

MONTAGE

NEWS FROM THE CAMPUSES OF MONASH UNIVERSITY

Volume 3 • Issue 3 • 12 pages

May 1992

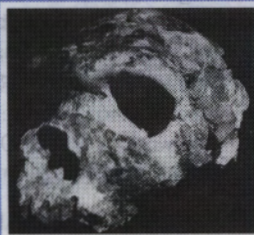
SAVANT

**Mathematics:
is it purely
Platonic?**



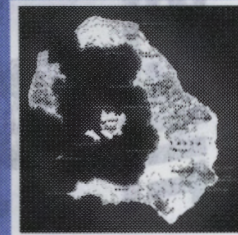
RESEARCH

**Revisiting
the cradle
of humanity**



HISTORY

**The volcano
that blocked
out the Sun**



Do breaks fail for sleepy drivers?

Taking a rest break while driving long distances may have little lasting benefit for drowsy drivers, according to road safety research at Monash.

An Accident Research Centre (ARC) study into finding ways of reducing driver fatigue has shown that for tired drivers the benefits of a break are transient. It found that within 15 to 30 minutes after a break the drowsy driver may again be on the verge of falling asleep at the wheel.

The study, supervised by Dr Narelle Haworth, also found that some commercial devices designed to alert drivers that they are falling asleep at the wheel fail to provide sufficient warning. In long-distance driving tests, researchers found that drivers' performance deteriorated significantly up to half an hour before they actually fell asleep (see *Research Monash* for more details).

Road safety authorities generally advocate that drivers take a 10 minute break every two hours on a long journey. The Accident Research Centre supports current strategies which focus on the benefits of drivers making regular rest and food stops, but Dr Haworth says most drivers go much more than two hours before resting.

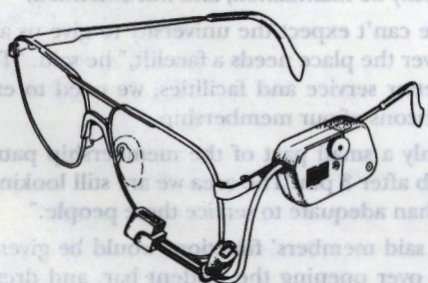
In a driving simulator the researchers monitored drivers over four to six hours. "They would take a break, and then drive for a couple more hours," Dr Haworth said. "We found that the break has a very short-acting effect. The sleepy driver's performance soon declines to its previous level."

The study confirmed overseas research showing that a rest break with a snack was more effective in beating the onset of fatigue than a rest break alone. "That is not to say a heavy meal will have the same beneficial effect, because people tend to go to sleep after a heavy meal," she said.

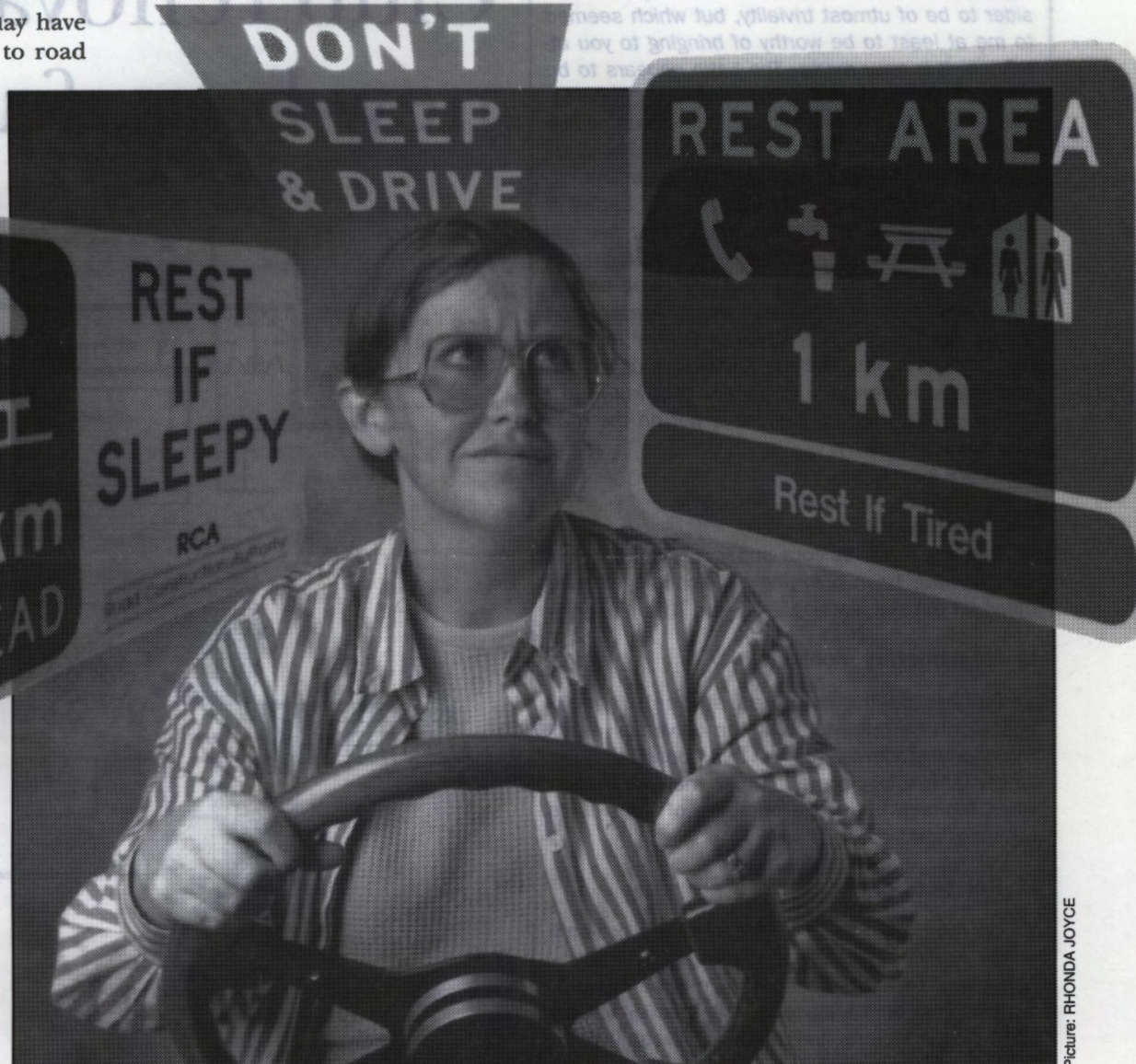
"The interesting thing about taking a snack is that we are not certain whether the effect is physiological or psychological. Does the snack work by making the rest break more interesting, by relieving boredom, or does it raise alertness by causing the release of glucose into the bloodstream?"

"Our experiments showed that a boring stop doesn't seem very useful at all to a tired driver," Dr Haworth plans to go back to the test track to see if the laboratory results translate to real driving.

Over hundreds of hours of monitoring driver fatigue during monotonous, long-distance driving at General Motors-Holden's Lang Lang test circuit, Dr



Researchers monitored frequency and duration of blinking to predict when drivers were about to fall asleep.



Dr Narelle Haworth: "The sleepy driver's performance soon declines to its previous level."

Haworth found that drivers' alertness and performance began to decline markedly up to half an hour before they fell asleep at the wheel.

As drivers become tired, they tend to close their eyes more frequently and for longer periods. By measuring the frequency and duration of blinking, the researchers were able to predict when a driver was about to fall asleep.

For up to six hours, the test drivers made repeated circuits of the track while researchers in the passenger seat monitored their performance. Sleepy drivers would drift down the banked track as they went to sleep, allowing the researcher to take over the steering.

"What interested me was that in almost every case where somebody was falling asleep, the experimenter would say their name to alert them, and they would wake up with a terrible shock and refuse to go on further," Dr Haworth said.

"Even though the experimental conditions meant they were quite safe, their impression was that it was far too dangerous to continue. It's comforting that the drivers are acting the same way they would on the road, and they won't keep going."

The study also confirmed accident statistics which showed that drivers tended not to go to sleep at the wheel in the daytime, but were much more likely to do so at night.

INSIDE

2 Uni club development
Spike: *Latinus Experticus*
3 Gippsland integration plan
Graduate salaries defy gravity

5 Recycling attitudes probed
7 Animating the AIDS virus
9 Emotions and morality
12 Diogenes: what's in a name?

Picture: RHONDA JOYCE

THE SPIKE



Latinus experticus

Reprinted verbatim:

Dear Sir or Madam,

I am an expert in Latin. I could not help noticing a point which you and your staff may well consider to be of utmost triviality, but which seemed to me at least to be worthy of bringing to your attention. It is your motto. The Latin appears to be quite garbled. There is no Latin word "imparo", and as it stands your motto reads something like "I am made unbalanced by my anchor!" There appears to be an error somewhere along the line.

Is the motto indeed meant to be Latin? If there is an error, it may be argued that few will notice, but some will, just as I did, and for those people it will detract from your perceived professionalism. Latin is not a dead language so long as we continue to use it even briefly in such things as mottoes, but the knowledge of its correct usage is certainly in danger of dying, and I am concerned that my patient is put on the road to a speedy recovery.

Yours sincerely

(signed) Dr Michael A. Thalbourne
University of Adelaide

Editor's note: 'Ancora imparo' is Italian. It is said to have been a saying of Michelangelo and means 'I am still learning'.

No monetary monikers

Full-fee paying overseas students should henceforth be referred to by the university as *international* students. The V-C told Council that the longer terminology came into use many years ago when Monash had large numbers of subsidised overseas students.

Released or escaped?

An Australian case of the dreaded pre-emergence disease – otherwise known as *Oxforditis* – has come to light. The press release crowed: "... ensuring RMIT's place as the premier tertiary institution in Victoria and, arguably, Australia."

Why not the world?

Tried and tested truisms

Truism 1: Sometime today, when you are most hurried, you will be stuck between a 120Y and a Volvo (Corollary 47a to Murphy's Law).

Truism 2: If F is the amount of free space currently on your computer's hard disk, C_0 is the capacity of your hard disk, and C_N is the capacity of your new mega-drive, then the amount of free space on the new disk will still be F . This is referred to as the Law of Unyielding Sectors.

Truism 3: A hitherto-faulty electrical appliance will work correctly if, and only if, there is a qualified repairer in the same room.

MONTAGE

Montage is published and produced by the Monash University Communications Department.
Editor: Greg Williams, Public Affairs Office,
phone (03) 565 2085, fax (03) 565 2097.

Macintosh DTP: Tim Mansour, phone (03) 573 2311.
Imageset by Pageset, 4 Palmer Court, Mount Waverley.
Printed by Camten Graphics, 15 Neutron Place, Rowville.
Registered by Australia Post: Publication no. VBGO435.

NOW & THEN

THIS MONTH LAST YEAR

Rapid expansion in the higher education sector has been at the expense of the quality of teaching and research in universities. Vice-Chancellor, Professor Mal Logan said that "desirable trends of growth in student numbers have been achieved at marginal funding levels, which has had an inevitable impact on the quality of teaching and research".

● Monash photographer Steven Morton came up with the world's first 360 degree panorama camera, to produce single-page images.

5 YEARS AGO

The Asian success ethic could hold the key to Australia's survival as a nation, according to Dr Brian Bullivant, a reader in the Faculty of Education. He

was commenting on findings in his report on ethnic students, which showed that Europeans and Asians were achieving academically out of all proportions.

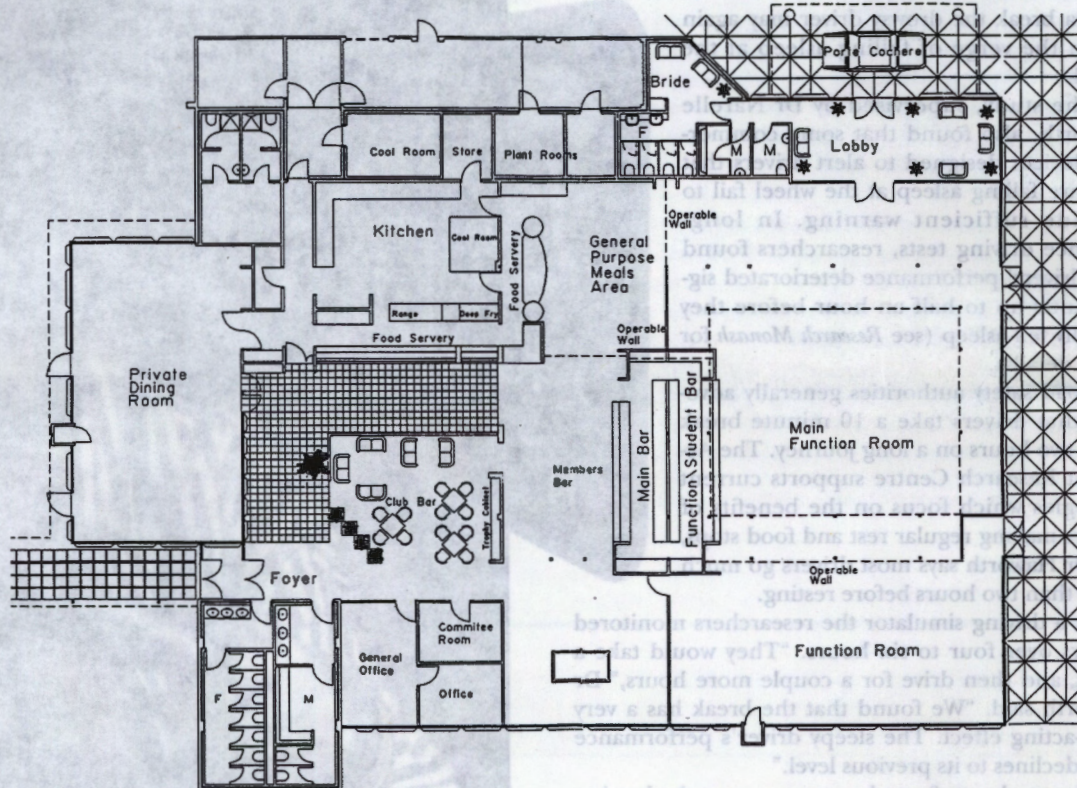
15 YEARS AGO

Professor Peter Singer, author of *Animal Liberation* criticised the lack of academic awareness about the ethics of using non-human animals in scientific experiments. He said that millions of animals were dying in laboratories, often in the course of trivial experiments or pointless teaching demonstrations.

25 YEARS AGO

Professor H. A. F. Dudley has returned from South Vietnam after three months with the Alfred Hospital surgical team at the Bien Hoa Base and will resume duties as chairman of the Department of Surgery.

Club renovations feature new bars, function room



An architect's drawing of the proposed development.

The Monash University Club is considering a proposal to allow student membership, as part of a \$300,000 redevelopment.

The plans involve:

- creating a general purpose function room and student bar;
- providing a new lounge bar for members; and
- extending the existing food servary.

Under the proposal, non-voting student memberships would be offered for \$20 per year. (Full membership for staff costs \$110.) Student members would be admitted only after 3 pm.

The club's board of management will resubmit a proposal to members this month. A previous resolution to allow wider access was rejected.

The president of the University Club, Mr Keith Allen, said the previous proposal had been defeated mainly because of members' concerns over privacy and control of the trading hours of the student bar.

Rather than being part of the house rules, which can be altered at any time by the club committee, the opening hours for associate members would now be inserted in the constitution, which could only be changed by members. Operable walls would cut noise and screen the function area and student bar from the rest of the club.

