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 Australian 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 preceding 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 Aboriginals 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 increase 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. 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.

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

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 30 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 see 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.

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. To 1970, 5.5 per cent of new students were over 25 years of age; by 1976, this figure had risen to 13.8 per cent.

NOW & THEN

5 YEARS AGO

Zoology students fitted radio transmitters to 10 Phillip Island fairy penguins with the find out whether they had adequate food supplies. The project, funded by the State Government’s Phillip Island 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 institutes 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 Julian), Anna, their mother Joan and grandmother Nina Millman.

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

Where 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 beamed 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 1961.

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June 1992

... graduate of one family...
Switchboard team makes right connections

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

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

"In particular, such a structure would be concerned with maximizing 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.

Take a good gander at this limping goose

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 phone calls, that animal technician Mr Cris Buskow decided to settle the mystery 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 resutting 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 cats and dogs suffering from 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 impairs 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, donkeys and sheep.
Faculty to be reorganised

The Faculty of Professional Studies will not exist in its present form from the end of 1992.

The Vice-Chancellor, Professor Mal Logan, has outlined a proposal to the Academic Board in which departments and schools in the faculty will be reorganised. 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 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 computer communication. By the end of this year, the Computer Centre says that 60 per cent of departments will be using the network.

Most buildings on Clayton campus have been connected to each other by optical fibres that allow high-speed data transfer while maintaining electrical isolation, which reduces the risk of lightning 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 engineer, 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, the line speed, installing, maintaining and upgrading software is reduced.
- 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-based 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 reorganisation of the vice-chancellorship (research) and in the proposed liaison between this position, committees and faculties. The university addresses 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.

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;
- facilities take positive steps to provide relief from teaching, on a competitive basis, for staff members requiring time to pursue research;
- research establishing facilities 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;
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 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 Kild, 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 Kild 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 Kild.

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 mounted in some quarters. We would want to avoid the kind of test where students have to respond to an unseen piece of text on 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 VCE 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 test, 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 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 guaranteed 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.

"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 mounted in some quarters. We would want to avoid the kind of test where students have to respond to an unseen piece of text on subject matters they have not studied and where they lack adequate context and background."
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 palaeoclimatologist Dr Gurtush Singh argued that a transition from fire-sensitive to fire-tolerant vegetation 130,000 years around Lake George, near Canberra, was caused by humans.

He believed that a pronounced increase in charcoal in sediments from Lakes George and Margaret, caused by the replacement of a casuarina-dominated forest by eucalypt forest, resulted from human activities 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 to 36,000 years in mainland Australia, and 40,000 for Tasmania.

Many prehistorians now accept Dr Kershaw’s evidence that a similar transition with Dr Andrew McMinn of the Centre for Environmental Science, Geography and Geology at Monash University, 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 system, which allows high-sensitivity trace element analysis of solid materials, has been installed in the Victorian Institute of Earth and Planetary Sciences’ Trace Analysis Laboratories 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 technology 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 HFIPA-alkali 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 Morrisson 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 week 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 a further talk 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 Ismail, Deputy Secretary General I, Tan Sri Haji Nik Musa; Director-General of Education, Dato’ Asiah; the Minister and the Vice-Chancellor.
Preying on passive plants

While literature glorifies the contest between hunter and hunted in the animal world, it hardy 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 austral 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 billardierii – and two leaf-browsing possums – the brush-tail, 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 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 proteins 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 oxy (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 astrigent 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: that 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 brush-tail possums accepted the dry food, the ringtails proved fussy and would only eat it wet. Weeting the food pellets caused the quebracho tannin to 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 brush-tail 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 brush-tails and ring-tails 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.”

“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 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 that has been recruited to new, but functionally related, roles in the body.

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 or enzymes.

In an elegant mix-and-match experiment, Ms Cristina Keightley, a PhD student working in Professor John Fuller's laboratory at Prince Henry's Hospital in 1979, contributed to the discovery that the guineapig cortisol receptor gene is different from that of other mammals. She discovered that, compared with rat and mouse genes, 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 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 difference by combining molecular techniques and 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 information from the gene to remove the unwanted introns. In the cortisol receptor gene, 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 region called the ligand-binding domain, a region involved in regulating genes.

Reasoning that the guineapig's cortisol receptor gene probably originates in the guineapig-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.

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 receptor 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 cortisol receptor protein are resistant to cortisol: conforming to the guineapig, rather than the human pattern.

She has put the cytokine 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 have originated as a rodent. Most taxonomists divide the world's 2,500 odd species of rodents into three orders: sciuromorphs (squirrels and chipmunks), myomorphs (including rats, mice, voles and lemmings), and hystricomorphs (guineapigs, porcupines, large South American rodents like the capybara and coypus, 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 mechanism by which corticosteroids bind to their receptors, Dr Fuller and Ms Keightley seem to have defined a fundamental biochemical difference between guineapig and other rodent and mammalian receptors.

