a number of theories which may explain why eucalypt shoots lose their capacity to grow roots. Some workers have shown that there may be specific inhibitors of root growth.

"We want to define the genes which are really important in forming roots," he said. "If we can get at these genes, we could answer the question about whether expression of the genes for root growth are merely inhibited, or permanently switched off."

Professor Hamill says the eucalypt project represents an application of his group's fundamental research on root development in plants. Central to this research is an unusual bacterium, *Agrobacterium rhizogenes*, that is closely related to the bacterial workhorse of genetic engineering, *A. tumefaciens*.

A. rhizogenes differs from its cousin in that it induces very rapid root growth in the plants it infects. *A. tumefaciens*, in its wild form, induces tumor-like growths on the above-ground parts of plants. Molecular biologists have developed a disarmed laboratory strain of *A. tumefaciens*, which no longer induces tumors, but which retains its capacity to transplant genes into plant tissues.



Genetics graduate Ms Assunta Pelosi and PhD student Mr Mark Harrison.

The vehicle for gene-transfer is a small loop of DNA called the Ti-plasmid. Genetic engineers routinely splice new genes into the Ti-plasmid and use it to transfer them into plants. *A. rhizogenes* has its own plasmid, which bears genes that induce prolific root growth in the plants it infects. One gene induces the release of a cell-division compound called an auxin, while another releases a growth-stimulating compound called cytokinin.

The beauty of the system, Professor Hamill says, is that the bacterial genes already have the right instructions, programmed into their DNA, which ensure that they produce the right quantities of these compounds, and only in those plant cell types where they are needed.

Professor Hamill says Mr Harrison and Ms Pelosi will attempt to isolate these genes, and transfer them to the Ti-plasmid of its cousin, *A. tumefaciens*. This genetic surgery is essential to protect the Australian environment, because *A. rhizogenes*, a root pathogen, is not present in our soils.

In *A. rhizogenes*, the genes that induce root formation are functionally linked on the plasmid with other genes that force the root tissues of the infected plant to make compounds called opines, which nourish the bacterium. The Monash and Calgene Pacific researchers plan to divorce the root-forming genes from the opine-synthesis genes, and then splice them into the Ti-plasmid of a crippled strain of *A. tumefaciens* that cannot survive without the special nutrients in the tissue-culture media.

In this way, the research team hopes to develop a gene-transformation system that will induce eucalypt shoots to grow roots, but which will ensure that when the rooted seedlings grown from these shoots are planted out, there is no chance that the transgenic bacterium will survive in the wild.

All the transgenic bacteria would die within 48 hours of the shoots being treated, after delivering their package of genes into the plant cells. Of course, because the roots grow underground, and the transformed cells do not form any above-ground organs, there is no chance of the genes being passed into the environment through pollen transfer.

"We have thought very hard about these safety mechanisms, to convince people that there would be no environmental risks," Professor Hamill said. He says that the Genetic Manipulation Advisory Committee, Australia's watchdog on recombinant DNA technology, would have to be satisfied that there was no risk to the environment before it approved the release of the seedlings.

Ultimately, a large-scale technique for rooting eucalypt shoots in vitro could be established, Professor Hamill said. It would work almost like a rooting-hormone dip – except using genes.

Calgene Pacific has already worked on developing such a system. The idea would be to take the shoots and dip them in a solution containing bacteria with the right combination of genes, and then plant them into compost where they would develop roots.

Cortisol works differently

From Research Monash 2

If they do, it would indicate that the guinea pig is correctly classified with hystricomorph rodents. And if other distinctive South American rodents like the capybara and coypu have the same substitution, it would point to them sharing an ancestor with the guinea pig.

It is not just cortisol that works differently in guinea pigs, but other hormones, including insulin. In most mammals, insulin mediates the conversion of glucose to glycogen, which is stored in the liver for release of energy when the body's circulating glucose levels run low. In guinea pigs, insulin seems to work more like a growth hormone than

in its conventional role of regulating energy storage; some of the more closely related glucose-regulating genes might share the cortisol receptor gene's distinctive mutation. This might explain the broad differences in glucose regulating activity that seem to separate guinea pigs from other rodents.

Dr Fuller would now like to study the DNA of those rare human individuals who display features of Cushing's syndrome, but whose problem traces to cortisol resistance and not cortisol excess due to an over-active pituitary or adrenal gland. Do such individuals have a tryptophan-for-cysteine substitution in their cortisol receptor that makes them, in a limited but quite literal sense, human guinea pigs?

Food affects breeding

From previous page

may not breed. Damage to seagrass beds by tropical cyclones may also affect food availability, and hence breeding.

Unlike other marine mammals like seals, whales and dolphins, dugongs seem not to have developed the specialised physiology and biochemistry to make deep, sustained dives. A non-feeding dugong has been observed to stay submerged for eight minutes, but Dr Lanyon says this figure is exceptional. One or two minutes is more common.

She says dugongs prefer to graze in coastal waters a few metres deep, occasionally moving into waters about 10 metres deep. The dugong's favourite

seagrasses are pioneer species that grow in disturbed environments, both inter- and sub-tidally. They grow rapidly and appear to have few defences against the dugong and green turtle.

Dr Lanyon suspects that by their take-all feeding technique, which uproots large swathes of the seagrass pastures, dugongs may actually perpetuate the disturbed environments in which their favourite seagrasses grow. Less frequently, dugongs have also been observed making forays up to 60 kilometres out from the coast to graze in unusually clear, deep waters just inside the Great Barrier Reef. The attraction is the almost pure pastures of highly nutritious and digestible *Halophila* seagrass, growing at depths of about 30 metres.

A new start in our foreign country

Monash is leading the way in early childhood education with a special course designed to up-grade qualifications of overseas professionals, who are now Australian citizens or residents.

Overseas-trained early childhood professionals from Germany, Russia, Croatia, Hungary, Peru, Thailand, El Salvador and England are completing a one-year intensive program at Monash's Frankston campus that will qualify them to teach in early childhood centres in Australia.