"The club has been servicing only a small portion of all the people who are on campus every day," Mr

Allen said. "The proposal would open it up to the whole university community, as well as visitors.

"Before going ahead with the plans we had an in-depth study carried out by marketing specialists. Their main criticism was that we serviced such a small group, and didn't particularly cater for anybody else. They felt that in this day and age you needed a far bigger audience to sell to."

He said over the past three years the current board had turned around a substantial deficit. However, with current revenue levels, existing services could only be maintained, and not extended.

"We can't expect the university to give us a grant whenever the place needs a facelift," he said. "To provide better service and facilities, we need to expand the horizons of our membership."

"Only a small part of the membership patronise the club after 3 pm. The area we are still looking at is more than adequate to service these people."

He said members' functions would be given preference over opening the student bar, and dress and behaviour standards would be the same for all members. Floor plans and artist's impressions of the redevelopment will be on show in the foyer of the club.

Gippsland plan affirms identity and regional links

The identity and style of the Gippsland campus will be retained and its strong regional focus encouraged under an integration strategy adopted by the University Council.

It covers the first stage of incorporating Gippsland's schools into the university faculty system, within the framework laid down by the Vice-Chancellor, Professor Mal Logan.

The plans were presented to Council by the Deputy Vice-Chancellor, Professor Robert Pargetter, following consultations with the Committee of Deans, Academic Board and the Gippsland Advisory Council, and discussions with heads of schools and general staff at the Gippsland campus.

The main points are:

- each of Gippsland's seven schools will become a school of a relevant university faculty (see box);
- university faculties will be responsible for degree programs;
- the schools will be responsible for student selection, arranging teaching programs, and publicising and delivering those programs;
- the role and status of school heads will be largely unchanged.

"Gippsland will continue to function in a similar way on a day-to-day basis," the paper, titled 'Gippsland - The Next Step' says. "Interaction with the community must be maintained, and hopefully developed further."

The Gippsland Advisory Council would continue to operate, and its views on name of the campus should be given considerable weight. At issue is whether the name *Monash University College Gippsland* should be maintained or the name *Monash University - Gippsland* adopted.

"The former name preserves a historical link and perhaps emphasises the role for local involvement; the latter indicates that the university proper operates in Gippsland, and that this is one of four university campuses," the paper says.

On an organisational level, academic issues would be the responsibility of faculty boards, it says. "It will be appropriate to have school boards to look after a range of functions and for school administration units to service the operation of the schools."

A general academic forum has been proposed to advise the Gippsland Pro Vice-Chancellor on relevant local academic issues and to facilitate academic development and cooperation between all schools at the campus. The Pro Vice-Chancellor would take special responsibility for distance education and act as director for the Gippsland operations.

The paper says it would be essential to have a unit of academic and general staff responsible for the distance education program. This unit would report directly to the Pro Vice-Chancellor, as would another general staff unit on directorial and managerial matters. Units of the Registrar's and Comptroller's offices would also be based at Gippsland.

"Heads of school would remain as the senior academics responsible for the operation of each school at Gippsland and carry out functions much as at present," the paper says. "A head of school would report to the relevant dean, but for operational matters would liaise with the Gippsland Pro Vice-Chancellor."

"Conditions of appointment and reappointment for heads of schools are currently under consideration by the Academic Board and arrangements for the incumbents will be determined after consultation with the Vice-Chancellor."

Professor Logan's framework statement says there will be:

- no movement of distance education load to non-distance education load without his approval;
- a move towards parity of funding when possible;
- no reduction in student load or diversity of courses. Students' access to a wider range of courses and adjustments would be open to consideration through the normal processes;
- no suggestion that any Gippsland school will now, or in the future, take a role as a feeder to the city campuses;
- a continuing development of a research ethos at Gippsland and opportunities for staff to move into research programs;
- development of postgraduate research.



Deputy Vice-Chancellor Professor Robert Pargetter.

Gippsland integration

GIPPSLAND SCHOOL	MONASH FACULTY
Engineering	Engineering
Applied Science	Science
Health Sciences	Medicine
Business	Business
Visual Arts	Professional Studies
Education	Education
Social Sciences	Arts

The paper notes that *school* is an ambiguous structure at Monash and, subject to eight general requirements set out in the document, a school's relationship with its faculty would be determined by mutual agreement.

Such an agreement would determine membership of departments and arrangements to provide links to other faculties or units. If agreement could not be reached, the matter would be referred to the Vice-Chancellor's Integration Committee to recommend steps towards a resolution.

Negotiations would also involve existing schools in faculties which may need to adjust structural arrangements. One such change would arise if the Caroline Chisholm School of Nursing also became a school within the Faculty of Medicine.

"A new development plan for the Faculty of Professional Studies would have to be produced. Negotiations concerning this will take place," the paper says.



Mr A'Vard receives the award from Sidney Myer executive director Mr Michael Liffman.

Arts contribution recognised

The Director of Monash University Theatres, Mr Phil A'Vard, has been awarded a Sidney Myer Award for his contribution to the performing arts.

The award recognises his achievements in children's entertainment through the Alexander Theatre, Australia's most prolific producer of children's theatre. "In 1992 we have plans for productions in Perth, Brisbane, the Gold Coast, Sydney, Melbourne and the West End in London," Mr A'Vard said after receiving his award at the Adelaide Festival in March.

The award recognises his efforts to develop adult professional theatre in the south-eastern suburbs, particularly through the Monash theatre season. He was presented with a Green Room Award for lifetime service to the performing arts in 1991, and a Churchill Fellowship for contribution to children's theatre in 1987.

Graduate salaries defy economic gravity

Graduate starting salaries continue to ride out the recession, according to a recent survey conducted by the Course and Career Centre.

The Australia-wide survey found that on average 1991 salaries had increased by between 1.4 per cent (\$1400) and 9.4 per cent (\$2700) over 1990 figures.

The survey, conducted by Ms Sandra McNamara, examined the salaries of graduates from six major disciplines.

It found that starting salaries of graduates in:

- Arts increased by 3 per cent for humanities, 3.5 per cent for languages, and 5.4 per cent for social sciences;
- Economics increased by 2.6 per cent;
- Chemical engineering rose by 7.2 per cent, mechanical and materials engineering by 7 per cent, civil 5.4 per cent and electrical 3.6 per cent;
- Law recorded the highest increase - arts/law rose by 9.4 per cent, jurisprudence/law by 6.3 per cent and science/law 5.9 per cent;

- Science showed healthy increases - geology rose by 5.1 per cent, maths/statistics by 5 per cent, and biology, physics, environmental science and chemistry by about 4 per cent; and
- Computer science recorded the lowest increase of 1.4 per cent.

"About 20 per cent of employers surveyed expected graduate recruitment to increase in 1992, 32 per cent said it would remain at the same level, and about half expected it to be lower than 1991 levels," Mrs McNamara said.

Continuing graduate recruitment was highly desirable, even in the current economic downturn, as it helped companies secure a reputation among potential recruits and ensured that future skills shortages at the middle management level did not occur.

"Although fewer jobs were being offered, the survey indicated that new graduates were seen as being well-prepared for the job market," she said.

"Decision making, problem solving and analytical ability were rated highly by prospective employers."

O B I T U A R Y



Computing pioneer dies

Mrs Pearl Levin, Head of the Pearcey Centre for Computing, died this week. She was 56.

Recognised as a pioneer in Australian computing, she had been studying and teaching at the Caulfield campus since 1965, overcoming many barriers against women in computing careers.

When she took her first step towards a career in computers, married women were not allowed to hold permanent teaching positions in colleges and universities. Twenty-seven years later, she became head of one of Victoria's largest computer training organisations.

The Pearcey Centre, part of the Faculty of Computing and Information Technology at the Caulfield campus, was established 15 years ago. It is a self-funding organisation which devises and promotes computer courses for industry and commerce.

Mrs Levin was the first female permanent part-time staff member in the Victorian Institute of Colleges. At the time of her death, she was the only woman in Victoria who was a principal lecturer in computing and one of only two women in the state who were Fellows of the Australian Computer Society.

After beginning her studies part time, Mrs Levin graduated in 1976 with a Certificate in Computer Operating and Coding and completed a Bachelor of Applied Science in Computing in 1980.

She joined the Pearcey Centre at its inception as a consultant and part-time lecturer and succeeded the former executive director, Mr Doug Burns, in 1990.

Parking problems examined

The Vice-Chancellor, Professor Mal Logan, has asked the Acting Comptroller, Mr John White, to prepare an option paper on the university's parking problems.

Professor Logan told the Academic Board that due to the greater number of students and staff, and the increasing daily movement between the four campuses, parking was now at a premium.

He said the Clayton campus, in particular, was further disadvantaged by being situated in the midst of a public transport wasteland.

He asked those with suggestions on the parking problems to pass them on to Mr White.

The Vice-Chancellor also revealed that he had placed on hold the ring road parking and car pool area proposals until Mr White had completed his option paper.

It had previously been proposed that parking be allowed on the ring road to help alleviate congestion. Another suggestion was that cars carrying more than one passenger should be allowed to park in specially designated areas.

MONASH INTERNATIONAL

University info bank targets Asian business

Australia's export capacity has been boosted significantly by the establishment at Monash of the country's largest data bank on Asia.

Asia Bureau will develop in-depth profiles on each of Australia's Asian neighbours, especially the latest data on their economies, culture, language, politics, demographics and business trends.

The service will channel the resources of 22 centres at Monash that deal with Asia: Australia's biggest collection of Asian expertise.

The Vice-Chancellor, Professor Mal Logan, said the Asia Bureau would be a concrete example of how the resources and expertise of a major university could be harnessed for the national good.

"The bureau will break new ground by offering a range of cost-effective services previously unavailable anywhere else in Australia. In particular, the bureau will tap into the skills of Monash's Asia Institute, Centre for In-

ternational Briefing and David Syme International Briefing Centre."

Monash, as well as being Australia's largest university, is also the country's biggest provider of Asian and business studies and its leading education exporter.

Professor Logan said globalisation meant Australian firms had to be better prepared than their international competition. In the case of Asia, he said, price advantage was not sufficient, business also must understand the culture.

He cited the example of an Australian manufacturing firm seeking to export to South Korea.

Monash could provide the firm with print-outs on Korean government policies, import regulations, economic trends, culture and language, technical background and guidelines on social behaviour.

IVF technology exported

Childless couples in Asia may soon have access to the latest *in vitro* fertilisation technology.

Monash University's Infertility Medical Centre, which supplies research to the biggest IVF business in the US, is planning to establish clinics in the region.

The centre's chief executive, Dr Robert Hetzel, said the first clinic would be operating in Asia within a year.

The clinics would be run independently using local doctors, donors and management, but would depend on

Australia for the development of new techniques.

All profits from the exports will go towards research at the centre, which is owned by Monash University and its Centre for Early Human Development. Dr Hetzel said there were clearly enormous business opportunities for the export of medical technology to Asia and a definite demand for infertility services.

The Infertility Medical Centre is the second largest infertility clinic in the world, after Brussels, providing 2000 IVF treatments annually.

AUSTRALIAN CAMPUS REVIEW WEEKLY CAMPUS

UNIVERSITIES • HIGHER EDUCATION • COLLEGES

READ *CAMPUS* WEEKLY

... and be informed on higher education news, employment, trends, reviews and debates.

Campus Review Weekly gives those involved and interested in higher education a broad and deep range of authoritative reports from Australia, New Zealand, South-East Asia and the South Pacific.

Campus readers are found on all Australian campuses, at all New Zealand universities, in Singapore, Hong Kong, the United Kingdom, Japan, India, the Middle East, the United States, South Africa, Canada and the South Pacific. Subscription sales, on-campus sales and selected newsagents have provided *Campus* with a weekly readership of over 18,565.

Campus Review Weekly is available from campus bookshops.

The mailroom tries to sort it all out

The medium is undeniably the message in the mailroom on Clayton campus.

Between seven and eight million glad, bad and indifferent tidings are delivered to the room each year.

Before the amalgamation, the staff of three sorters, two drivers and one trainee handled a mere four million articles annually.

Now, the mailroom in the Central Services Building deals with more than four tonnes of mail each week.

The only thing that hasn't changed, according to acting supervisor Mr Brian Blackhall, is the number of complaints. The mailroom still receives on average only one grumble each month.

Pictured (from left) are mail room staff David Fields, Brian Blackhall, Nick Carydias, Ann Tauti, Lou Bourazikas and Steven Fletcher.

Missing from the line-up is mailroom supervisor Don McKie. Also absent is Ian Newbold, who served in the mailroom for 23 years and was posted recently to the university offices.



Ms Helen Goring in the music library with issues of Australian Musical News from 1949.

Musical history back in the news

A two-year project to find and film the 52 volumes of Australian Musical News has been completed by the music librarian Ms Helen Goring.

Dated between 1911 and 1963, the publication is one of the most important Australian music history sources available. After an Australia-wide search, the volumes were obtained from the State Library of Victoria, the Performing Arts Museum, the University of Melbourne Library, the National Library of Australia, and Monash's music library.

The set is now available for the first time on microfiche and 35 millimetre microfilm. Ms Goring believes that all universities offering Australian studies will want a copy of the collection, made up of 470 microfiche or 12 microfilms.

The set will soon be available for consultation in the Main Library.

The cost of the collection is \$400 for the microfilms, or \$200 for the microfiche version.

Recycling study probes community behaviour

The first psychological and behavioural study of community recycling attitudes, conducted by Monash, is helping to formulate State Government policy.

The study, 'Understanding why people recycle', surveyed householders in Camberwell, Frankston and Richmond about their views on recycling and waste reduction. The Environment Protection Authority (EPA) and collection contractors provided information on whether or not a household had put out a recycling bag for collection at least once over a five-week period.

The main finding was that while 98 per cent of people surveyed thought recycling was a good idea, actual participation rates were significantly lower. In some areas, there was a difference of up to 20 per cent between the 'self-reported' and actual level of participation.

The research team was led by Mr Rob Curnow, of the Department of Applied Psychology, Frankston campus, with funding from the EPA and the Litter and Recycling Research Association. Other team members included lecturer Ms Mary Marsh, and research assistants Ms Robyn Parker and Ms Stephanie Deeley, and 15 community psychology students.

The study, which developed from local teaching initiatives, looked at the differences between residents who do and don't recycle; differences in participation rates among different socioeconomic groups; and the attitudes towards the perceived costs and benefits of recycling.

Mr Curnow said the suburbs chosen were typical of high (Camberwell), medium (Frankston) and low (Richmond) community involvement in recycling. "There was a consistent indication of involvement that did not match behaviour," he said.

"There was a strong community pro-recycling sentiment, which was greatest in areas of high participation." In Camberwell, 89 per cent of people not actively involved in recycling indicated their support for involvement, whereas 56 per cent of non-participants in Richmond indicated involvement.

Those surveyed believed that promotional activities and labelling recyclable products were the best ways to encourage recycling. "Non-participants in the low participation area endorsed improved service delivery and advertising," Mr Curnow said.

"Council leaflets and local papers were the most remembered sources of information."

He said non-participants remembered less about the service, had less idea where to obtain a bag or when it was collected and had less idea of what went into the bag. However, general knowledge about the service was not good for participants in all areas. "Confusion exists about how to recycle appropriately," he said.