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 cytokine-to-tryptophan substitution in their cortisol receptor proteins.
Vacuuming 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 grazier. Dr Lanyon, who studied koala nutrition in her Honours year in the Department of Ecology and Evolutionary Biology, switched to dugongs for her PhD at Queensland 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 aquatic 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 sub-tropical 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 short 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 Vieta. 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 content 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.

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 teeth 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 cell-loss and lignin; the length of time in the gut permits near-complete digestion.

The dugong's preferred diet consists of two species of seagrass — Halodule wrightii and Halodule uninervis — 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 conservation 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 Halodule 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 may passively strongly starve.

Continued overleaf
Cloning eucalypt forests

These trees are a precious genetic resource. They exhibit superior growth characteristics, disease resistance or pest resistance. These trees would like to establish natural forests always contain a small percentage of elite trees that grow faster or very young shoots or buds and growing in special nutrient media contain in special nutrient media containing plant hormones that induce root growth from rapidly dividing meristem tissue. But mature specimens of the main species in the Australian forestry industry - the shining gum Eucalyptus silvinae, mountain ash E. regnans and bluegum E. globulus - lose their capacity to form roots as they approach maturity. Shoots from seedlings will regenerate rootlets, but woody 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 world of genetic engineering, A. tumefaciens. A. rhizogenes differs from its cousin that induces tumors in above-ground parts of plants, we could answer the question about whether expression of the genes for root growth are merely inhibited, or permanently switched off.

Professor Hamill says that when these shoots are treated after delivering their package of genes into the plant cells, 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 dispersal.

"We have thought very hard about these safety mechanisms, because 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's research 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.

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

The vehicle for gene-transfer is a special strain of T-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 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 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-synthesizing genes, and then splice them into the Ti-plasmid of this cousin A. tumefaciens, which 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 grow from these shoots, there is no chance that the transgenic bacteria will survive in the wild.

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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 upgrade 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 upgrade 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."

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

Students are given an initial 12 week intensive English course to become familiar with early childhood descriptions and terms, and are now supported by three hours English tuition a week at Monash's Frankston English Language Centre.

"We've been fascinated by the program of the group," Dr Mellor said. "Despite such different backgrounds, they are a very close and cohesive group. The Russians are cooking Thai food and the Thai ladies are speaking Russian – they really are an amazing group of people."

Dr Mellor said the students were all highly qualified in their own country 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

Leaving home far behind

"Something 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 Dora Kalt arranged to have her three-week-old son for the first month of the course. Dora has been introduced to a child care centre on a day-care basis and has moved to Australia to work at Yoollla, in Melbourne.

"Everyday is a new challenge, meeting and socialising with new people. It is hard to imagine what it must be like there now," she said. "Everywhere is a new challenge, meeting and socialising with new people. It is hard to imagine what it must be like there now," she said. "Everywhere is a new challenge, meeting and socialising with new people. It is hard to imagine what it must be like there now," she said. "Everywhere is a new challenge, meeting and socialising with new people. It is hard to imagine what it must be like there now," she said. "Everywhere is a new challenge, meeting and socialising with new people. It is hard to imagine what it must be like there now," she said.
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 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 are arranged by the Japanese national television company NHK for the Japanese Government - 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.

"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.

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.

"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 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 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 "stability of computer-based software engineering laboratory, which will bring the latest computing technology to undergraduates and postgraduate computing students.

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

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

Trot 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, 'Trot Also Multiplied', explores just about every mathematical facet of fish farming. Actor Mr Helen Milne 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.

"We also plan to offer a series of computing seminars where industry representatives will be invited to address final year students on current industry practice.

"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.

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June 1992

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 Magrath 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 switch, Monash University Union. Fees are means tested on income, for further information phone extns 75 3039 or 75 3019.

THEATRE OFF CAMPUS

• Playbox, CUB Malthouse

Michael Guir'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 Tillers 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, ext 75 3529.

June 1992

Montage — 9

Classical 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 Twixt 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 result, 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 30 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.
The Faculty of Engineering's $6 million new building, with attached examination halls, has been completed in time for mid-year exams.

About 550 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 Darvl in (below), addresses students at a celebration to mark the building's completion (see The Spike on page 5).

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.

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 Geographer 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 Tainish, Ms Lyon, and Ms Nicola Smith.

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.

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

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

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, student membership and resource material on steel construction.

The award was presented by AISC chief executive, Mr Ian Hooper, last month.
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 Venture Forum 'Biotechnology information seminar', chaired by Professor Bruce Holloway, AO Auditorium, Telecom Research Lab.

DIARY & PRESS CUTTINGS

JUNE

10 Mechanical Engineering seminar 'Adaptive control of an electrohydraulic servo system', by Koji Takahashi, Sophia University, Japan. Room 205, Engineering Building B7 (5); Clayton campus. 4 pm. Contact Ms Elizabeth Wong on extn 73 3572, or Mr Peter Dransfield on 73 8511.