Monash is the first university in Australia to offer a Commonwealth-funded Overseas Trained Teachers (OTT) program for professionals to up-grade their qualifications. Thirteen women are taking part in the program this year, with plans to introduce further courses and increase student numbers.

Dr Elizabeth Mellor, Head of Foundation and Education Studies at Frankston, said the course gave trained professionals an opportunity to up-grade their qualifications as the first step towards finding work in Australia.

"The course prepares the group for Australian teaching conditions and is supported by a special English course," she said. "The program is a massive undertaking in its own right, and is complicated by the wide range of English skills of the group."

and, in many instances, were experts in their field.

"We have had to be very mindful of their level of academic ability," she said. "We can't make the mistake of assuming they don't know information and once we've established what they know and don't know, we can work on what they need to know. I think we are learning as much from them as they are from us."

All participants in the program are graduates with qualifications and experience relevant to early childhood studies. Dr Mellor said the group featured a diverse range of skills. As well as their education qualifications, skills ranged from speech therapists, music teachers, psychologists, technical experts to dance educators and journalists.

The students work in day-care centres, pre-schools and primary schools as part of their practical training, and despite lacking confidence because of their English skills, they have made quite an impression on the local community.

"They are realising that in such a multicultural society they have a strong contribution to make to teaching, and



Libda Pettko lends a helping hand at the Frankston Day Care Centre.

Most have experienced very traumatic cultural changes and upheaval in their lifestyle... some of the families have escaped from their own country

country or been affected by local disasters, they have come so far in such a short time."

Faculty staff have fostered strong relationships with the overseas teachers. They have taken part in special workshops to help understand the group, as well as receiving regular newsletters and information. OTT program coordinator, Ms Anne Kennedy and lecturer Ms Rosemary Allen, have been responsible for integrating the program into mainstream teaching.

Under the National Innovative Mainstream Funding, the Federal Government has contributed \$250,000 over three years for the introduction of the

OTT program for new immigrants to gain Australian qualifications. Part of this funding has been ear-marked for research.

"The program represents a unique research opportunity which will be invaluable. We will be able to use the OTT program to discover information on how people from other countries work with children and replace the assumptions about this relationship with accurate data," Dr Mellor said.

The faculty is also working towards introducing a program in 1993 for overseas trained childcare workers or teachers.

Leaving home far behind

Speak to Dolores Ramirez, who, with the help of the Red Cross, escaped in the middle of the night from El Salvador, and she'll tell you that the course is an opportunity to start again.

"I think this course will help me to find work and maybe will change my life," she said.

Vesna Basic left Yugoslavia before the civil war escalated. As a trained kindergarten teacher, she left behind a job and her family to start a new life in Australia. Her husband is a qualified electronic engineer and in the 14 months since moving to Australia, has been unable to find work.

"Even though my husband has no work, we are happy to be here because of the conflict at home. It is hard to imagine what it must be like there now," she said.

"Everything is so different in Australia. The schools are much more relaxed and the children are friendly and happy all the time. At first, the hardest thing was visiting child care centres because I was afraid of not understanding the children, but now it's a lot easier."

Hungarian-born Ildiko Runic was accompanied to classes by her three-week-old son for the first month of the course. Ildiko has come from the Peto Institute and moved to Australia to work at Yooralla, in Melbourne.

Russian teacher and journalist Dora Khait arrived in Australia unable to speak English and only a small network of friends to help her start a new life. Sofia Koyan and Tamara Poel are music and early childhood specialists, who not only left behind their family and friends but also left valuable musical instruments when they fled.



The class of 1992: (back row from left) Lecturer Jill Robbins, Tamara Poel, Dr Elizabeth Mellor, Dora Khait, Ildiko Runic, (middle) Svetlana Gurevich, Vesna Basic, Dolores Ramirez, Vatcharee Gordon, Fiona Ireland, Ria Hanewald, (front) program coordinator Anne Kennedy, Libda Pettko, Galina Kats. Absent Sofia Kogan.

Solar car races in Japan

The Monash solar vehicle team have been invited to take part in an international competition in Japan.

The Monash entry is one of only two Australian competitors taking part in the the Grand Solar Challenge – a one-day, 110 kilometre rally held in Kanazawa on 30 August.

Monash, along with Adelaide-based Annesley College and international competitors from America and Europe, will compete against 70 local vehicles.

All expenses for the rally – arranged by the Japanese national television company NHK for the Japanese Government – are being met by the organisers.

"The Japanese are world leaders in solar and electric vehicle engineering, so we have a great opportunity to promote our achievements, as well as finding out about their designs," project leader Mr Paul Wellington said.

Mr Wellington, a lecturer in the department of Mechanical Engineering at Caulfield campus, said a six-person crew would travel to Japan a week before the race day to familiarise themselves with local conditions and to carry out official scrutineering of the vehicle.

Before leaving Australia, the solar-powered vehicle, named SOLution, would undergo minor modifications. "The brakes will be improved to meet Japanese road standards, and some minor changes will be carried out to suit local conditions," Mr Wellington said.

"The crew will concentrate on driving practice and spending time preparing the vehicle. Competing against international standards is always very exciting and gives everyone involved a great sense of focus."

The driver sits in a small cockpit at the front of the right hand hull, which contains the electric motor and steering wheel. The second hull has a single wheel.

Solar cells are mounted on a panel connecting the two hulls and on the outside of each hull. Use of high-tech carbon and glass fibre panels means the vehicle, which is slightly larger than a Ford Falcon, weighs only 205 kilograms.