On a surprising result was that only nine of the 342 people sampled correctly recognised which items could be placed in recycling bags. All were from Camberwell, and eight were participants.

Participants in recycling tended to be younger, better educated, more willing to get involved, stronger in their sense of community, more confident in the gains and impact from recycling, more confident in their capabilities for setting goals, and more involved in community initiatives.

"Greater community education is required for all areas," Mr Curnow said. "High participation areas can use peer pressure, or positive role models and social support to encourage others to get involved."

"Low participation areas need authorities to take the lead in providing guidelines, together with effective service delivery, active promotion and reinforcement of results."

"Clear evidence emerged that people looked to their local papers and councils for information and encouragement to help them contribute to schemes which made a broader impact."

Launching the study in April as 'Recycling month', the Minister of Conservation and Environment, Mr Barry Pullen, said more needed to be done to translate people's desire to recycle into action.

"The survey tells us that motivating people to recycle requires a clear understanding of the system and how to do it," he said. "Where people think their actions are helping to produce change, they will participate in recycling."

The Government's response included legislation intended to strengthen the recycling industry and to halve the amount of waste going to tips. A new supply of white recycling bags and information pamphlets would be supplied to all council-run schemes, and a new media campaign based on the 'Don't bin it. Bag it' theme.

Course prices pegged

The price of all courses for Clayton students at the Arts, Crafts and Tuition Centre has been pegged at \$20 for the second consecutive year.

Since early last year, when charges across the board were cut and the special student rate introduced, interest in the centre's activities has increased.

"The centre now regularly reviews its courses with the aim of attracting students and staff," said staff member Ms Tess Mora. "The results speak for themselves, as shown by the heavy demand."

Ms Mora said although the centre was attracting more Monash people to its courses than ever before, its budget was tight. "To continue contributing to the cultural and recreational life of the university, it needs continuing support from Monash and the wider community," she said.

Its regular classes include pottery, photography, car maintenance, music and art. New additions such as wine appreciation and Shiatsu massage classes have proved popular, as have those in sewing skills, making environmentally-safe products, sculpture and batik art.

Established nearly 12 years ago as a non-profit university organisation, the centre is now run by the Monash Association of Students. "It maintains a high standard of tuition and employs professionals well respected in their fields," Ms Mora said.

"For instance, pottery tutor Laurie Close regularly exhibits and sells his work, and batik tutor Raghu Menon is noted for his quality of work, as well as the fact that he has produced the longest piece of batik art in the world."

For more information, contact the centre on extn 75 3180.



Dance bridges cultures

Indian classical dancer and arts educator Ms Tara Rajkumar (above), has been appointed an honorary fellow of the Monash Music Department.

A guest lecturer and performer of Indian classical dance at the university since 1986, she was appointed to a teaching position last year.

Ms Rajkumar has been instrumental in developing a dance program under the auspices of the Music department as part of its performing arts program.

"The fellowship acknowledges work being put into creating the dance program and recognises the important role that dance has within an Asian performing arts program," she said.

She said that dance was a wonderful form of expression and could also be an important way of bridging the cultural gap.

"To learn to dance, we need to have a sound knowledge about that country's culture, to appreciate the customs, the people, their lifestyle," she said. "Dance encourages an understanding of the way of life in a country

and therefore has an important role in the wider community."

Her life-long passion for dance began at the age of five, and she has gone on to establish a reputation as a performer and teacher of the two classical Indian dance forms Kathakali and Mohiniattam.

She has taken her classical dance from traditional Indian temples to theatres in London, where she founded the National Academy of Indian dance, and has also formed her own Indian dance school called Natya Sudha in Melbourne.

Ms Rajkumar was a keynote speaker at this year's Asian Pacific Conference of Arts Educators, held at the Frankston campus, and has recently finished a season as artistic director and performer in *Traditions in Transitions* at the Beckett Theatre.

As well as her Monday evening classes, she is keen to run lunchtime lessons in Indian classical dance. Interested people may contact her on 551 7592.



Pictured at the launch are (from left) Sir Zelman Cowen, His Excellency Mr Kedar, Vice-Chancellor Professor Mal Logan, and convener of the liaison committee, Professor Louis Waller.

Jewish civilisation centre launched

A national home for Jewish studies was unveiled last month at Monash. The Australian Centre for Jewish Civilisation was launched jointly by Sir Zelman Cowen and Israel's ambassador to Australia, Mr Zvi Kedar.

About 200 members of the Melbourne Jewish community attended the launch of the centre, which expects to be the major focus for research on Jewish communities in Australia. In his speech, Sir Zelman described Jewish civilisation as a proud possession of Australian society.

The centre will recognise the Jewish contribution to the modern world by providing an overview of Jewish history and heritage, from the origins of the

Jewish people in Biblical times through the dispersion of the Jewish people, the Holocaust, the establishment of Israel and contemporary Jewish experiences in Australia.

Under a portrait of Sir John Monash, Sir Zelman said it was appropriate that the national centre for Jewish studies be established at the university named in his honour.

"Monash University is a highly successful and very vigorous university and the establishment of the centre will only add to that success," he said.

The Ambassador for Israel, Mr Kedar added: "The centre will help focus on the rich heritage of the Jewish civilisation."



VCE students pictured during the scientific instruments workshop series.

Lab test for VCE students

Hundreds of secondary students swapped the classroom for a Monash chemistry laboratory recently for a practical introduction to science.

More than 640 Year 12 students from metropolitan schools took part in a week-long workshop series, designed to help schools meet their curriculum requirements for the VCE.

Senior chemistry lecturer, Dr Ian McKinnon, said the series – the first of its type at Monash – was a cooperative effort to familiarise students with scientific instruments.

"The workshops provided students a unique opportunity to gain practical

experience in a laboratory," he said. "They also covered important curriculum material for the VCE."

Dr McKinnon said the workshops had received positive feed-back from both students and schools and would be held at Monash annually.

"I think the students enjoyed the practical learning and took advantage of the content of the workshops," he said.

Staff and graduate and honours students from the Chemistry department conducted the teaching and demonstrated equipment.

RESEARCH

MONASH

Revisiting sites of man's ascent

Political change in Africa means that scientists can now revisit the rich sites which document the birth of our own species. Professor Martin Williams will return later this year to the Great Rift Valley to search for fossils that could identify a common ancestor of the great apes and Homo sapiens.

Peace has returned to Ethiopia with the collapse of the Mengistu regime, and like many other Western scientists, Professor Martin Williams is looking forward to returning to the Awash Valley, the cradle of mankind.

Professor Williams, of the Department of Geography and Environmental Science, is an inveterate fossil hunter. He says the Danakil region in the country's north-east, where the Great Rift Valley is slowly bisecting the continent, offers a rich record of hominid evolution spanning the past 6.5 million years. That richness, he believes, is the product of a unique conspiracy between regional geology and global climate.

Hominids were widely distributed in Africa, Asia and Europe between about 15 million and 6 million years ago, but in Ethiopia, some special quirk of the environment gave a push to hominid evolution, and it acquired a momentum that culminated in the appearance of our own species, *Homo sapiens*, around 250,000 years ago.

In 1981 Professor Williams, along with two long-time palaeoanthropologist colleagues, Professors Desmond Clark and Tim White, of the University of California at Berkeley, were searching an area to the east of the Awash River when they found hominid bone fragments 11 metres down in a layer of sedimentary rock, overlaid by a 40 centimetre cap of volcanic ash, called a tuff.

On the other side of the Awash Valley at Hadar, a few hundred kilometres further north, Professor Donald Johansen and Dr Tom Grey were discovering the most celebrated fossil in the human family tree, the small female of the species of *Australopithecus afarensis* that Johansen and Grey dubbed 'Lucy'. Volcanic tuffs sandwiching Lucy's stratum placed her age at between 2.8 and 3.1 million years.

With their own volcanic tuff securely dated at between 3.8 to 4 million years, Professor Williams and his colleagues know that the hominid fossils they found must be even older – probably in the 4 to 5 million-year range. The prospect of finding more fossils of this enormous age – fossils that could help fill in the gap between Lucy and the

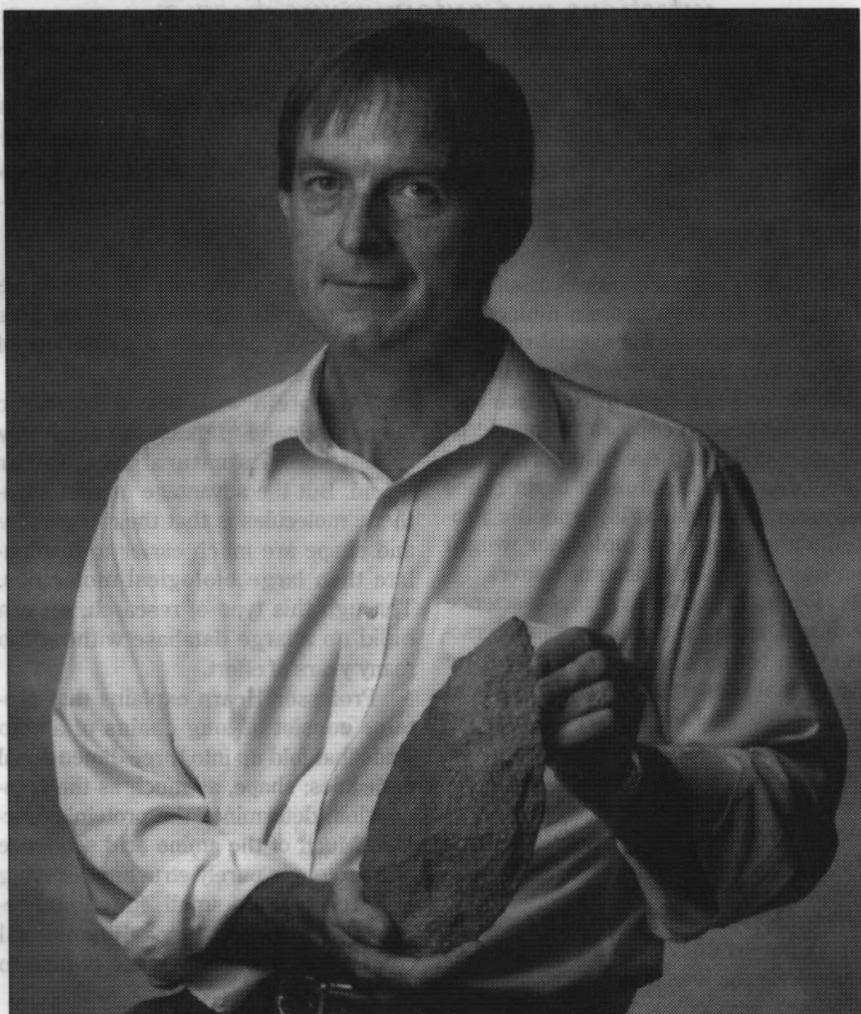
common ancestor of the great apes and humans – will take them back to Ethiopia later this year.

Professor Williams has had more than a decade to consider the circumstances that made Ethiopia a hotbed of hominid evolution. He believes the answer is bound up with the same complex geological history that preserved the fossils and gave researchers an ideal frame of reference against which to determine their age and relationships. Some of his ideas, developed with the help of his geologist wife Frances, who worked for seven years in Ethiopia, are necessarily speculative, but they provide plausible correlations between the geological and fossil record.

Hominid evolution seems to have begun accelerating around 6.5 million years ago, when the global climate began drying out. The Mediterranean became a waterless salt desert, only to refill a few thousand years later. The same thing happened at least a dozen times during the next million years, possibly driven by the so-called Milankovich effect, a climatic cycle that resonates with periodic perturbations of the Earth's orbit.

Geologists refer to these events as the Great Messinian salinity crisis. Some have attributed the repeated drying of the Mediterranean to tectonic events, including the birth throes of the Great Rift Valley. But Professor Williams turns this idea on its head.

The drying of the Mediterranean was caused ultimately by the expansion of the West Antarctic ice sheet in a Milankovich-induced ice age. As global sea levels fell by as much as 40 metres, the Mediterranean lost its connection with the Atlantic at a sill between the Pillars of Hercules. Freed of the compression of the Mediterranean's water mass, the Earth's crust rebounded, reactivating ancient Precambrian faults in the region and creating stresses that, among other things, caused the mas-



Professor Martin Williams holds a stone cutting tool, probably used by early meat-eating hominids, dated at about 2.5 million years old.

sive eruptions that intermittently blanketed the Awash Valley with volcanic ash.

As the Mediterranean became a salt desert, and the Nile cut a huge canyon over two kilometres deep, extending all the way up to Aswan, Africa's ramapithecines – the presumed ancestors of the higher primates – became genetically separated from those in Europe. Until this time, the climate had been tropical and less seasonal, and the region featured extensive rainforests.

The rainforests became increasingly dissected, and in Ethiopia were increasingly replaced by open savanna woodlands. By 5.5 million years ago, at the end of the last Mediterranean dry phase, Africa's hominids had been isolated from those in Europe for a million years. "Quite suddenly, down in the Ethiopian rift, there were small-brained, upright walking creatures, almost as fully bipedal as today," Professor Williams said.

When he and his colleagues were last in Ethiopia, they located the bed of an ancient lake that had periodically dried out and refilled, apparently in response to the same climatic changes that had so drastically affected the Mediterranean. In exposed, eroded parts of the ancient lake shore they found alternating sequences of ancient lake sediments and volcanic tuff, and in one layer, the 4 to 5 million-year old hominid fossil fragments.

"It was here, and nowhere else in the world on present evidence, that the first hominid tool users – although not tool-makers – make their appearance,"

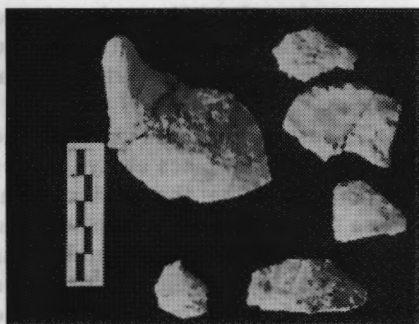
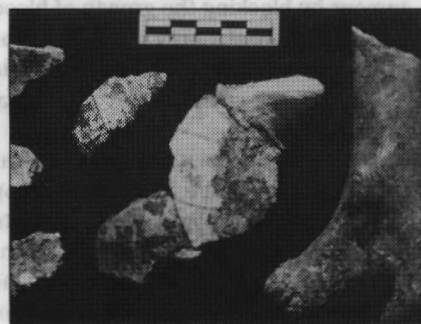
Professor Williams said. Not far from Hadar, in the Gona Valley, a side valley off the Awash Valley, the first worked stone tools appeared about 2.5 million years ago. With them, researchers have found butchery sites – the hominids were using sharp stone flakes, capable of cutting through two centimetres of tough hide, to dismember game as large as hippo and buffalo.

Now the hominids were eating meat, an abundant resource in the region. And because their upright stance greatly reduced the area of their body exposed to the direct rays of the noonday sun, and they had sweat glands all over their bodies, they could hunt without competition from the big cats, which were forced to rest in the shade.

An upright stance liberated the hominids' hands, and they increased their skills at fashioning stone tools. The free availability of meat meant these proto-humans gained leisure time for social interaction, and for improving their communication skills. Feedback effects now saw a dramatic increase in the size and complexity of their brains.

Another pivotal development occurred some 1.5 million years ago. This is the estimated age of many fossilised hearths, made of clay baked and reddened by firing at over 500° C. The hearths are associated with burnt animal bones.