11 Robotics and digital technology seminar 'Applications of DSP', by Mr Robert Slaverno and Mr David Pope. Room B222, Caulfield campus. 1 pm. Contact Associate Professor Dransfield on 75 3511.

15 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.

29-30 Anthropology and sociology short course 'SPSS, PC+'. Contact Dr Peter Miller on 662 0539, or Ms Juliette Vee on extn 73 2084.

JULY

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

Press cuttings

A selection of recent Monash print media coverage.

APRIL

5 Australian Doctor Weekly - Ms Miriam Tabib, Community Services GP should treat child depression.

6 Herald-Sun - Dr Robert Birrell, Ananthropology and Sociology: Mail-order brides boost migrant intake.

9 Herald-Sun - Mr Paul Mathis, Accounting and Finance: Brand in the balance sheet.

15 Herald-Sun - Dr Judith Laneley, Centre for the study of Mothers' and Children's Health: Cot death risk for Ausie babies.

24 Business Weekend - Professor John Miller,丁nity Faculty of Business: Plan for audit changes.


27 The Age - Professor Paul Zimmet, Centre for Molecular Biology and Medicine: Diabetes: Average called to account.

28 The Age - Professor Victor Parton, Centre for Molecular Biology and Medicine: Test may lead to diabetes cure.

29 The Sydney Morning Herald - Professor Max Wahlsheim, Faculty of Medicine: Cooking methods hold key to health.

MAY

5 The Australian - Dr Peter Vukics, Accident Research Centre: Monash to widen crash study.

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

MAY editiof of Master - Professor Noel Murray, Civil Engineering: Damage control.

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

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

9 The Age - Dr Narville Haworth, Accident Research Centre: Safety tip for drivers.

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

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

13 The Age - Professor Mark Wahlsheim, Faculty of Medicine: Take heart, if you eat garlic.

20 Financial Review - Dr Paul Ogden, Koori Research Centre: Loose cannon who fires...

25 Financial Review - Professor Paul Ogden, Koori Research Centre: Loose cannon who fires...

27 The Age - Professor David Dr Kreuzer, Institute for Research and Development: Lifting the barrier of inferiority.

A group of the primary teaching students are pictured showing their work.

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 developed." He said the trip's success could be partially measured by the number of students who would like to see links between Monash and Alice Springs further developed.

Schools technical studies program set to continue

The school technical 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 Davall 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' contribution to classes and curriculum development. In many cases last year, teachers were able to use resources developed and provided by the students.

"Pupils benefited also," Mr Penna said. "They have enhanced quality of classes, contact with a "real 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.

June 1992
Some women express a belief that they are entitled to more尊重. 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 image is a serious concern at the real injuries and perceived vulnerability of their sex: rape, violence and insecurity. And it is further dealt with by the refusal to support women who look at real problems 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 2520 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 is a mnemonic, deriving piquancy from the masculine capacity for erotic pleasure in memory and anticipation, and it can be educational.

Men very commonly go to pornography for reassurance about their penis 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 than that. 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 sexual sadomasochism with either male or female victims dominated by either males or females, leather, bondage, loose but large coalition of women's groups who

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 Fackner/Walsh magazine has a reading age of about eight to 12.

Having worked on Nation Review under the editorship of Richard Walsh, I believe that the most offensive misgivings of their images are more a part of what lurks in the minds of the upwardly mobile lower-middle-class man enjoying doing more than a true reflection of the working class. Sexual vilification images have no counterpart in other blue-collar magazines, like Put, with a long, happy tradition of stiltation but they do resemble middle-class products of the '60s - like Hustler, Stack, and Soon.

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 erotic display (jockstrapping without requirements to prove manhood). But since pornography usually lacks conscious humour, the attempts at humour in People and Picture need explaining.

The double entendre in these magazines belong to the same tradition as musical hall, as postcards of the '60s - like Hustler, Stack, and Soon.

The publishers target People and Picture at blue-collar workers. Since the sexual content is beyond explicit sexual content but there are no protests at advertisements for computers, calculators and microscopes that feature proud parents admiring a new baby or the elderly that shows a male infant only three weeks old and already making himself heard across the world.

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R.I.P.

From G.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 mathematicians. Descartes and Liebniz 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 meaning in terms of Russell was following nomadic peoples with their bags (sets) of pebbles. Counting for them was making a one to one correspondence between the pebbles and the set of pebbles. Knowing the actual number of sheep they had: i.e. they needed only to be able to count to one.

Russell 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 logic. Russell and his pupil Wittgenstein gave us a method of logical analysis that has been of immense help in both philosophy and mathematics.

That most of us can't do mathematics is not Russell's point. 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 is for the science.

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

If Pollicar had listened to his mathematical intuition, instead of the scientist's conception of what was real at the time, he would have produced the marvellous machine as it was. This was left to the weatherman to develop.

Mathematics is probably in its most creative phase at present. Russell has 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 logic. Russell and his pupil Wittgenstein gave us a method of logical analysis that has been of immense help in both philosophy and mathematics.

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