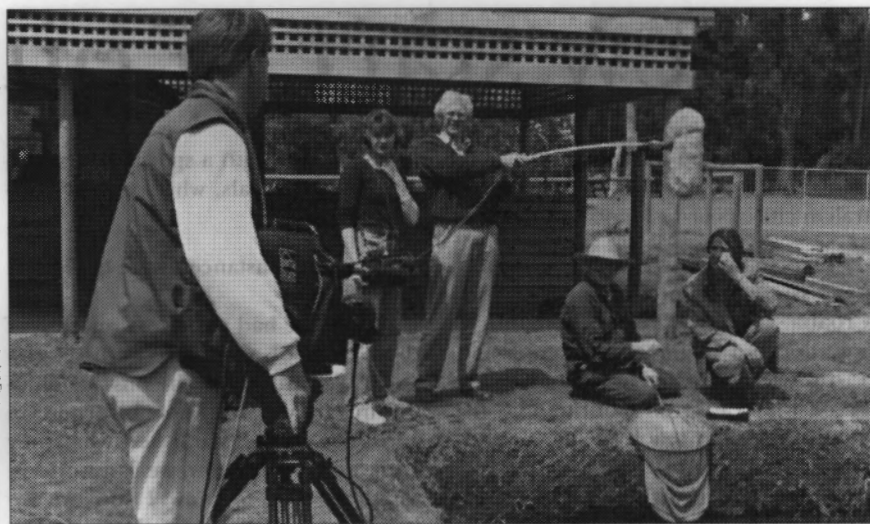
One of the features of the project has been the contributions from a range of disciplines. Students from mechanical and electrical engineering have worked on the vehicle, graphic design students have prepared promotional material, and marketing students have raised corporate sponsorship.

Industrial design and applied psychology students have also been involved in designing the cockpit layout and selecting drivers who can tolerate driving non-stop for three to four hours a day in 40C heat.

Mr Wellington said the Japanese rally would be excellent preparation for the 1993 World Challenge.



Fourth year mechanical engineering student Mr Anthony Chan upgrades SOLution's braking system in preparation for the Japanese Grand Solar Challenge.



Fishing for the right angle: Teaching Services Unit cameraman Peter Biram with (from left) technical officer Sarah Harrington, research associate Chris Penna, trout farmer Harry Finnegan, and actor Helen Milte.

Trout served up on very different tables

A series of videos showing school students that mathematics does not end as soon as the calculator batteries run down has taken several Monash staff to some unlikely places.

The stars of the latest video produced by the School of Graduate Studies, in the Faculty of Education, are fish – or a Macclesfield trout farm and its manager to be precise. Previously, it was a suburban post office, the setting for 'Posties Also Count'.

The new video, 'Trout Also Multiply', explores just about every mathematical facet of fish farming. Actor Ms Helen Milte and manager Mr Harry Finnegan guide students through the operations of the farm, such as feeding, weighing, calculating growth rates and averages, and sales.

It is the second in the series for students in grades 5 to 10, which is designed to bring workplace mathematics into the classroom in an enjoyable way.

Director Dr Gilah Leder, a member of the Centre for Science Mathematics and Technology Education, says the videos present real working environments to students and give mathematics meaning in everyday life.

"It is not feasible to give teachers and their students first-hand experience of a workplace setting, but we can provide a good view using video," Dr Leder said.

"One aim is to make clear that there are many aspects of the world outside school that require mathematics, and that men and women, especially in positions of responsibility, use mathematics regularly and equally well."

"Children have the notion that maths, by its very nature, cannot possibly be fun. We are hoping these videos will contribute to improving their outlook." They also may influence teachers, Dr Leder says. "It's a way of showing teachers one of the directions in which modern mathematics teaching is going."

The team – which consists of Dr Leder, research associate Mr Chris Penna and the Audio Visual Resources Group – has chosen those industries that employ numbers of people, and where the mathematics is not concealed, as it can be in computers.

The videos, funded originally with a grant from the Monash Development Fund in 1989, also bring in other elements of life in the workplace.

New department formed

The Faculty of Computing and Information Technology has recently given its Frankston school departmental status by creating a Department of Computing at Frankston.

Professor Phillip Steele heads the newly formed department, becoming only the third professor based at the Frankston campus. Appointed a professor for five years, he believes the upgrade was essential for academic growth.

"It gives the department independence to undertake different projects and introduce new initiatives, which is so vital for Frankston," he said.

The Department of Computing at Frankston now has 500 students enrolled in courses ranging from Bachelor of Computing (Information Systems), Bachelor of Business (Accounting)/ Bachelor of Computing (Information Systems), Bachelor of Technology and the Diploma of Applied Science (Nursing).

Next year, the department plans to introduce a Bachelor of Computing

(honours) course and a Graduate Diploma in Computing, as the first step towards developing significant postgraduate activity on the Frankston campus.

The department is also involved in a number of research projects spanning a range of computing disciplines. One project is the establishment of a computer-assisted software engineering laboratory, which will bring the latest computing technology to undergraduate and postgraduate computing students.

Following the success of their research seminar program, the department also plans to offer a series of computing seminars where industry representatives will be invited to address final year students on current industry practice.



Professor Phillip Steele: departmental status essential for academic growth

"The seminars are part of our program to develop stronger links with industry to ensure the courses offered by the department are relevant to the needs of Australian industry," Professor Steele said.

"We are also very keen to develop links with other faculties and departments based on the Frankston campus through teaching services and joint multi-disciplinary research projects involving information technology."

ARTS & MINDS

THEATRE ON CAMPUS

with Sandy Guy

Maryanne Fahey plays Mary Hardy in *Mary Lives!*, a vibrant portrayal of one of Australia's most unique entertainers, at the Alexander Theatre.

Written by Hardy's brother, Frank Hardy, author of the controversial novel *Power Without Glory*, and well known as playwright of *The Ringbolter* and *Faces in the Street*, *Mary Lives!* is a brother's portrayal of his sibling's unique and troubled personality. Mary Hardy, winner of seven Logie awards and owner of a splendid wit, was less well known for her love, generosity and courage. This play is Frank Hardy's moving tribute to an exceptional woman.

Following the 6 June premiere season of *Mary Lives!* at the Playbox Theatre, CUB Malthouse, the play will transfer to the Alexander Theatre, opening on 30 June and playing until 4 July, followed by the George Jenkins Theatre, Frankston campus, from 8 to 11 July.

Winnie The Pooh, a Garry Ginivan production, will open at the Alexander Theatre on 7 July and play daily at 10.30 am and 1.30 pm until 18 July (July school holidays).