Professor Williams says some researchers speculate that the practice of cooking meat began with the accidental



The hominid bone fragments found in the Awash Valley by Professor Williams and his colleagues in 1981.

Continued on Research Monash 4

Expanding biological frontiers

Protein molecules largely handle the flow of information from cell to cell. Tapping in to this vital communication network at a molecular level is leading to a new frontier in biology: custom-designed molecules with the potential to treat cancers, virus infections and autoimmune diseases.

First there was biology, then came molecular biology. Professor Milton Hearn, Director of the Centre for Bioprocess Technology, believes the new frontier will become known as atomic biology, where biology fuses into chemistry and physics, as foreshadowed by the eminent Swedish scientist Professor Mosbach more than 10 years ago.

Much of biology revolves around interactions between protein molecules. Cells communicate via special receptor proteins in their membranes. Viruses and bacteria link their own surface proteins to these receptors to invade or damage cells, and even the formidable intelligence of the human brain relies on neurons exchanging specific proteins and other low molecular weight substances called neurotransmitters.

Professor Hearn says that if science can understand protein-protein interactions in terms of the interplay of the functional properties of the amino acid side chains, and the underlying molecular forces involved, it will be well on the way to custom-designing compact molecules that will mimic, and perhaps improve upon, the natural activity of proteins and enzymes. Such molecules could be used as vaccines, as drugs to treat metabolic disorders and cancers, or as potent enzymes to catalyse biochemical reactions in industry.

Last year, *Research Monash* reported on the work of Matthew Wilce, a PhD candidate supervised by Professor Hearn, who is studying how proteins interact with synthetic carbon-based molecules attached to surfaces.

Mr Wilce's research – as well as the associated investigations of Dr Mibel Aguilar, Dr Peter Stanton, Dr Phillip Thompson, Dr Irena Cosic and other postgraduate students in Professor Hearn's research team – have shown that these reactions simulate the interaction of proteins with their natural ligands, such as other biological substrates or surfaces, and can be used to help pinpoint the active regions of protein molecules.

"Unfortunately, we don't yet understand the rules but one can get a lot of information from chemical interactions that have relevance to biological phenomena," Professor Hearn said. "The important contribution if the research

team is that we are now starting to be able to quantify those interactions. This project really has been a gold mine of information.

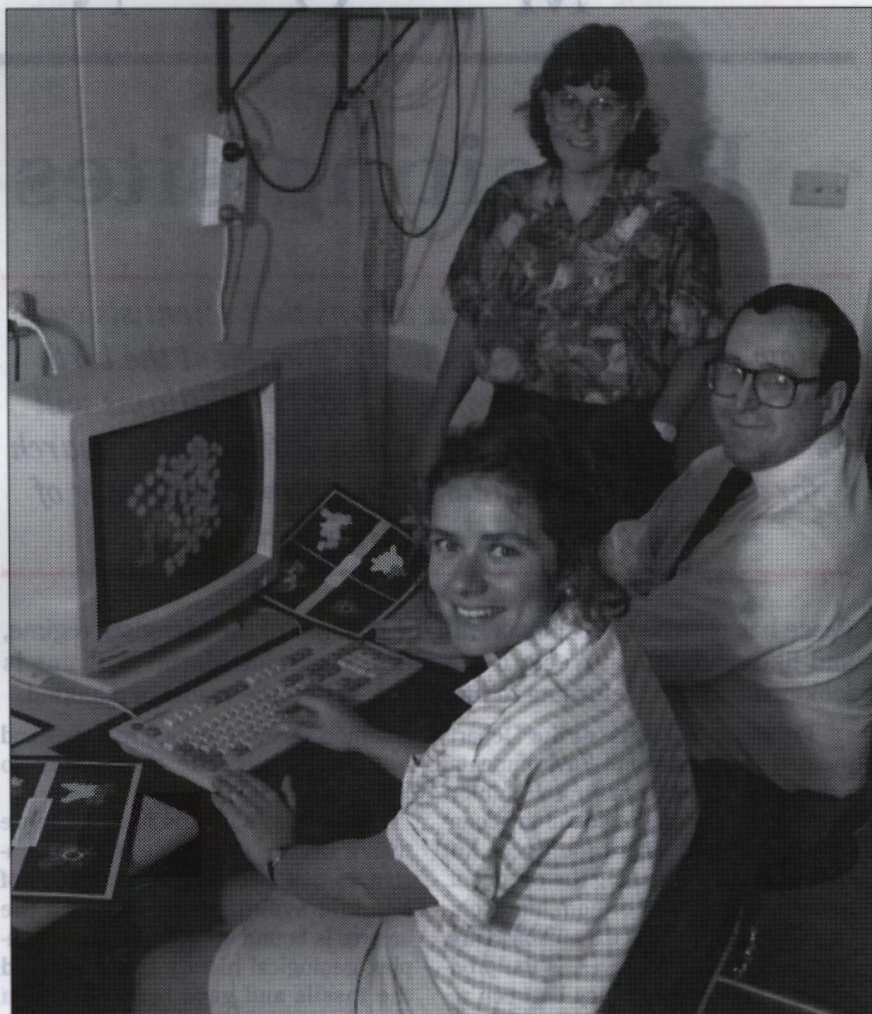
"A protein will 'see' a synthetic chemical ligand in much the same way that it sees its natural receptor or ligand. But the advantage of using synthetic molecules is that their chemistry and shape are much easier to manipulate than large biological molecules. Through this type of research, we can build up a large database without too many years of effort.

Professor Hearn explains that proteins consist of long chains of amino acids that fold up into three-dimensional molecules; shape, as much as the composition, determines the protein's function. Much of the amino acid sequence of a protein is purely structural, serving only to hold the small, functional regions in the right three-dimensional conformation that allows the protein to do its job.

If it were possible to excise these functional regions from the protein without altering their shape, these biomimics could display the biological activity of the original protein. Moreover, synthetic molecules of quite different chemistry, but of similar shape, could be used to replicate behavioural properties similar to biochemical substances.

"We are now starting to quantitatively understand subsets of behaviour, seeing how amino acid side-chains – specific parts of proteins – interact with different substrates. Proteins, when they interact, see only particular functional or binding regions of their interacting partner.

"The basic rules to unravel these recognition events come from beyond biology, from the biophysics of interactions at the atomic level. We are moving from molecular biology to atomic biology."



Professor Milton Hearn with members of the research team Dr Mibel Aguilar (seated) and Dr Irena Cosic.

Ways of describing molecules in the digital language of computers, in terms of contoured surfaces, have been developed by the research team, allowing the simulation of these interactions on powerful computers. The molecular interactions can be experimentally modified on the computer until they fit the structure of a particular ligand or substrate.

"A good analogy is to imagine that you are flying over the city, so high up that you can't see your own home, but you have a grid reference in mind, and if you can match the pattern of city streets to the one in your mind, you can find your home," Professor Hearn said.

"We are using pattern recognition to generalise different classes of protein behaviour. In this way, one can begin to tackle some very interesting problems involving biorecognition. For example, what is an antibody seeing when it recognises an antigen, and what part of a viral protein is responsible for causing the symptoms of a disease?

"We can approach these questions, but we have a long way to go. It's an exciting study because in the few examples we have looked at, we have been able to very accurately predict the key component on a protein's surface that confers its specific biochemical property.

One potential application of this new generic technology would be the development of novel peptide vaccines, based on synthetic molecules that would mimic the antigenic properties of viral proteins.

The use of attenuated viruses in the production of vaccines always carries the slight risk that the vaccine might cause the very disease it is intended to prevent. By designing molecular mimics capable of eliciting the same protective antibody response from the immune system as the viral protein, scientists could develop completely safe vaccines.

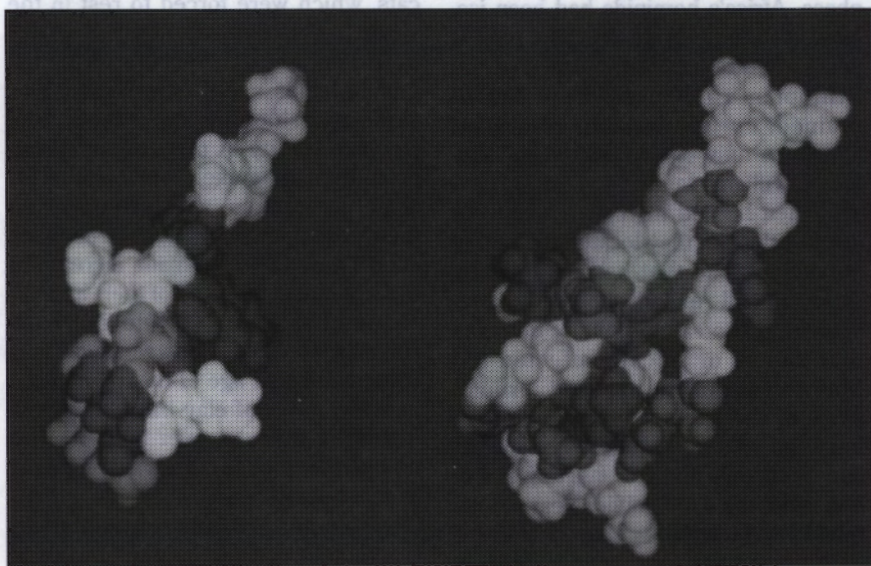
Professor Hearn's research group has already used its pattern-recognition technique to develop peptide fragments for prototype vaccines against several viruses and has established a strong research collaboration with the French research agency, the Centre Nationale de Recherche Scientifique (CNRS) to test these peptide mimics.

The combined efforts of this international research team has led to the preparation of synthetic peptide antigens that produce an appropriate antibody response from the immune system. In addition, the collaborative research is currently developing synthetic antibodies that recognise viral proteins. Experiments with rodents suggest that these synthetic molecules will have no adverse effect on the body.

Eventually, scientists may be able to design synthetic molecules to fit or mimic the active site of any natural biological substance, but this would require an enormous database of molecular structures. For example, within Professor Hearn's research group, Mr Wilce's PhD project alone has employed more than 2000 different structures.

Based on similar methodology, the Monash team has developed other peptide mimics that show promise of selectively inhibiting a particular class of tumour by blocking the growth of blood capillaries that carry nutrients for tumour growth. Several of these peptide analogues are currently under evaluation in Germany.

Professor Hearn believes similar strategies could be used to develop small peptide analogues to deactivate the immune system processes that cause autoimmune diseases such as rheumatoid arthritis and some forms of diabetes, or could be applied to the development of several classes of protein drugs.



Computer models showing the surface-active regions of bombesin (left) and β -endorphin peptides.

Exploding a volcanic puzzle

Around 1620 BC a massive volcanic eruption devastated the island of Thera, causing floods in the Nile Valley, and lowering world temperatures for several years. But did it also cause the collapse of the Minoan civilisation? Mathematics, geology and classical studies experts are working together to solve this ancient puzzle.

Some 110 kilometres north of Crete, homeland of the vanished Minoan civilisation, lies the crescent-shaped island of Thera, and the massive caldera of its extinct volcano.

The caldera dominates the island's outline – 18 kilometres long and 10 kilometres wide – suggesting the eruption released four times more energy and material than the Krakatoa eruption in Indonesia in 1885. Huge tidal waves and a glowing cloud of ash spread out from the epicentre on Thera, bringing catastrophe to the Minoan archipelago.

The cloud of ash and chemical aerosols projected into the stratosphere veiled the Sun, cooling the Earth for several years. Oak trees recovered from bogs in Ireland made almost no growth in two successive summers. Similarly aged ice cores from Arctic glaciers bear Thera's chemical signature.

The disaster left scientists and historians with a mystery. As accurately as scientists can determine from these two lines of evidence, Thera erupted between 1625 and 1620 BC, yet the archaeological evidence places the collapse of the Minoan civilisation at 1560 BC – some 60 years later.

At this time, the Mycenaean civilisation from nearby Greece seems to have rapidly supplanted the Minoans, occupying Crete and surrounding islands, and taking over the Minoans' extensive trading networks in the Aegean.

This mystery has brought together an unusual interdisciplinary team at the University, comprising mathematician Professor Joe Monaghan of the Department of Mathematics and volcanologist Professor Ray Cas of the Department of Earth Sciences in the Faculty of Science, and Dr Peter Bicknell, of the Department of Classic Studies in the Faculty of Arts.

Professor Monaghan says that the third international conference on Thera in 1989 was unable to reconcile the conflicting dates. One theory raised at the conference was that the tree-ring and ice-core records from 1620 BC might not be the signature of Thera, but of a smaller eruption somewhere else in the world. A relatively small eruption with the right chemistry can have a disproportionately large impact on global cli-

mate, as typified by the eruption of Mexico's El Chichon volcano of 1982.

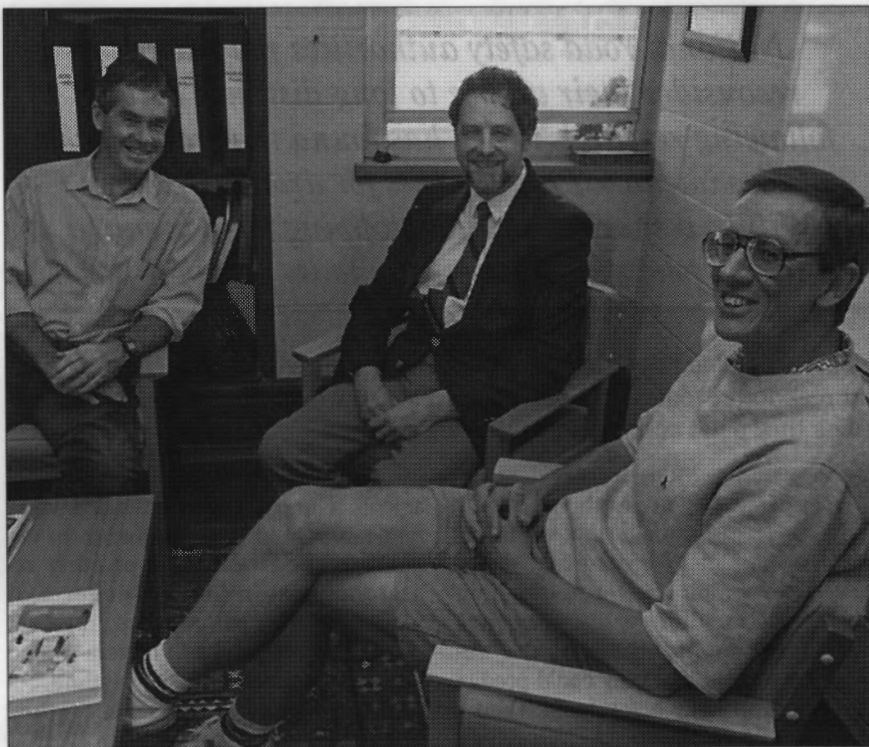
That Thera erupted, violently, is beyond doubt. But if the mystery is to be resolved, scientists must provide historians with a realistic picture of what happened to the Minoans when Thera exploded.

The eruption was so powerful that it would have had widespread effects throughout and even beyond the Aegean. Dr Bicknell's review of the history of the age indicates that the Nile delta suffered catastrophic flooding, perhaps because of tsunamis, the tidal waves spreading out from the eruption.