Tickets are \$14.90 adults and \$12.90 children, with a special offer for 7, 8 and 9 July: book a party of 10 or more and save \$2 per seat. For information and bookings, phone Natalie on extn 75 3992.

Child care for babies and children to school-age is available at the swiCh Flat, Monash University Union. Fees are means tested on income, for further information phone extns 75 3039 or 75 3019.



The real Mary Hardy

THEATRE OFF CAMPUS

■ Playbox, CUB Malthouse

Michael Gurr's *Sex Diary of an Infidel* will open its premiere season at the CUB Malthouse on 27 June.

The play, set against the backgrounds of Manila and Melbourne, is the story of a journalist who travels to the Philippines to write an expose of Australian sex tours to that country. Blackmail and revolution become an unexpected part of the job for this journalist, as the play unfolds to reveal a pattern of truth, lies, self-delusion and depravity.

The Playbox offers concessions, subscription discounts and group concessions, plus 'early shows', which are held Monday and Tuesday evenings at 6.30 pm. Theatre-buffs can also attend 'Discovery Nights', an opportunity to meet the director, designer and the cast in an informal setting. Discovery Nights are held following the 6.30pm Tuesday early show. For further information regarding all Playbox productions, phone 685 5111.

For listings in the theatre guide, contact Ms Sandy Guy on extn 75 3039.

IN THE GALLERIES

Early last year Monash University became affiliated with the Australia Centre for Contemporary Art (ACCA). Now, in addition to the University Gallery, Monash students and staff have access to contemporary visual exhibitions at another cultural venue.

■ ACCA exhibitions

Geoffrey Weary's video and photographic installation *Faraway* opens on Tuesday 9 June 1992 as does 'Fuel', a group exhibition exploring the uses of new technology and video.

ACCA is located on Dallas Brooks Drive near the Botanic Gardens and the Herbarium. The centre opens on the weekends from 2 to 5 pm and on week days (except Mondays) from 11 am to 5 pm.

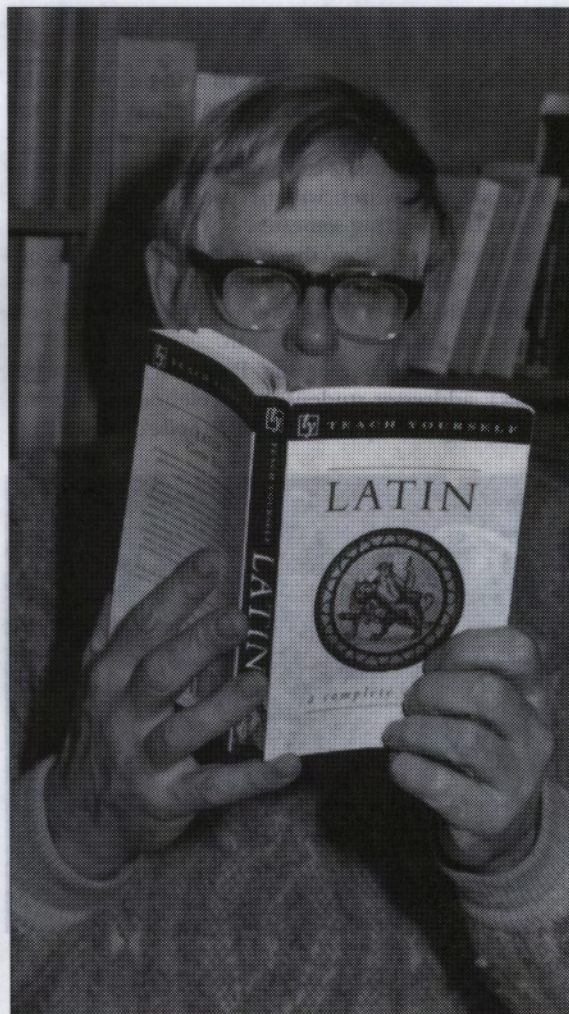
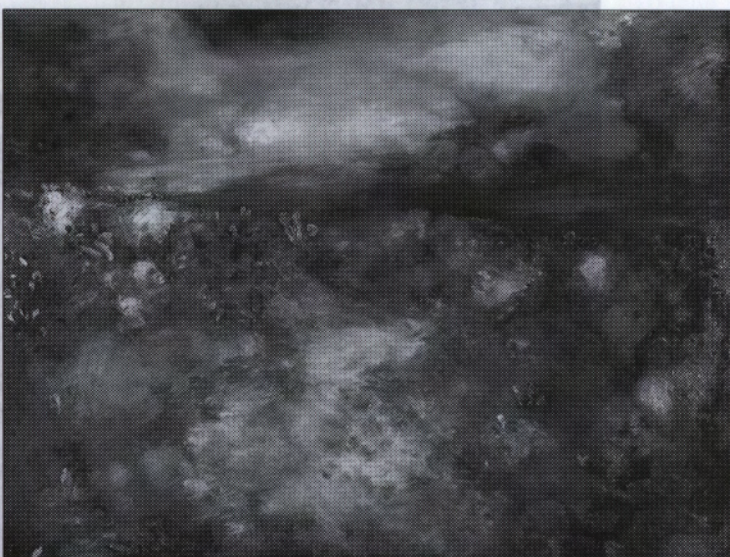
Monash students and staff are eligible for membership of ACCA as well as the Monash University Gallery. Phone 654 6422 for more information.

■ University gallery exhibitions

The 'Contemporary Gippsland Artists' exhibition and Imants Tiller's 'Life of Blank' conclude this month.

Beginning on June 24 is an exhibition by Melbourne artist Philip Hunter, 'The Territory: 1st Hemisphere'. The exhibition examines a series of cycles of Hunter's recent work-still-in-process, consisting of paintings, drawings and prints exploring ideas of self, place and history around the themes of the continent, the garden and the visit. Pictured at right is his *Continent 1* (1988).

For listings of campus cultural events, contact Ms Suzie Bourne, extn 75 5329.



Classicist Associate Professor Gavin Betts ponders a classic in modern Latin.

No sign of a death in the old language

If a Monash classicist gets his way, Latin will outlive all those who continue to assert it is a dead language.