But in the more immediate proximity, the primary agent of death and devastation may have been a pyroclastic flow, a glowing hurricane of ash and gas that the French call a *nuée ardente*, which raced outwards over the surface of the Aegean at 500 to 700 kilometres per hour on a cushion of vapourised sea water.

In 1991 the world saw video footage of a relatively minor pyroclastic flow speeding down the slopes of Mount Unzen in Japan. Krakatoa's *nuées ardentes*, flowing out over the surface of the ocean, caused fatal skin burns to people on islands up to 40 kilometres away. The same phenomenon, applied to the much larger pyroclastic flow from Thera, might explain why Minoan settlements 140 kilometres away, on Crete, were devastated well away from the coast, at altitudes beyond the reach of even the largest tsunamis.

The Monash team has approached the Australian Research Council for a grant to support its project, which will attempt to develop mathematical models of the dynamics of the eruption and the propagation of tsunamis in the Aegean. Professor Monaghan has developed a series of mathematical models that quite closely reproduce the dynamics of water and waves flowing through channels, and over and around objects such as dam walls and sluice gates.



From left: Professor Joe Monaghan, Dr Peter Bicknell and Professor Ray Cas.

He plans to use scaled-up models to simulate the generation of tsunamis during the Thera eruption, and the subsequent propagation of the giant waves across the Aegean. The models must take into account the depth of the water, the sea-floor topography, and the shape of the many islands.

Under certain circumstances, waves can be amplified by channels, especially in shallow waters. Professor Monaghan says Krakatoa caused tsunamis 30 to 50 metres high to mound up in the shallow waters of the narrow Sunda Strait, where the water is about 200 metres deep. The sea floor of the Aegean between Thera and Crete is very rugged, and ranges between 600 metres and 2000 metres deep. As the depth of water approaches the typical 2000 metre interval between waves, the waves lose height but move faster.

Professor Monaghan believes the tsunamis generated by Thera would have been at least 20 to 30 metres high – about the height of a 10 storey building – and would have been moving through deep water at about 400 kilometres per hour. The damage these waves caused would have been strongly influenced by both the shape and coastal topography of the islands in their path.

"Nobody has tried to do this sort of thing accurately before," Professor Monaghan said.

"We would like to determine how the waves propagated, and then use this information to develop a video animation of what it might have been like for Minoans on the shoreline to watch the tidal waves and the pyroclastic flow approaching."

Given the variable depth of the Aegean, and the shape and position of the islands, Professor Monaghan says there would have been repeated episodes of focusing and defocusing as the waves spread out.

"The other question is whether, given the shape and topography of the shoreline, we can predict the behaviour of the waves as they came ashore at various sites," he said. "For example, near Zakros in the east of Crete, there are offshore islands and promontories, and as the waves turned around them they

would be diffracted and may have lost height.

"We want to be able to predict which sites are going to be disrupted, and see how consistent these predictions are with on-the-ground information from the local archaeology. We also want to see the effects on other islands in the region. There may be places where the damage was quite significant, and we want to talk to the archaeologists about that as well."

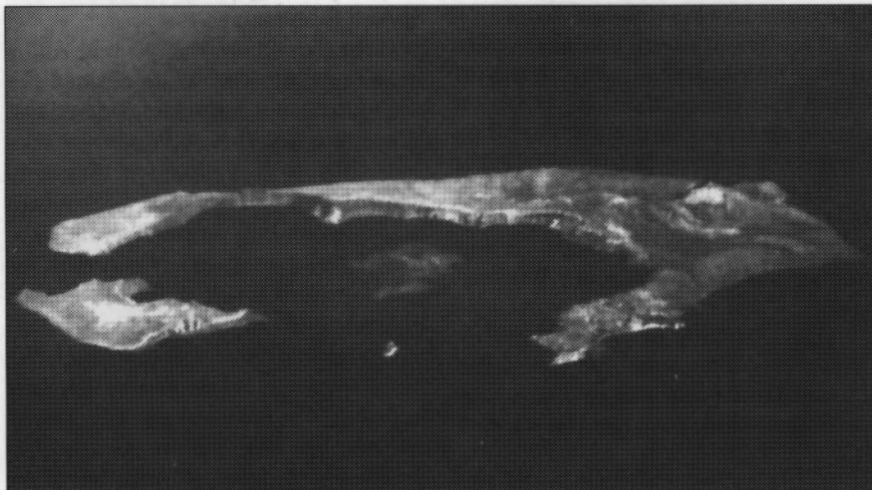
Professor Monaghan said that when he first considered the possibility of modelling the tsunamis generated by Thera, he had assumed in ignorance that they were caused by the sea rushing into the collapsed magma chamber within the caldera.

"But Ray Cas pointed out that the tsunamis are more likely to be caused by the pyroclastic flow, which throws up a tremendous amount of rock, ash, dust and gases," he said. "Any material heavier than air then comes down like a giant ram on the sea surface around the island, displacing enormous masses of sea water and throwing up tidal waves."

Professor Cas also pointed out that tsunamis can be created by the horizontal outburst of pyroclastic material at temperatures between 600 and 800° C. Just as a droplet of water will skate across the top of a hot stove, suspended on a thin layer of vapour, a pyroclastic flow can propagate long distances on a cushion of water vapour created by its own intense heat.

Professor Monaghan hopes to model the interaction between a pyroclastic flow and the sea surface, to see whether the *nuée ardente* from Thera could have traversed 140 kilometres to Crete – a possibility suggested by the apparent destruction of buildings well inland on Crete. Dr Bicknell will analyse archaeological records and memories preserved in myth to throw light on a catastrophe which some historians believe gave rise to the legend of Atlantis.

People living in the 20th century may one day be able, via the latest computer graphic and video techniques, to gain some inkling of what the last minutes of the Minoans may have been like.



The island of Thera, dominated by the caldera of its extinct volcano.

Saving drowsy drivers

National road safety authorities may have to reconsider their advice to long-distance drivers following research which has found that rest breaks provide no lasting benefits for drowsy drivers. Within a short time after stopping for a break, a driver's performance declines to its previous level.

Road signs along Australia's major highways urge drivers to stop and take a break to prevent them falling asleep at the wheel. But many drivers still think they don't need to stop until they are tired.

Research at Monash's Accident Research Centre, supervised by Dr Narelle Haworth, found that within 15 to 30 minutes after a break a tired driver may again be on the verge of falling asleep. By monitoring the frequency and duration of blinking, the researchers found that they could predict up to half an hour beforehand when a driver would fall asleep.

The study also found that certain commercial devices, which are supposed to alert drivers that they are falling asleep at the wheel, fail to provide sufficient warning. By the time they alert the sleepy driver, it may already be too late to avert a life-threatening accident.

In 1987-88 Dr Haworth conducted a literature review for the Federal Office of Road Safety, on factors which affect driver performance. She identified fatigue as one of the most important of these, and received further funding to develop a way of detecting when a driver is close to falling asleep at the wheel. She was also interested in looking at factors which may influence how rapidly a driver's performance declines with increasing fatigue.

Experiments in a car simulator in her laboratory at Monash University, and on the test track at Lang Lang, showed that as drivers become more tired, they tend to close their eyes more frequently, and for longer periods.

"We found we could plot the length of eye closure against time to predict when a person was going to fall asleep at the wheel," Dr Haworth said. "People keep going for quite a long time when they are sleepy, which means that you have a long enough period of time to detect it and do something about it."

In hundreds of hours of monitoring driver fatigue on General Motors-Holden's Lang Lang test circuit, Dr Haworth found that drivers' alertness and performance began to decline markedly

up to half an hour before they fell asleep. The test drivers at Lang Lang made repeated circuits for up to six hours, while Dr Haworth or other researchers sat in the passenger seat monitoring their performance.

Dr Haworth said that drivers tended not to go to sleep in the daytime. As suggested by accident statistics, they were much more likely to go to sleep at the wheel during the night. The phenomenon of fatigue seems to be linked to the body's circadian rhythms, which in turn are driven by changing light levels during the day and night.

Back in the laboratory, Dr Haworth tried to find ways of preventing or slowing the onset of fatigue. The first thing she tested was the value of rest breaks. Road safety authorities generally advocate that drivers take a 10 minute break every two hours on a long drive, but most drivers will go much longer before taking a break.

In a driving simulator, test subjects drove for four to six hours, took a break, and then drove for a couple more hours. "We found that the break has a very short-acting effect," Dr Haworth said. Within 15 to 30 minutes, the sleepy driver's performance had declined to its previous level.

"Looking at overseas research, we concluded that perhaps if drivers eat during the break, the benefit is much more prolonged," she said. "We did the relevant experiments and showed that this really is the case - a rest break with a snack is much more effective than a rest break alone."

"That is not to say a heavy meal will have the same beneficial effect, because people tend to go to sleep after a heavy meal. The interesting thing about taking a snack is that we are not certain whether the effect is physiological or psychological. Does the snack work by making the rest break more interesting, by relieving boredom, or does it raise



Long-distance driving tests were carried out using a driving simulator.

alertness by causing the release of glucose into the bloodstream?"

Dr Haworth plans to conduct open road testing to see if the laboratory results translate to real driving conditions, but she says that having a snack does seem to improve driver alertness.

But drivers on our highways will still go to sleep, and have potentially fatal accidents by running into oncoming cars, or hitting trees off the side of the road. How can this be prevented?

Dr Haworth has tested several commercially available devices which supposedly monitor driver alertness. One is an inclinometer containing a mercury switch, which sounds an alarm when the driver's head drops forward, below the vertical.

"Unfortunately it doesn't work," Dr Haworth said. The simple device misses the dangerous decline in alertness and performance in the half hour before the driver's head actually falls forward. By this time, the driver is actually asleep, and in the few seconds that it takes for the alarm to sound and rouse him, an accident may already be unavoidable.

A commercial device which monitors blinking by reflecting an infra-red beam off the eyeball and eyelid works better, but its presence in the field of vision can be irritating to the driver, and may also invalidate an insurance claim if it could be argued that it obstructed the driver's field of view.

Another device which requires the driver to press a button every few seconds - it is based on similar devices already fitted to rail locomotives and

some trucks - works surprisingly well. Dr Haworth says drivers do not seem to be unduly irritated by the repetitive action, because they welcome any activity which relieves boredom. However, the device may be impractical for motor cars because drivers on commuting trips would need to be able to switch it off, and might fail to reactivate it for long trips.

Dr Haworth has been working with a major European car manufacturer which is developing a steering wheel movement monitor. She recently spent several weeks at the manufacturer's research centre in Europe, exchanging data with its researchers.

The steering wheel monitor has the advantage that it monitors the deterioration in driver performance, without the driver being aware of it.

An alert driver makes very frequent, small corrections to the steering wheel to keep the car well positioned on the road; with fatigue, these corrections become less frequent, and of greater amplitude because the vehicle is straying at increasingly larger angles from the ideal line.

The frequency and amplitude of these corrections form characteristic patterns that can be monitored and analysed by a specialised computer chip. The problem, Dr Haworth says, is to develop algorithms that can discriminate between the corrections made by a driver on the point of sleep, and the patterns generated by, say, a drive on a twisting mountain road.

Stone tools appear

From Research Monash 1

discovery of trees that had caught fire in lightning strikes. Some of these trees contained termite mounds, which when heated by the slow-burning tree-trunk, became natural ovens in which animals resident in the trees were accidentally cooked. The ancient hearths of the Afar region resemble those used by Australian Aborigines at Lake Mungo, who constructed ovens from chunks of clay termite mounds.

Cooked meat is easier to chew, and digests more rapidly. People may have begun eating around the fire on which they cooked their meals, safe from

night predators, and re-enacted the drama of the hunt, using the first primitive language.

Around the same time, large stone tools worked on opposite edges appear in the fossil record. Professor Williams said these tools would be used for sawing, cutting, defleshing and skinning, even for debarking trees to extract soft, edible cambial tissue. Stuck in wet clay and braced by the feet, these tools could also have been used to saw through bones.

"This material culture may have been very simple and unspecialised, but with this tool kit, people moved out of tropical savannas into the Ethiopian

highlands at altitudes of about 2500 metres, and further afield, eventually reaching Europe, Choukoutien in China, and Java in south-east Asia.

"On the present evidence, and unless new material coming out of China and the former Soviet Union shows something to the contrary, then Charles Darwin was probably right when he wrote in *The Descent of Man* in 1871 that the earliest progenitors of humans probably appeared on the African continent," Professor Williams said.

One intriguing discovery made by Professor Williams and his colleagues illuminates the final stages of the long evolutionary trajectory that transformed an ape into man.

In the 1970s, researchers in the Bodo Valley, another small valley off the main valley of the Awash, found an

adult male cranium with features that seem to represent the transition some 300,000 years ago, between *Homo erectus* and *Homo sapiens*.

When the team was visiting Addis Ababa in 1981, Tim White cleaned the skull of calcium carbonate concretions, and found a series of fine cut marks inside the eye sockets and on the cheek bones below the eyes. "They indicate that this creature was deliberately defleshed and scalped, presumably in some form of death ritual," Professor Williams said.

"Whoever did it was proficient, because every cut seems purposeful. This is the earliest evidence of ritual associated with the dead that we possess, predating the evidence of ritual burial by the Neanderthals at Shanidar, in Iraq, by more than 200,000 years."

Bringing new dimensions to AIDS research

A journey through the AIDS virus within a computer database, developed at Monash, illustrates the growing importance of computers in both teaching and research. Information scientists and medical researchers are using this multimedia tool to enrich our understanding of HIV infection.

In the information age, computers, the global telecommunications network and a constellation of databases have made information on almost any subject readily accessible to expert and lay person alike.

The problem is no longer one of access, but excess. How can information be organised and distilled so people can learn what they need without drowning in detail or irrelevant data? At the Department of Information Systems at Monash's Caulfield campus, Mr Henry Linger is developing a prototype of tomorrow's information system, around a subject that has probably generated more new knowledge more rapidly than any this century: AIDS.

Mr Linger's multimedia tool is based on the remarkable Apple Macintosh HyperCard software package, but extends the HyperCard concept into new dimensions. The program gives researchers and students a way of following an information trail: moving between multiple layers – from the general to the highly specific and back again – and laterally within layers, at the click of a mouse button.

The layers offer information in a number of complementary forms. Network-like diagrams, including a model of the dynamics of the infection process, show how the AIDS virus infects human cells. The diagrams are supplemented by captions, bibliographies of AIDS-related literature, descriptive text and animated sequences.

The system uses as its home base three diagrams which describe the interactions between the human immunodeficiency virus (HIV) and its human host. It employs a concept, called Petri Nets, developed by the German scientist C. A. Petri during the 1960s and 1970s. Petri originally developed his networks to model computer systems and as a tool for designing computers.

Mr Linger is working with Drs N. Deacon and D. McPhee at the Macfarlane Burnet Centre for Medical Research to develop descriptive, mathematical and visual models of HIV infection. The researchers at the centre are interested in the dynamic role played by the various HIV proteins in the process of infection.

The project also involves researchers in Italy. On the biology side, Mr Linger is collaborating with professor A. Clivio, of the University of Milan, and Professor A. Siccardi, of the San Raffaele Scientific Institute. On the computing side, he is working with Professor P. Mussio, of the University of Milan.

Professor Mussio spent two weeks in Melbourne in March working on the project and presenting seminars. In addition, a graduate student from Monash's Department of Information Systems has been awarded a research fellowship by San Raffaele Institute to work in Italy on the project.

Mr Linger says the Petri Net concept is now beginning to find much wider application because of its power to organise large volumes of related in-

formation. "I have tried to model the whole area of AIDS," he said. "It's so large that I had to break it down into three areas."

"The first, which is still only partially implemented, is the process of HIV infection. Another deals with the structure and function of the human immune system, and the third deals with the immune system's response to HIV infection."

"I have modelled one biologist's view of how HIV infection proceeds. Its attraction is that each step of the infection process is described by equations, so with appropriate software, the researcher can simulate the infection process dynamically."

"This network is overlaid with the sorts of interfaces common to Macintosh software. If you want to look at one component of the infection process in more detail, you use the mouse to highlight the box surrounding it and it takes you to another level of detail."

"You can do the same at this next level, and keep going until you reach the most specialised level of interest. Using the same techniques you can track back up through the network to see how processes relate to one another."

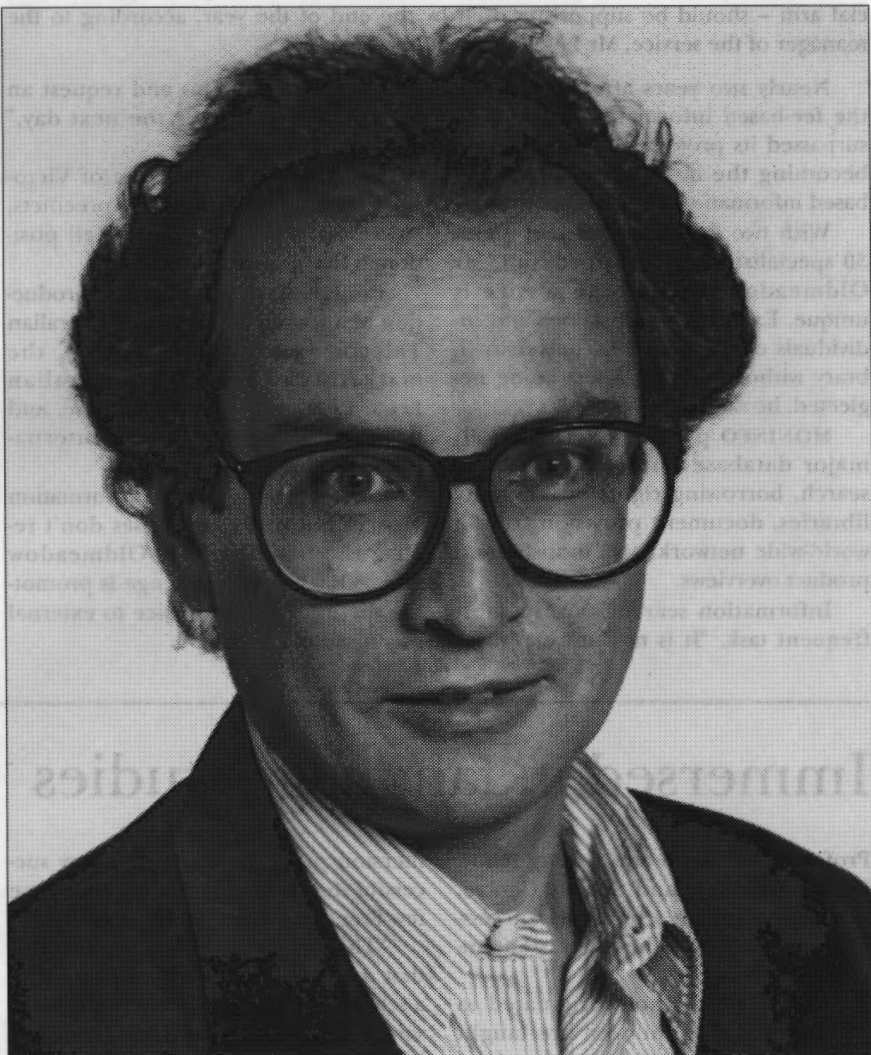
Mr Linger says another valuable aspect of the system is that it provides access to reference material on each component of the infection process.

The amount of money devoted to AIDS research, and the consequent explosion of knowledge, has seen researchers move to mass storage systems based on compact disc read-only memory (CD-ROM).

Individuals maintain their own idiosyncratic mental images of what happens at a cellular level during an AIDS infection ... computer animation can illustrate the process.

"The last time I looked, there were 10 CD-ROMs on AIDS, containing traditional referencing information, commentaries and the full text of research articles," he said. "To date, I have focused on the Medline system on CD-ROM, using the Petri Net model to organise and structure the literature in such a way that the biologist can use the mouse to highlight a node in the model as a way of requesting a literature review on that specific topic."

"The biologist then has the ability to display just the bare minimum, such as title and author, but can then move on to the abstract from the Medline CD-ROM. The next level of detail would



Mr Henry Linger: specialists will interpret the same scientific data in different ways.

be the full text of the article, but we don't yet subscribe to these services.

"Each node is then described in my system's encyclopaedia. You can use key words alone or in combination to extract the information you want, and when new information comes in, the system will be set up so that the person maintaining it can select important information, attach it to the relevant node or delete information which has been superseded."

"The notion is that once it has been modelled, any subject of interest related to AIDS becomes the basis of the organisational structure of the information." The system also makes provision for a researcher reading the information to make comments.

With the growth of computer networks, researchers could use it to discuss and exchange information on a subject of mutual interest, using the model as a touchstone.

Mr Linger says this facility will be developed later because while researchers may agree at a general level, as specialists they are interested in particular information and will interpret the same scientific data in different ways.

This diversity of viewpoints may lead to an original model evolving simultaneously down divergent pathways to meet the needs of individual researchers.

"Then we need to look at the much more interesting problem of how the models can converge again," Mr Linger said. "The model itself then becomes a point of discussion, so that researchers will look not just at the data being produced, but why certain experiments were performed, and how their results may support the assumptions of one model versus another."

"All the elements that relate to a particular model can be stored in an encyclopaedic repository, where they are accessible to anybody interested. Potentially this could be part of office automation systems, where the researcher obtains the experimental results, records them in a lab book, writes the paper, and then links all the information into the model. In this way, you could extend the model and build upon the knowledge base."

The last component of Mr Linger's system is animation. He describes biology as an "inherently visual discipline", but one in which each individual is likely to maintain his or her own idiosyncratic mental images of what happens in a particular event or process during an AIDS infection.

Using an animation package, Mr Linger and his colleagues have provided animated sequences that illustrate the process of the HIV virus infecting a cell. But this is no ordinary animation, because just as the tool kit provides access to multilayered information – either as diagrams or text – the animation provides access to moving images at different levels of magnification.

It shows, for example, a broad view of HIV encountering a cell and then moving into the cell. By clicking on one part of the scene, the researcher can magnify it and show how this

Continued overleaf

Info service on call

The Monash Information Service (MONINFO) – the university library's commercial arm – should be supporting itself by the end of the year, according to the manager of the service, Mr Leigh Oldmeadow.

Nearly two years after its launch, the fee-based information service has surpassed its projected business levels, becoming the most active university-based information service in Australia.

With two full-time staff and about 30 specialist librarians to consult, Mr Oldmeadow believes the service is unique. External organisations and individuals could access the university library without primary users being neglected, he said.

MONINFO provides access to all major database services, market research, borrowing rights in university libraries, document provision from a world-wide network, and industry and product overviews.

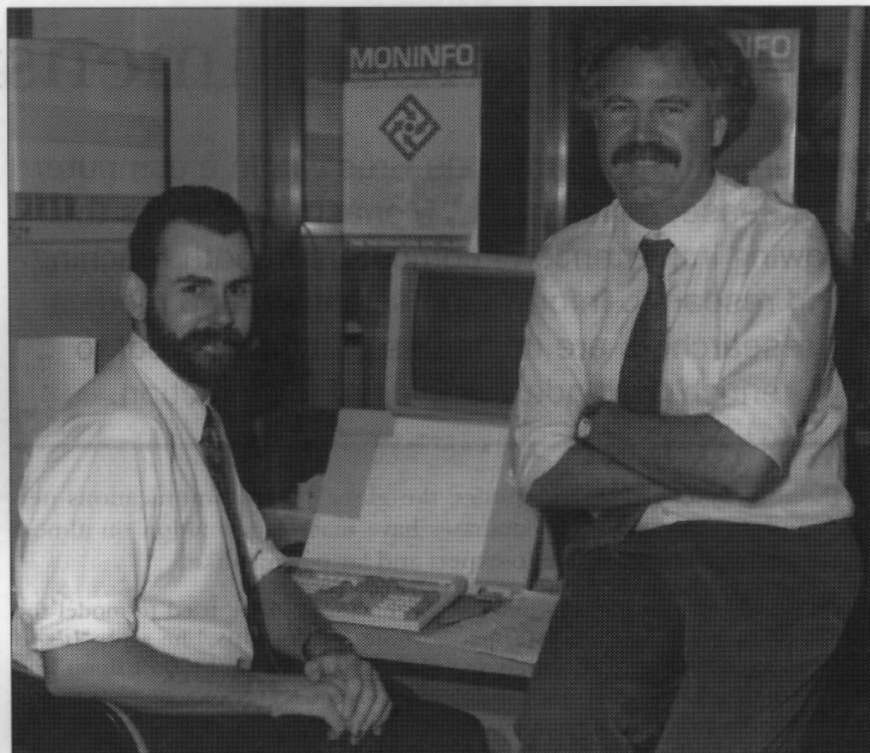
Information searches are its most frequent task. "It is not unusual for a

business to contact us and request an information search by the next day," Mr Oldmeadow said.

Located at Clayton, one of Victoria's recognised technology precincts, MONINFO is geographically well positioned for industrial business.

Projects have included the production of a source book for the Australian Telecommunications Industry, the marketing of the ALLI (Australian Legal Literature Index) database, and briefings for Monash ANZ International Briefing Centre.

"A real need exists for information services but many businesses don't realise the benefits," Mr Oldmeadow said. "Our biggest challenge is promoting the information service to external organisations."



MONINFO's Mr Neville Condon (seated) and Mr Leigh Oldmeadow.

Immersed in language studies

Professor Merrill Swain, visiting fellow in the Language and Society Centre, believes Australian schools are successfully implementing the immersion language method.

Under the method, originated in Canada in 1965, children are taught some or all of their subjects in a second language. The mother language, it is considered, will be mastered at home and in the first language classes.

Professor Swain, a pioneer evaluator of the teaching method, says that even though Australia's language situation is different to Canada's, immersion programs here could be just as effective in promoting bilingualism. In Vancouver, for instance, French im-

mersion programs had been very successful despite the fact that there were few French speakers there.

"The key to the method's success is that it is taught by teaching content in a school environment," Professor Swain said. "The reason it works is because language teaching and content teaching are integrated."

Professor Swain visited Australian schools using the method and found comprehension and language skills were very high, despite the limited hours of immersion. The schools usually offered from three to five hours of the program each week.

In Canada it is usual for at least half of all classes to be taken in the second language.

Professor Swain became involved in evaluating the method in 1971 in response to concerns raised about the first language skills of children in immersion programs.

She has concluded that there is "no negative impact at all. If anything there seems to be an enhancing effect on first language skills."

Children involved in the program also were high achievers in other areas of study, and their listening, reading and comprehension skills were enhanced.

The earlier a child was introduced to the program, the more confident they would be with the second language in adulthood, she said.



Professor Merrill Swain.

From previous page

process is mediated by an interaction between the virus's surface proteins and cell-surface receptors.

Another click magnifies this image, so that the researcher can actually look at the fine structure of the viral or cellular proteins, and gain an understanding of how they interact at the molecular level. Every structure is labelled, and the label in turn serves as a way of stepping through layers of text that provide increasingly detailed information on that structure.

This animated medium, Mr Linger says, is a powerful teaching tool and also is beginning to define a protocol for visualising the subject in the same way that researchers develop a specialised jargon – an agreed terminology that simplifies discussion and exchange of information.

If research shows that the visual model is wrong, it can be amended in much the same way that a mathematical model or a bibliography are amended to take account of new information, or the inaccuracy of previous information.

At a later date, the model could be extended to provide researchers with access to human DNA sequences, or to segments of the genetic code of the highly variable AIDS virus. Information of this type is currently assembled by the Los Alamos National Laboratory at the United States, and is available on disks to researchers who need it.

As the mathematical model underpinning the Petri Nets becomes increasingly sophisticated, researchers may be able to minimise their reliance on costly, time-consuming experiments and do 'experiments' on the model alone.

"We could explore the dynamics of infection using the mathematical model, and when the model provides useful information, it can be fed back into the Petri Net to improve the sophistication of the simulation," Mr Linger said.

Mr Linger, who has been working on his package for two years, believes it offers two main benefits. As an educational tool, the software could bring students and researchers up to speed on the subject of AIDS more rapidly than by any other method.

And while most researchers in the field will be familiar with the information contained in the system at a general, if not a detailed level, he believes that the way the information is structured will force researchers to think about their own activities in a much more organised way. They may see gaps in knowledge that they have been avoiding, or have simply overlooked.

With the mathematical model allowing the testing of new hypotheses, the system may begin to influence and formalise the pattern of experimentation, in contrast to its rather ad hoc nature today. "To *in vitro* and *in vivo* experimentation, we may soon be able to add a third mode – the *in machina* experiment," Mr Linger said.

Press cuttings

A selection of recent Monash print media coverage

MARCH

Modern Times – Professor Peter Singer, Centre for Human Bioethics: Not what you produce, but how much you spend.

6 The Herald-Sun – Dr Joseph Mathew, Mechanical engineering: SEC averts computer virus disaster.

8 The Sunday Age – Dr Helga Kuhse, and Professor Peter Singer, Centre for Human Bioethics: Should we be allowed to slip the bonds of life?

10 Herald-Sun – Mr Bill Yeadon, David Syme Centre for International Business: Need spawns expert export trading group.

12 Herald-Sun – Professor Jeff Northfield, Graduate Studies: VCE letter row.

13 Business Review Weekly – Dr Chris Sharpley, Stress Management and Counselling Clinic: How to manage workplace stress.

14 The Age – Dr Eve Fesl, Koorie Research Centre: Indocination fuels bigoted attitudes.

16 The Herald-Sun – Mr Ian Haig, Centre for International Briefing: Cap the republican spray.

18 Sydney Morning Herald – Dr Bob Birrell, Anthropology and Sociology: Gov't told to scrap migrant program.

18 The Australian – Professor Robert Porter, Medicine: Medical deans urged to fight cuts.

20 Business Review Weekly – Professor Janek Ratnatunga, David Syme School of Accounting: Mathew report in limbo as government turns its back.

21-22 The Weekend Australian – Mr Jeff Jarvis, National Centre for Australian Studies: Industry 'undervalued'.

23 Herald-Sun – Associate Professor Neil Cameron, Mathematics: VCE maths crisis.

24 The Bulletin – Dr Robin Gerster, English: Time tripping.

24 The Herald-Sun – Professor Bob Williams, Law: Prisoner clamp push blasted.

25 The Australian – Associate Professor Threadgold, English: Appointments.

25 The Age – Dr Kevin O'Connor, Geography and Environmental Science: Recovery could take some time.

26 Herald-Sun – Mrs Paddle-Ledinek, Monash University Medical School, Alfred Hospital: New skin hope on burns.

28 The Age – Associate Professor P. McGorry, Psychological Medicine: Attitude here to human rights none to glorious.

Wrestling with reason and the emotions

Can I be blamed for my emotions?