A new edition of *Teach Yourself Latin*, by Associate Professor Gavin Betts of the department of Classical Studies, has just gone into its seventh impression and second edition.

The original version of Mr Betts' rise and rise of the Roman language was published in 1938, about eight years after the series – one of several examples of the self-improvement-through-books ethic – was founded by the English Universities Press.

Mr Betts used the original text in his elementary Latin classes at Monash. However, he was less than impressed by its erudition. So in 1982 he wrote to the new publishers Hodder and Stoughton, offering to write an improved text for the modern reader. The rest, as they might say, is Latin.

The book first appeared in 1986, and has since sold more than 28,000 copies worldwide. Its popularity, says Mr Betts, is probably due to a general swing towards the classics. "In the early '80s, interest began to grow, particularly in the US, where it is still expanding."

"About 50 years ago, the tradition of teaching Latin at school had surrendered to pressure from scientific subjects, but a recent disillusionment with science education has been accompanied by a heightened awareness of classics."

Mr Betts puts the new-found enthusiasm down in part to the rising popularity of archaeological documentaries and classical dramas on television.

Even in Australia, which has yet to experience the full force of the overseas trend, there has been a noticeable upturn in interest in classics. Enrolments in classical studies have increased steadily at Monash in recent years, and there has been a rise in interest in ancient Egypt with the recent appointment of senior lecturer in Egyptology, Dr Colin Hope.

Mr Betts has also written *Teach Yourself Ancient Greek* with the head of the Classical Studies Department, Professor Alan Henry. It is one of about 120 titles in the Teach Yourself series, which cover more than 40 languages and subjects from dancing to philosophy.

▼ New engineering building

The Faculty of Engineering's \$6 million new building, with attached examination halls, has been completed in time for mid-year exams.

About 500 students can sit an exam at one time in the new halls, which will be used as engineering design offices during semester.

It is expected that the building, on which construction began at the end of 1990, will be opened officially by the Federal Minister for Science and Technology, Mr Ross Free, this month.

The Dean of Engineering, Professor Peter Darvall (below), addresses students at a celebration to mark the building's completion (see *The Spike* on page 2).



▼ Overseas awareness

The inaugural Overseas Students Awareness Week was marked on the Clayton campus by a free barbecue, organised by the Overseas Student Service and supported by the Centre for International Students and the Monash Association of Students.

The aim of the week, arranged by the Melbourne Council of Overseas Students, was to promote interaction and mutual support between local community groups and overseas student organisations, as well as improve long-term relations with Australia's regional neighbours.

The week's theme, 'More than a local culture, it's a global future,' emphasised the role overseas students played in fostering economic and political ties throughout the region.



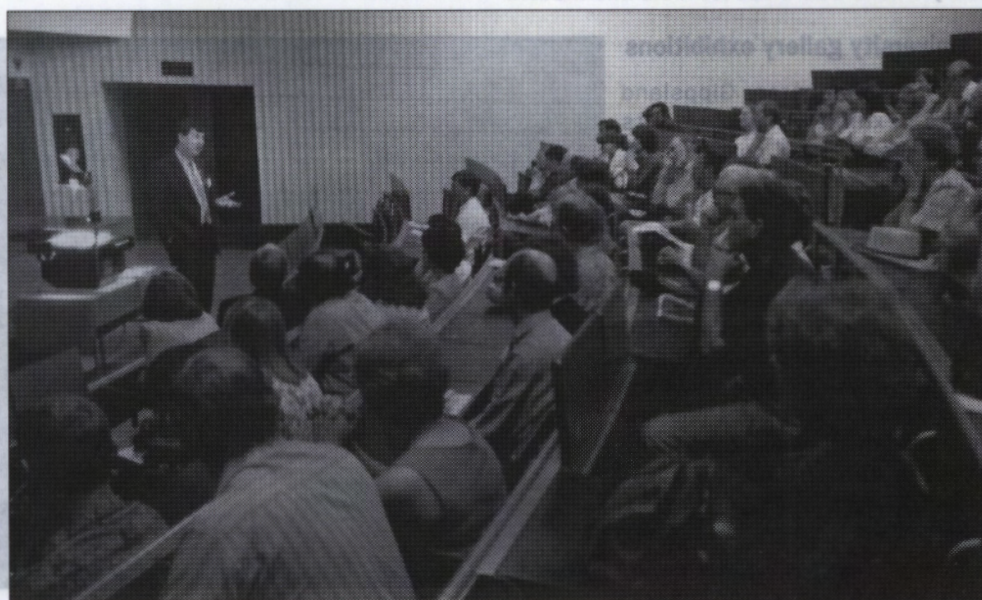
■ Parents enrol at university

About 550 parents and several keen grandparents of undergraduate students 'enrolled' in the annual parent orientation program at Clayton campus recently.

The program began with an address by the Vice Chancellor, Professor Mal Logan, a talk about the transition from school to university by Director of Community Services, Mr Graham Briscoe, and an 'experienced' parents perspective on university life by Mr Gary Stock.

The faculties of Medicine, Science and Engineering opened departments for the parents of their students. Other parents were escorted around the campus by 21 student guides.

Parents visited the University Gallery, Religious Centre, Union building, the Main Library and gardens. The program concluded informally at the Sport and Recreation Centre with afternoon tea provided by the Women's Hockey Club.



▲ A stream of success

Students from the Graduate School of Environmental Science (GSES), in the Geography and Environmental Science department, have again been awarded the Ernest Jackson Memorial Research Grant by the River Basin Management Society (RBMS).

A group of Master of Environmental Science students – Ms Kate Auty, Mr Greg Tainsh and Ms Toni Lyon – will undertake research into physical and institutional aspects of stream degradation in South Gippsland for the Department of Water Resources.

Last year the grant was won by Ms Nicola Smith, a PhD student undertaking research in the GSES on the changing hydrological regimes in the Avoca River. Other recent awards to students of the school include the CWA Environmental Science Scholarship to Mark Jenkins (1991) and Jim Arthur (1992). Pictured (from left) are Ms Auty, supervisor and Director (Administration) GSES, Dr Paul Bishop, Mr Tainsh, Ms Lyon, and Ms Nicola Smith.