Dr Justin Oakley, a lecturer at the Centre for Human Bioethics, explores the significance of human emotions in his new book entitled *Morality and the Emotions*.

He argues that emotions have intrinsic moral significance and demonstrates that a proper understanding of emotions can reveal the important roles they play in our lives. He says too often emotions can be taken for granted, and they are often regarded as being outside the scope of reason and responsibility.

"We excuse ourselves from blame because of our feelings, and yet we praise those who have deep emotional capacities for sympathy and compassion," he said. "This ambivalence in our attitudes towards our emotions betrays a degree of ignorance about what they are and how they reflect on us."

"I believe that we don't think enough about how we feel, so we don't understand our emotions. I would like to see people debate the issue of what emotions are and how we may be responsible for them, as these are topics of relevance and interest for most people."

"For example, some people conclude incorrectly that because we

cannot change an emotion of ours at will, we cannot be responsible for having it.

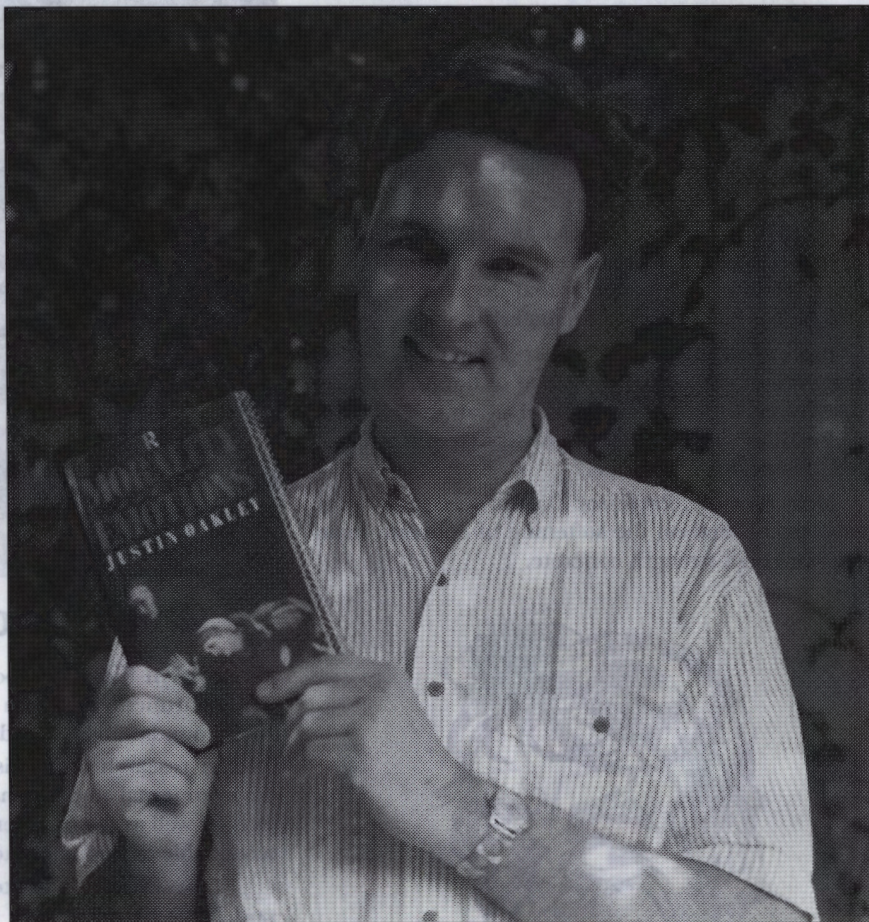
"But on reflection, we can see that little of significance in our lives is subject to such immediate control, yet we are still held responsible for those things."

He said philosophers were now showing a renewed interest in the emotions, but there had been little attempt to present an overview of how we can properly appreciate the moral significance of our emotions.

Morality and the Emotions looks at moral assessments which may justifiably be made about us because of our emotions, and also reveals the extent to which we are responsible for those emotions.

Dr Oakley has taught moral psychology and ethics at La Trobe University and Monash, and his writings have been published in several journals. The book, for non-philosophers and professionals, is a revision of his PhD which took five years to complete.

In the first month of sales, the book has sold more than 500 copies. It is available in hard back at the University Bookshop, Clayton campus, for \$59.95. A paperback edition will be available later this year.



Dr Justin Oakley, author of *Morality and the Emotions*.

Orchestra and choir in concert

The Monash University Choral Society celebrates 30 years of production this year with the Melbourne premiere of Mozart's 'Great' mass in C minor.

In its first major performance for 1992, the society will be joined by the new Monash Orchestra and highly-acclaimed sopranos Jane Edwards and Vivien Hamilton.

They will perform the newly-published Maunders edition of the Great mass, with anthems by Purcell and Handel, on Saturday 23 May at 8 pm in Robert Blackwood Hall.

According to the Choral Society's president, Mr Andrew Wailes, the

Mozart production shows the university's desire to become a major force in the cultural and musical life of Melbourne.

"The choir has built a reputation for producing high quality performances and provides an example for others to follow," he said.

"The high musical standards and youthful exuberance demonstrated by the choir in recent years has led to a high regard from within and outside the university."

He said the increasing number of offers from musical organisations to work with the choir, and healthy audi-

ence numbers, was a reflection of the choir's growing reputation.

The Choral Society is one of the university's oldest student organisations. To celebrate its 30th anniversary, the choir hosted 'Cherubfest II', a festival named after the choir's mascot, over the Easter weekend. It brought together past members, conductors and committee members.

Mr Wailes said to join the choir, no previous experience was necessary, and this non-auditioning policy had encouraged greater student involvement. The society has also launched a fund raising program for a proposed regional tour,



and hopes to participate in the Australian National Choral Championships in Wagga later this year.

Tickets for the 23 May concert are now on sale, and can be reserved at the Robert Blackwood Hall box office on extn 75 3090. For further inquiries and information regarding group concessions, contact Mr Wailes on 568 7374.



Lorraine Bayly and Lewis Fiander in *Dear Liar*.

Encore performances in subscription season

Some productions in this year's Monash subscription theatre season may be extended due to popular demand.

The Director of Monash University theatres, Phil A'Vard, said the season was shaping up to be one of the most successful yet. "Last year we tripled our subscriber base, so we are looking forward to an even better result in 1992," he said.

"The George Jenkins Theatre season in Frankston is ahead of budget, with three productions to go in only its second year of subscriptions. The season at the Alexander Theatre has also attracted a much greater response than last year's season."

Extra performances of the play *Dear Liar*, which opens in May, have already been scheduled to meet demand. This Australian premiere production stars Lorraine Bayly and Lewis Fiander and portrays an unusual love affair between George Bernard Shaw and Mrs Campbell: the original Eliza Doolittle. Internationally-known author, actor and director Jerome Kilty will travel to Australia to direct the play, which he wrote in 1960.

The Victorian State Opera production of *La Traviata*, which is directed by Reg Livermore, has already sold out. The final production of the season is *Shirley Valentine*, starring Amanda Muggleton.

Bookings can be made at the Monash Box Office on extn 75 3992.

▼ Darvall honoured

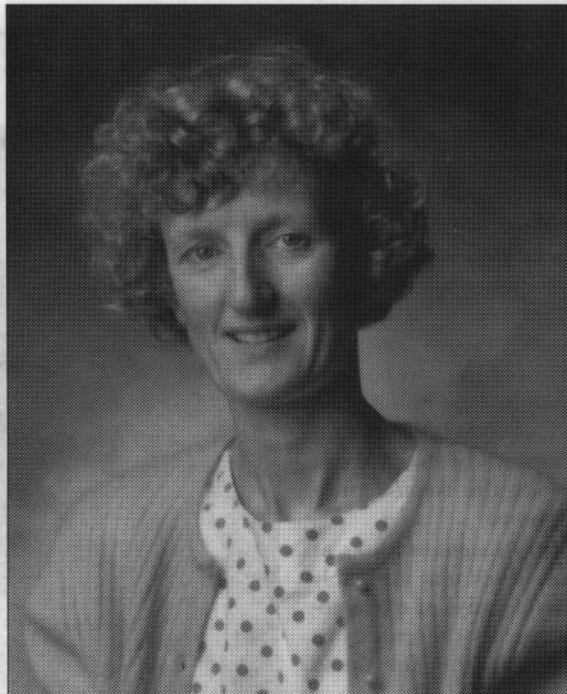
The Institution of Engineers Australia, Victorian division, has presented its 1991 Chairman's Award for Service to the Profession to the Dean of Engineering, Professor Peter Darvall.

After graduating in Engineering at the University of Melbourne in 1963, Professor Darvall gained higher degrees at Ohio State University and Princeton University, and a Diploma in Tertiary Education at Monash.

In 1970 he joined Monash as a lecturer in Civil Engineering and was subsequently promoted to senior lecturer and reader in that department. Since 1988 he has been Dean of Engineering.

Professor Darvall, now a recognised engineering education expert, is the president of the Australasian Association of Engineering Education, a Fellow of the Institution of Engineers Australia, and a Chartered Professional Engineer.

Most recently, Professor Darvall's research work has concentrated on the softening of concrete structures and high strength concrete.



▲ Green scholarship

Ms Bronwyn Ridgway (above), of the Civil Engineering department, has been awarded the Sir James McNeill Foundation Postgraduate Scholarship.

Her research project is on assessing the effects of environmental impact analysis on engineering projects, as well as the broader topic of the application of sustainable development to engineering projects.

"It is a great honour to win the scholarship", she said. This is the second consecutive year that the scholarship has been awarded to a Civil Engineering student.



▲ Polish community award

The Polish Government last month awarded Professor Jiri Marvan (above, centre), of the Department of German Studies and Slavic Studies, the Cross of Merit for services to the Polish community.

In his presentation address, Dr Waldemar Figal, a counsellor with the Polish Embassy, said that "the splendid work done by Professor Marvan and his colleagues in the Department of Slavic Studies has greatly expanded and sustained the interest of Australians in Poland and other Slavic countries".

■ Orchestral leader

Mr David Stefanski, a first-year student in the Faculty of Medicine, has been awarded the inaugural Vice-Chancellor's Orchestral Leader Scholarship.

His musical background includes completing his Associate Diploma in Violin while in Year 10 and a perfect VCE Music score in 1991.

The scholarship, worth \$2500, will be presented to Mr Stefanski at a concert in Robert Blackwood Hall on 23 May at which the New Monash Orchestra and the Monash University Choral Society will perform.

Competition for the scholarship also attracted six other string players to the orchestra.

■ Engineering chair

Associate Professor Peter Dransfield has been appointed to a personal chair in the Department of Mechanical Engineering.

After a period as an associate professor at Oklahoma State University, he took up appointment as a senior lecturer in the Department of Mechanical Engineering at Monash in 1968. He was promoted to associate professor in 1971.

He has made scientific contributions in several fields of fluid power engineering, such as dynamic modelling, analysis, design and control of high pressure hydraulic control machines, vehicles and industrial automation systems.



▲ Mathematics scholarship

Monash's first International Women's Day Scholarship has been awarded to Ms Tahl Kestin (at right) of the Faculty of Science.

The scholarship, proposed by the Vice-Chancellor, Professor Mal Logan, recognises an outstanding female mathematics student. It was awarded to Ms Kestin on the basis of her 1991 VCE results. She gained a VCE score of 403, which included a perfect score for the maths subject Change and Approximation. The scholarship is worth \$6000 over three years.

Ms Kestin, a former student of Bialik College, is pictured with (from left) the Manager of the Equal Opportunity Office, Dr Margaret James; Professor Logan; and the Head of the Department of Mathematics, Professor Warren Ewens.



■ Medical chair

Dr Stephen Holdsworth has been given a personal chair in Medicine.

Dr Holdsworth graduated MBBS from Monash University in 1970. He has held positions including professorial registrar in the Department of Medicine and nephrology registrar. From 1975 to 1977 he was an NH&MRC fellow in the Nephrology and Medicine departments. He was admitted to the degree of Doctor of Philosophy at Monash in 1978.

Dr Holdsworth was appointed senior lecturer in the Department of Medicine at Prince Henry's Hospital in 1980, after spending two years in the United States on fellowships. He was promoted to reader in 1981. His research activities focus on glomerulonephritis, the major cause of kidney failure. He has also made an important contribution to the understanding of the male reproductive function in chronic renal failure.

■ Telecommunicating in residence

Senior telecommunications managers from 16 countries in the Asia-Pacific region attended a residential seminar, organised by the Public Sector Management Institute, at the Banks Hotel, city.

Twenty-five representatives from telecommunications agencies, government ministries and regulating authorities, examined key issues to be faced over the current decade in this rapidly-changing field. They heard presentations from 30 prominent Australian and overseas speakers from telecommunications carriers, government, business and Academe.

Benefits of the seminar, opened by the Vice-Chancellor, Professor Mal Logan, included ex-

ecutive development for regional managers, forging further links with countries in the region, and promoting Australia's telecommunications products and support skills.

The keynote address was delivered by Mr Mike Hutchinson, Deputy Secretary of the Department of Transport and Communications. Sponsors included Telecom, the Australian and Overseas Telecommunications Corporation, government organisations and telecommunications manufacturers. Through sponsorship, Monash provided a fellowship covering fees and accommodation for each participating country, as well as assistance with air fares.



Delegates and staff (from left) are: Chairman of Sri Lanka Telecom, Mr Veron Watson; Dr Anna Bodi, GSM; Vice-President of Indonesia's INDOSAT, Mr Herman Simandjuntak; GSM conference manager, Mrs Irene Thavarajah; GSM Director, Professor Bernard Barry; Dr Peter White, of La Trobe University; Head of Inspectorate General INDOSAT, Mr Abdoel Djabar; Chief of Cambodia's ITMC, Mr L.Y. Sam An; GSM conference convener and senior research fellow, Mr Tony Neustead; and Assistant General Manager, Telekom Malaysia, Mr Mohd Zakri Hasan.

DIARY & COURSES

MAY

1 *Accounting and finance seminar* 'Company takeovers and equity returns: The target size effect', by Associate Professor Don Anderson, University of Queensland. Room 954, Menzies Building. 2.15 pm.

Psychology colloquium 'Implicit evidence for retained linguistic competence in agrammatism', by Dr Doug Saddy, University of Queensland. Room 306, Biology Building. 2.15 pm.

History discussion 'Hungary after the revolution', by Dr Elizabeth Boross. Room 614, Menzies Building. 2.15 pm.

4 *Physiology seminar* 'Fetal lung development and oligohydramnios', by Dr Kerry Dickson. Seminar Room, Department of Physiology. 4 pm.

5 *Music seminar* 'The voices of the rainforest: Problems of ethnomusicological activism and representation', by Dr Steven Feld, University of Texas. Room S807, Menzies Building. 9.30 am.

6 *Environmental forum* 'Koories, nature and spirituality'. Rotunda 6. 5.15 pm.

7 *Monash Technology Precinct forum* 'Commercialising technology', by Professor Denis Kiellerup, Syme Centre for Enterprise Development and Mr Don Anderson, Amskan Limited. Auditorium, Telecom Research Laboratories, 770 Blackburn Road, Clayton. 4 pm.