▲ Banking scholarship

Economics Honours student Ms Sue-Ellen O'Keeffe, of the Faculty of Economics Commerce and Management, has been awarded the annual Bankers Trust Australia Ltd Honours scholarship, worth \$4000 over one year. Pictured at the presentation are (from left) the Dean of Economics Commerce and Management, Professor Gus Sinclair, Ms O'Keeffe and Executive Vice-President of Bankers Trust, Mr David Williams.

▼ Poetry in emotion

Renowned Indonesian poets Rendra (below) and Goewanan Mohamed recently visited Australia, sponsored by the Australian Indonesian Institute.

As part of the visit, 300 students and members of the local Indonesian community attended a joint performance, organised by the Centre of Southeast Asian Studies and the Department of Asian Languages and Studies at Monash. Rendra and Goewanan are both prominent figures in Indonesian cultural, literary, social and political life.

Goewanan's renditions reflected the philosophical and spiritual themes upon which his poetry is based. Rendra, Indonesia's most renowned poet, presented his works with vitality and emotion.

He believes that poetry should be sung, like music. His presentation was a compelling dramatic experience evolving from his childhood fascination with traditional story tellers.

Rendra's works focus on dissident issues with a political agenda. His performances are often banned and he has spent time in prison as a result of his radical literary works.



■ Engineering award

Engineering student Mr David Cugley, of Monash University College Gippsland, has won a 1991 Australian Institute of Steel Construction (AISC) steel design awards.

The award, which acknowledges excellence in steel-related subjects is open to third year engineering students throughout Australia. The AISC is closely linked to the university by providing lectures, special student membership and resource material on steel construction.

The award was presented by AISC chief executive, Mr Ian Hooper, last month.

DIARY & PRESS CUTTINGS

JUNE

10 *Mechanical Engineering seminar* 'Adaptive control of an electrohydraulic servo system', by Koji Takahashi, Sophia University, Japan. Room 203, Engineering Building 37 (5), Clayton campus. 4 pm. Contact Ms Elizabeth Wong on extn 75 3572, or Mr Peter Dransfield on 75 3511.

11 *Robotics and digital technology seminar* 'Applications of DSPs', by Mr Robert Slaverio and Mr David Pope. Room B2.22, Caulfield campus. 1 pm.

Centre of Southeast Asian Studies seminar 'Reflections of Indonesian democracy in the 1950s and 1960s',

by Dr Herb Feith. Room 515, Menzies building, Clayton campus. 11.15 am.

19 *Centre for Migrant and Intercultural Studies seminar* 'Visible minorities: a research seminar'. Theatre, Gallery building, Clayton campus. 9.30 am - 4.15 pm. Cost: \$40 (concession \$30).

25 *Centre of Southeast Asian Studies seminar* 'Establishing the "modern" in Malay poetry', by Ms Samantha Szeredi. Room 515, Menzies building, Clayton campus. 11.15 am.

Monash Technology Precinct Forum 'Biotechnology information seminar', chaired by Professor Bruce Holloway. AO Auditorium, Telecom Research Lab-

oratories, 770 Blackburn Road. 3.30 pm. To book, contact Ms Sue Porter, extn 73 2857.

29-30 *Anthropology and sociology short course* 'SPSS/PC+'. Contact Dr Peter Hiller on 562 0539, or Ms Juliet Yee on extn 75 2984.

JULY

2 *Centre of Southeast Asian Studies seminar* 'Social attitudes to astrology in Bangkok', by Dr Nerida Cook. Room 515, Menzies building, Clayton campus. 11.15 am.



Press cuttings

A selection of recent Monash print media coverage

APRIL

3 *Australian Doctor Weekly* - Ms Miriam Tisher, Community Services: GPs should treat child depression.

9 *Herald-Sun* - Mr Paul Mather, Accounting and Finance: Brands in the balance sheet.

23 *Herald-Sun* - Dr Judith Lumley, Centre for the study of Mothers' and Children's Health: Cot death risk for Aussie babies.

24 *Business Review Weekly* - Professor John Miller, David Syme Faculty of Business: Plan for audit changes.

25-26 *The Weekend Australian* - Dr Robert Birrell, Anthropology and Sociology: Mail-order brides boost migrant intake.

27 *The Age* - Professor Paul Zimmet, Centre for Molecular Biology and Medicine: Test may lead to diabetes cure.

28 *The Age* - Professor Jeff Northfield, Education: 'Loose cannon' who fires VCE shots.

28 *Financial Review* - Associate Professor Dransfield, Engineering: Topical forum.

29 *The Age* - Professor David De Kretser, Institute for Reproduction and Development: Lifting the barrier of infertility.

30 *The Australian* - Dr Peter Vulcan, Accident Research Centre: Monash to widen crash study.

30 *The Sydney Morning Herald* - Professor Mark Wahlqvist, Faculty of Medicine: Cooking methods hold key to health.

MAY

May edition of *Motor* - Professor Noel Murray, Civil Engineering: Damage control.

2 *The Age* - Mr Andre de Quadros, Music: Creating a musical life.

3 *The Sunday Age* - Dr Robert Griffiths, Centre for Early Human Development: Tests point to heart problems as key to cot deaths.

4 *The Age* - Dr Narelle Haworth, Accident Research Centre: Safety tip for drivers.

4 *The Advertiser (Adelaide)* - Professor Paul Zimmet, Centre for Molecular Biology and Medicine: Diabetes test may help block disease.

5 *The Age* - Ms Bernadette McSherry, Faculty of Law: Why some offenders go free.

5 *The Age* - Professor Mark Wahlqvist, Faculty of Medicine: Take heart, if you eat garlic.

5 *Financial Review* - Mr Cameron Rider, Banking and Finance: Capital gains tax is constitutional.

5 *The Australian* - Dr Colin Rubenstein, Politics: News coverage called to account.

7 *The Age* - Professor Ken Ogden, Civil Engineering: The road widens for reform of Australia's rail routes.