South-east Asian Studies seminar 'The 1973 student revolution in Thailand: Report on fieldwork', by Ms Eli Bartak. Room 515, Menzies Building. 11.15 am.

8 *Accounting and finance seminar* 'An architecture for computer-based accounting systems: New directions for research', by Dr Peter Seddon, University of Melbourne. Room 954, Menzies Building. 2.15 pm.

Psychology colloquium 'Evaluation of comprehensive health programs: Quit and Sun Smart', by Dr Ronald Borland, Centre for Behavioural Research on Cancer. Room 306, Biology Building. 2.15 pm.

History seminar 'Doing public history', by Chris McConville. Room 614, Menzies Building. 12 noon.

11 *Women's studies seminar* 'Culture and contemporary sexuality: How to live with romantic love and feminist deconstruction', by Ms Bernice Martin, University of London. Room S703, Menzies Building. 1 pm.

Physiology seminar 'Cloning and expression of the ovine growth hormone receptor', by Dr Tim Adams,

University of Melbourne. Seminar Room, Department of Physiology. 4 pm.

13 *Comparative literature and cultural studies* 'A Female Genealogy: George Sands' family', by Marie Maclean. Room 809, Menzies Building. 3.15 pm.

Environmental forum 'Nature as a spiritual guide', by Ms Susan Beckio. Rotunda 6. 5.15 pm.

Genetics and environmental biology 'Tissue specific expression of a proteinase inhibitor in the flowers of ornamental tobacco', by Dr Angela Atkinson, University of Melbourne. Room 662, Biology Building. 4.15 pm.

14 *South-east Asian Studies seminar* 'The informal sector in Indonesia: Developments and policies', by Dr Bob Rice. Room 515, Menzies Building. 11.15 am.

15 *Accounting and finance seminar* 'An empirical analysis of the ED39 Longform audit report on user perceptions of the auditor's role in financial reporting', by Mr Grant Gay and Mr Peter Schelluch. Room 954, Menzies Building. 2.15 pm.

Psychology colloquium 'Huntington's disease: A paradigm for understanding brain-behaviour relationships', by Associate Professor Edward Chiu, University of Melbourne. Room 306, Biology Building. 2.15 pm.

History seminar 'Derrida and history: Is there anything beyond the text?', by Kevin Hart. Room 614, Menzies Building. 2.15 pm.

18 *Professional development forum* David Suzuki launches his new book *Wisdom of the Elders - Bridging native and scientific visions of the natural world*. Monash Medical Centre. 5.30 pm. Cost: \$40. Bookings: Ms Belinda Van der Zipp, 550 2708.

Physiology seminar 'Cholinergic and non-cholinergic nervous control of adrenal catecholamine release', by Dr Philip Marley, University of Melbourne. Seminar Room, Department of Physiology. 4 pm.

19 *Faculty of Business research seminar* 'Disclosure and measurement in accounting: Some deficiencies and their exploitation', by Mr Chris Warrell, Australian Stock Exchange. Clayfield Room, Caulfield. 11 am.

20 *Environmental forum* 'Fire and the environment: What do we want and how do we get there?', by Mr David Packham, Bureau of Meteorology. Rotunda 6. 5.15 pm.

Genetics and environmental biology 'Molecular analysis of a gene involved in lipopolysaccharide biosynthesis in *Dicellobacter nodosus*', by Mr Steve Billington. Room 662, Biology Building. 4.15 pm.

21 *South-east Asian Studies seminar* 'The West New Guinea crisis 1961-62: Australian involvement in a new perspective', by Mr Pierre Hutton. Room 515, Menzies Building. 11.15 am.

Music seminar 'What's new in Tippett's opera *New Year*', by Dr Sue Robinson. Room S807, Menzies Building. 9.30 am.

22 *Accounting and finance seminar* 'Leptokurtic stock distributions: Implications for option valuation', by Mr Howard Chan. Room 954, Menzies Building. 2.15 pm.

Psychology colloquium 'Cortical mechanisms that be involved in localising the source of a sound in space', by Dr John Brugge, University of Wisconsin. Room 306, Biology Building. 2.15 pm.

History book discussion 'PC (political correctness) - a review of Dinesh D'souza's *Illiberal education: the politics of race and sex on campus*'. Room 614, Menzies Building. 12 noon.

26 *Faculty of Business research seminar* 'Consolidation accounting and piecemeal acquisitions', by Mr Chris Grainger and Mr Trevor Wise, University of Melbourne. Clayfield Room, Caulfield. 11 am.

27 *Comparative literature and cultural studies* 'Mass Mediauras, or: Art, aura and the media in the work of Walter Benjamin', by Professor Samuel Weber. Room 809, Menzies Building. 3.15 pm.

Environmental forum 'Institutional auditing: Issue of culture and environment in psychiatric hospitals', by Mr Peter McCallum, Deputy Chief Psychiatrist, State of Victoria. Rotunda 6. 5.15 pm.

Genetics and environmental biology 'Biotechnology at Burnley: Applications to horticulture and agriculture', by Dr Karen Neilson, Burnley. Room 662, Biology Building. 4.15 pm.

29 *Women's studies seminar* 'Investigating gender differences in language maintenance', by Dr Anne Pauwels. Room S426, Menzies Building. 11 am. Clayfield Room, Caulfield. 11 am.

Psychology colloquium 'Movement control systems and animal models', by Dr Mal Horne. Room 306, Biology Building. 2.15 pm.

JUNE

5 *History seminar* 'The capital of capitalism: the image and reality of New York city, 1890-1990', by Professor Ken Jackson of Columbia University, a Fulbright Fellow attached to the Department of History. Room 614, Menzies Building. 12 noon.

SHORT COURSES

Sales management executive program

The David Syme Faculty of Business is organising a three-day course for sales and marketing managers in consumer, industrial and service organisations. The course, to be held between 20 and 22 May, costs \$895. Inquiries: Ms Margaret Butterley, extn 73 2302 or 73 5425.

Manufacturing management course

A two-day course, providing manufacturing executives with a solid understanding of advanced manufacturing management technologies, is being held from 14 to 15 May. Cost: \$850. Inquiries: Ms Margaret Butterley, extn 73 2302 or 73 5425.

Marketing management principles and practice

Designed to meet the needs of participants in consumer, industrial, service and government organisations, this intensive program will be run between 22 and 26 June. Cost: \$1500. Inquiries: Ms Margaret Butterley, extn 73 2302 or 73 5425.

Monash agribusiness

The Graduate Diploma in Agribusiness is designed for managers in full-time employment working in the food and fibre industry. The course covers management concepts and practice for the agribusiness sector. It comprises eight five-day residential ses-

sions, spread over two years and is being organised by the Faculty of Business. Inquiries: Mr Christopher Kimberley, extn 73 2304, or Ms Elaine Layton, extn 74 4312.

Image processing and graphics courses

Advanced computer animation and visualisation. 6-8 May. Cost: \$950.

Introduction to image processing and analysis. 12-14 May. Cost: \$950.

Image processing and analysis software packages. 15 May. Cost: \$360.

Programming and using Renderman. Evenings of 19 and 26 May, and 2 June.

Arts and crafts classes

Classes in pottery, jewellery, batik painting, landscape photography, South-east Asian cooking, and porcelain doll making will commence in the next month at the Arts Crafts and Tuition Centre. The centre also holds life classes and will run a children's holiday program. Inquiries: Ms Tess Mora or Mr Luke Harris on extn 75 3180.

Computing short courses

One and two-day short courses in DOS, spreadsheets, desktop publishing, project management, word processing, database development, and object oriented programming are being held by the Pearcey Centre

for Computing. For further information, contact the centre on extn 73 2489, or fax 563 5173.

Towards a better understanding of the VCE

The Monash Professional Development Centre is presenting an eight session series on various aspects of the VCE for principal teachers, students, parents and the general public. Presenters and topics will be wide-ranging to give a broad understanding of the VCE. Interested people can attend one or all of the sessions.

Dates: 28 April and 16 June. Cost: \$10 per session or \$65 for the series. Inquiries: Ms Joan Szalman on extn 75 2787.

Leadership seminar

The Syme Leadership Seminar series is to include a presentation by Sir Edward "Weary" Dunlop. The seminar is to be held on 20 May at 5 pm. For further information, contact Ms Jennie Haynes on extn 73 2590.

Finite element method

An intensive short course, on the Clayton campus, providing a general overview of the method. Course content covers element formation, types of elements, modelling techniques, applications in fracture mechanics, dynamics and industrial problems. Inquiries: Office of Continuing Education, extn 73 2806, fax 73 2805.

ARGUABLY, PHILOSOPHERS have a lot to answer for. For one thing, high school graduates can't get the right answers to very simple questions about fractions, percentages, simultaneous equations, or any of a number of other things that citizens of a clever country really should be able to answer with one hand tied behind their back.

This year, the University of Melbourne's distrust of the secondary school system was so deep that they administered an extra mathematics test to many of their first-year students. Alas, the results deepened their distrust.

Generation after generation of children undergo compulsory mathematics education, and they experience boredom, anxiety, loss of self-esteem, and other forms of relatively intense suffering. This suffering might be justified, if it led to some great long term benefit. Yet many children learn just one lesson really well: that they cannot do mathematics. Their parents suffer along with them; so do their teachers. This tragedy of epic proportions is at least partly the fault of philosophers.

In the first two or three decades of the twentieth century, a revolution took place in the foundations of mathematics. Partly because of Bertrand Russell, mathematics was rewritten in the language of set theory. This new set theoretical philosophy of mathematics had a profound influence on some key figures who were doing research on child development and education in the middle of the century, notably Piaget.

These educationists, in turn, influenced a radical change in the teaching of mathematics. It took over half a century for the new philosophy to travel from the academies to the classrooms. But when it finally did influence educational policy, its impact was felt by almost every person across several generations in many countries. Yet this 'set-theory theory' of mathematics is mistaken. Mathematics is not a theory about sets, it is a theory about patterns.

Now I hear rumours on the grapevine that another philosophy of mathematics is influencing the formulation of new educational policies: this time emanating from a passionately obscure philosopher called Ludwig Wittgenstein. According to the Wittgensteinians, mathematics consists of practical activities meshed with manipulations of symbols which do not refer to anything.

This stands in direct opposition to Platonism, which maintains that the symbols of mathematics do



by John Bigelow

refer to real things, called forms. According to Plato, the forms are very, very real; more real in fact than the world of appearance that we see and hear around us. According to the Wittgensteinians, the forms are mere shadows cast by systematically misleading metaphors embedded in ordinary language.

Wittgensteinians and other opponents generally assume that Platonism is false, and that this philosophy of mathematics should not guide educational practice. This implies that Plato's academy would have produced more and better mathematicians if only the academicians had realised that mathematics is just a family of socially constructed language games. That is manifestly absurd. Plato's academy was a focus for one of the greatest outbursts of mathematical creativity that the world has ever seen, so the relevance of Platonism cannot have been much of a hindrance to the educational process.

The true core of Platonism is realism: the doctrine that mathematics has a subject matter, that its

symbols refer to things which exist in the real world. Educational policy should reflect this. We should not just teach children to manipulate symbols according to rules. Rather, we should encourage them to ask what the symbols refer to, and we should try to help them to perceive the patterns in the world that are referred to by mathematical symbols.

However, there is an 'other-worldliness' about Platonism which is not friendly to experimental science. Plato imagined forms as being outside space and time, but what are much more interesting are the mathematical patterns which can be perceived in this world. Often it is hard to see them, because so many different patterns are overlaid on one another. That is why experiments are needed: the patterns in nature can be made visible by careful experimental design.

Nevertheless, I become profoundly nervous whenever I contemplate educational policy. Any monoculture in mathematics education will run enormous risks. The secret of the golden age of Plato's Greece was certainly not that an efficient bureaucracy imposed Platonism on everyone. Likewise, the secret of success during the Renaissance in Galileo's Italy was not the imposition of a uniform Platonist education policy.

In fact, it works exactly in reverse. Mathematics advanced fastest in times and places where there was very little central control: for instance in Italy or Germany before unification, rather than in Spain under the Inquisition. A centralised bureaucracy, like that of Rome or China or Egypt (or Canberra), is unlikely to generate an explosion of creativity.

We should not seek any single solution to the perceived crisis in mathematics education. Indeed, we should harbour a deep distrust of all 'solutions'. Our best strategy would be to fill the schools with teachers who love mathematics the way that Platonists usually do. And teachers should be encouraged to ignore central planning when they can see that it does not work in the classrooms.

So philosophers have a lot to answer for – on two grounds. In the first place, they have strayed too far from the truth this century: they have thrown out the Platonist baby (mathematical realism) along with the Platonist bath water (sexism, right-wing politics, and other-worldly intellectualism). Secondly, and more importantly, they have failed to nourish educational practice in the schools with a sufficiently balanced diet of varied and digestible mathematics.

Professor Bigelow is Head of the Department of Philosophy.

DIOGENES



The pace was maintained through lunch, when the second bottle of wine helped produce Human Hovel, an appropriate and agreeable title for a project aimed at cleaning up the Melbourne-Sydney highway.

But that afternoon the font began to run dry.

The call came while the alcohol still held the company's director in its loose and languid grasp. The inquirer was obviously Scottish.

He had invented, it transpired, a new computer, and wanted to call it The Real McKay.

"This will be the Big Mac of computers," he thundered down the line in tones dripping whisky. "It'll make everything else on the market look thud-rate. Aye, superseded."

"With your help we are goin' to be bugger than that American clan of pretenders. Hah! From now on there'll be nae such thing as a piddlin' 'mouse'. It'll be called a moose, the true Scots pronunciation."

"I intend giving the computer back to the Scots, where it belongs. So what I need are appropriate names for all the other wee things like disks, hard drives, keyboards, monitors and so on."

After he had hung up, the director sobered up. He began pencilling names on a pad. The Real McKay? Not a bad start. He called in his staff. Three hours later they compared notes. The results were mixed.

Someone had toyed with the idea of calling the keyboard a tartan, on the grounds that both the pattern of letters and plaid were irregular and just as difficult to comprehend.

Another suggested that the hard disk be renamed the caber. "Well," he began hesitantly when questioned, "I think some comparisons – tenuous, I admit – could be drawn in the way the caber can be difficult to get moving, makes a noise when it crashes, and takes one person to operate but an army to set up."

Eyes were downcast. It was proving a lot harder than first imagined. Then someone mentioned bagpipes, the archetypal Scots symbol.

Puzzled expressions met the speaker. "The bagpipes and computer programs. The link is obvious and explicit. Look, what effect do bagpipes have on most people? Awe coupled with confusion. Add the fact that both programs and pipes leave their audi-

ence ambivalent, and you have the perfect link."

The speaker sat down. No one was convinced. A different approach was needed, and the director knew that drastic steps had to be taken.

To set the scene and fire the collective imagination, he ordered several bottles of expensive malt whisky. The alcohol soon began to work its spell, and by the early hours of the following morning tentative progress had been made.

It made sense, it was agreed eventually, that if the computer were to be called The Real McKay, then it followed that the names of its parts should be similarly existential.

Suggestions slurred off the tongues around the table. The Absolute Monitor, the Substantial Keyboard, the Meaningful Floppy Disk, the Palpable Hard Drive and, of course, the Essential Moose. Everybody went home happy.

By next morning, staff were back at work on a new title. It was for a chirpologist who dealt exclusively with dogs. They broke for an early lunch after someone suggested Soft-Paw Cornography.