9 *New Scientist* - Dr Peter Kershaw, Geography and Environmental Science: Forest fires signal early arrival of first Australians.

13 *The Age* - Dr Julian Teicher, Graduate School of Management: Buyer beware new wages bargaining.

13 *The Australian* - Professor Jeff Northfield, Education: The classroom connection.

14 *The Age* - Professor Richard Snape, Economics: Limits to playing the field.

14 *The Age* - Professor Rob Willis, Business Systems: ACB set to approve tour by England 'A' squad.

15 *The Australian* - Dr Peter Kershaw, Geography and environmental science: Burning evidence adds 100,000 years to history.

15 *The Age* - Mrs Chooi Hon Ho, Library: Chinese community diverse, youthful and useful.

16 *The Age* - Ms Sandra McNamara, Course and Career Centre: Graduate salary increase.

17 *The Sunday Age* - Dr Brian Fildes, Accident Research Centre: RACV calls for 'rational' road speeds.

17 *The Sunday Age* - Professor Louis Waller, Faculty of Law: Stringent laws discourage sperm donors, clinics say.

18 *Herald-Sun* - Professor Gab Kovacs, Obstetrics and Gynaecology: Couples given early chance of IVF birth.

18 *The Berwick Journal* - Dr Kevin O'Connor, Geography and Environmental Science: Uni man's material in 'Push'.

19 *The Age* - Dr Eve Fesl, Koori Research Centre: Plan for aboriginal perspective in key subjects.

22 *The Age* - Professor Hugh Emy, Department of Politics: The time to try out trimesters.

Schools technical studies program set to continue

The school technology studies project, in which university engineering students take part in teaching in schools, is to continue following a successful pilot year.

Created by the collaborative efforts of the Engineering and Education faculties at the end of 1990, the project is designed to provide support for primary and secondary teachers in the new curriculum area of technology studies.

The unit, offered as a part of final year engineering studies at Monash, also gives engineering students valuable experience in innovative planning, communication and report writing, and offers an experience very different from most electives.

Dean of Engineering, Professor Peter Darvall said: "The role of engineering students involved in the project is to help devise and supervise technology studies classes. Our students have valuable resources and up-to-date information to contribute that may otherwise be unavailable in a school environment."

In secondary schools, the new curriculum area is being taught by teachers of various backgrounds. Trade, art and craft, and science teachers are all striving to implement the new technology education curricula, many aspects of which have not been part of their prior teaching experience. For primary

school teachers, technology studies is an entirely new part of the curriculum.

Coordinator of the project, Mr Chris Penna, of the Education faculty believes the project has many benefits.

"Engineering students benefit from being in a real-world situation to which they have to respond," he said. "They have to communicate specialist knowledge to non-professionals, and they have realistic experiences in presentation and reporting."

Secondary and primary teachers benefited from the engineering students' contributions to classes and curriculum development. In many cases last year, teachers were able to use resources developed and provided by the students.

"Pupils benefit also," Mr Penna said. "They have enhanced quality of classes, contact with a 'fellow student', and an opportunity to find out about tertiary education."

He said Monash lecturers involved with the 15 students who took part in the pilot program had been very positive about the project.

After nine weeks visiting schools for up to four hours a week, the students had developed confidence and ability in making presentations.



A group of the primary teaching students are pictured climbing Uluru.

Student teachers visit NT

Twelve final year primary teaching students have travelled to central Australia for three weeks of teaching experience.

The students from Frankston Campus took part in a series of workshops, field trips and cross-cultural exchanges during the visit, made possible by cooperation between Monash and the Northern Territory Government.

Dr Brian Parton, of the School of Early Childhood and Primary Education, said the field trip gave the students valuable training and a wider appreciation of teaching in remote areas.

"The students learned many valuable lessons by being able to put theory into practice," he said. "They were very well received by a number of agencies who would like to see links between Monash and Alice Springs further developed."

He said the trip's success could be partly measured by the number of second year students already placing names on the list for next year's visit.

Students were rotated between primary schools in Alice Springs, School of the Air and Aboriginal communities to experience different teaching environments.

"In many cases, the students were in very different, innovative teaching situations and they really enjoyed the challenge," Dr Parton said. "I think that several of the students will look at working in the area next year."

"Just as we build our links to South-East Asia, we also need to build closer links with our own culture. The teaching practice is a terrific opportunity for this cultural exchange."

"IT'S SO MUCH EASIER to see a drunk than a principle," said Frances Willard, the brilliant first president of the Women's Christian Temperance Union. Today it is easier to see a naked woman in a dog-collar than a principle. For Willard, the principle was women's right to vote. The loose but large coalition of women's groups who emerged this autumn to boycott [sic] Packer Magazines does not seem to have a clear principle. They were outraged by images in *People* and *Picture*. Historically, women and other subordinate groups resist what they do not want more vigorously than they pursue what they do want. They achieve consensus easily on grievances but fail to agree on positive demands.

Some women express a belief that they are entitled to more respect. Others express apprehension that the images lead to rape and violence. Many say that such images lead to attitudes conducive to rape and violence, drawing a parallel with racial vilification and incitements to racial violence. The dog-collar nude, the woman cavorting with an inflatable pig, and the laser directed at a woman's genitals with the caption "killing has never been so easy", certainly are demeaning and violent. A minority fear that the images will corrupt their young sons.

For the first 18 months of their existence, *People* and *Picture* were submitted to the chief censor and obeyed the guidelines on offensive language, genital display and sexual acts but women had neglected to have sexual vilification written into the guidelines. The most common solution, which is being implemented in WA and SA, is that the magazines should only be available on request from under the counter or from sex shops. I have not observed a demand for a total ban – which is what one would expect if there was a sincere, widespread conviction that the magazines were true equivalents of racial vilification.

Women's protest against demeaning images is not new. It has been present in second-wave feminism since 1965, when the Women's Liberation Movement hived off from the New Left in reaction to its oppressive sexual conduct and refusal to accept women as political equals. The original analysis took in a broad range of demeaning images in advertising, art and pornography.

Current protests confuse sex and sexism. Sexism is a system of discrimination against individuals on the basis of their sex or sexual preference. It goes beyond explicit sexual content but there are no protests at advertisements for computers, calculators and microscopes that feature proud parents admiring the promise of their schoolboy son, or images of a traditional breadwinner buying life-insurance to protect the future of his dependent wife, or spreads promoting long-distance telephone services that show a male infant only three weeks old and already making himself heard across the world.

The publishers target *People* and *Picture* at blue-collar males between school-leaving and marriage, designing the magazines to express the macho values of this class and age-group. Compared with magazines for bikers – a similar age group and socio-economic



by Beatrice Faust

bracket – *People* and *Picture* seem gratuitously moronic. The biker mags not only offer material of considerable technical complexity, their editorial is highly political. The Packer-Walsh magazines have a reading age of about eight to 12.

Having worked on *Nation Review* under the editorship of Richard Walsh, I believe that the most offensively misogynist of their images are more a pastiche of what larrikin journo's of the upwardly mobile lower-middle class enjoy doing than a true reflection of working class taste. The sexual vilification images have no counterpart in other blue-collar magazines, like *Post*, with a long, happy tradition of titillation but they do resemble middle-class products of the 'sixties – like *Hustler*, *Such*, and *Screw*.

Men enjoy pornography as they enjoy dirty jokes: a masculine pastime and according to Paul Gebhard, "an amusing, ephemeral, and possibly titillating thing of no importance". It reinforces male bonding by giving an opportunity for safe epideictic display (jock-strapping without requirement to prove manhood). But since pornography usually lacks conscious humour, the attempts at humour in *People* and *Picture* need explaining.

The double entendres in these magazines belong to the same tradition as music-hall, the postcards of Donald McGill, and office pornography. This last sub-genre exposes the sexual in the suburban – often redrawing familiar cartoon strips or re-wording official documents pornographically. Truckie porn and office porn are both subversive – expressions of the will to survive. Office-workers (from lift-drivers to ex-

ecutives) cock a snook at oppressive respectability while proletarian males seek analgesic laughter.

Women's protests rarely focus on expensive soft porn or office porn but their recent outrage is not just the traditional recoil of the middle class from the uncouth manners of the proles. It is informed by genuine concerns at the real injuries and perceived vulnerability of their sex: rape, violence and insecurity. And it is deformed by the refusal to temper visceral clutch with a realistic appraisal of risk, a thoroughgoing political analysis and a close examination of pornography as a genre.

A probability analysis of the major crime index for 1986-87 and the population figures for June 1987 found that a Victorian household can expect one rape every 8250 years. Even allowing for considerable unreported rape and an increase due to the recession, the actual risk of rape is overwhelmingly less than the perceived risk. The rape crisis workers and anti-pornography protesters are actually disempowering women by exaggerating their vulnerability.

Pornography has many uses, most of them relating to men's place in the world and only incidentally – if at all – to do with women. It can be a mnemonic, deriving piquancy from the masculine capacity for erotic pleasure in memory and anticipation, and it can be educational.

Feminists deny that pornography can function as sex education because women generally define sex as procreational activity, conflating it with health and hygiene whereas men generally define sex as recreational. Pornography does not deal with contraception, venereal infection, menstruation, pregnancy or climacteric but it can incidentally demonstrate varieties of genitalia, arousal techniques and coital positions to the ignorant or innocent. Much of the hostility towards pornography comes from women whose partners want them to try new techniques or positions.

Men very commonly go to pornography for reassurance about their penile size and performance. Some go for reassurance that women are sexual creatures more or less like men and are disappointed to find the reality is less rather than more. Although homosexual porn represents a sizeable part of the market, it is invisible to the feminist critique. A tiny market share goes to representations of variant sex: sadomasochism with either male or female victims dominated by either males or females, leather, bondage, lingerie (a bit passe now?) and children.

Whether pornography leads to sexual conduct depends on the social environment of the user: solitary men masturbate, men with partners copulate. Most pornographic videos are hired by couples as an adjunct to love-making. Compared with the normal uses of pornography, the obsessively perverse uses are infrequent.

The protesters need to consider George Orwell's prudent advice about engaging the opposition in frank debate: "If you disregard people's motives, it becomes much harder to foresee their actions."

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R.I.P



DIogenes, the founding Cynic, has put down his pointed quill. This column's namesake Greek philosopher is said to have committed suicide by holding his breath. Our columnist does not wish to go the same way.

From C.M. Horne, Gardening Department.

The mathematics of philosophy

I read with interest Professor Bigelow's article in the last issue of *Montage*.

Philosophers have not always misrepresented mathematics. Descartes and Leibnitz are examples; Russell's contributions are also important. His attempt to derive mathematics from a few axioms of logic led to Goedel's disproof of this possibility.

In defining number in terms of sets, Russell was following nomadic peoples with their bags (sets) of pebbles. Counting for them was making a one to one correspondence between pebbles in the bag and sheep in the flock, without knowing the actual number of sheep they had: i.e. they needed only to be able to count to one.

Russell's analysis showed that even simple ideas like that of a set can't be described in ordinary language without contradictions (Russell's paradox of sets). In *Principia Mathematica*, the calculus of prepositions used advanced symbolic

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logic. Russell and his pupil Wittgenstein gave us a method of logical analysis that has helped remove sloppy argument in both philosophy and mathematics.

That most of us can't do mathematics is not Russell's fault. Mathematicians are born, and as with Lewis Carroll, are imaginative, creative people. They take for their study any objects, real or imaginary, and are not bound by the real world – that it is for the scientist.

Science and mathematics often influence each other's development, just as science and technology do, one sometimes ahead, one sometimes behind. ("Science owes more to the steam engine than the steam engine owes to science.")

If Poincare had listened to his mathematical intuition, instead of the scientist's conception of what was real at the time, he would have produced the mathematics of chaos. As it was, this was left to the weatherman to develop.

Mathematics is probably in its most creative phase at present, and mathematical creativity is largely independent of philosophical theories about its nature.

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