MONTAGE

NEWS FROM THE CAMPUSES OF MONASH UNIVERSITY

VOLUME 4 ISSUE 1 MARCH 1993 16 PAGES

SAVANT

The long twilight of the Khmer Rouge

➤ Analysis P12

RESEARCH

Koorie plant knowledge rediscovered

➤ Research liftout

ORIENTATION

How to find out about Monash

➤ Story P5

New UV laser focuses on single cells

A chance meeting of minds between two laser physicists on opposite sides of the globe has resulted in the invention of a new type of ultraviolet laser.

The physicists – one from Monash University and the other from a physics institute in Hungary – are now perfecting the laser for potential applications as diverse as inscribing ultrafine circuits on computer chips and performing laser 'surgery' on individual cells.

Dr Rod Tobin, of Monash's Department of Physics, and Dr Karoly Rozsa, of the Hungarian Academy of Sciences' Research Institute for Solid State Physics in Budapest, each had been working on separate research projects to develop such a laser.

In fact, both researchers had foreseen its potential applications and were directing their research efforts to meet the commercial demand. Working together last year for just a few months at a time in each others' laboratories was the catalyst for their collaborative success.

Until now, the systems used to generate ultraviolet laser beams have been relatively expensive and complicated. The beauty of the new laser tube is its low power needs, low cost and long life.

Exploiting a known scientific principle, it can produce a highly focusable beam in the 200- to 300-nanometre ultraviolet range, just beyond the wavelength of visible light. This makes it suitable for a wide range of uses in biological science and technology.

"For a lot of applications, such as irradiating single cells, you don't need a high-powered beam, just a fine focus," Dr Tobin explained. "It works the same way as a magnifying glass focusing the warmth of sunlight into a very hot, bright spot.

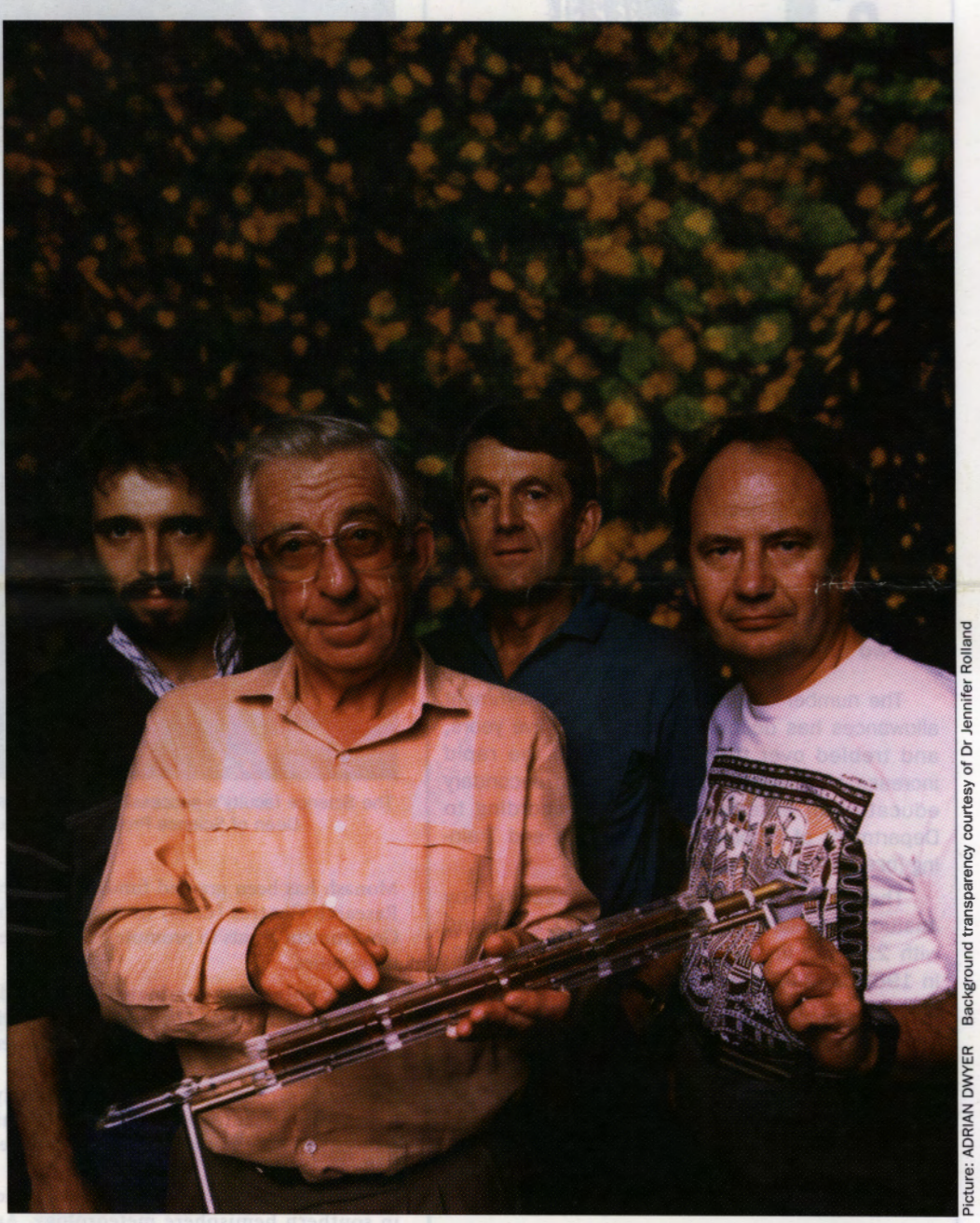
"At wavelengths of UV light shorter than 250 manometres, DNA in living cells can be damaged; it is possible that our laser could be used to perform very small-scale surgery on pieces of DNA.

"I became interested in the potential of UV lasers in absorption spectroscopy. The proteins strongly absorb ultraviolet light, and the fraction of the transmitted radiation can be used to measure the quantity of protein.

"Existing devices use a mercury-vapour lamp, but it's an incoherent light source that can't be focused to the same degree as a laser. To measure protein in minute concentrations you must have a focused, stable light source of UV light. Our laser should provide that."

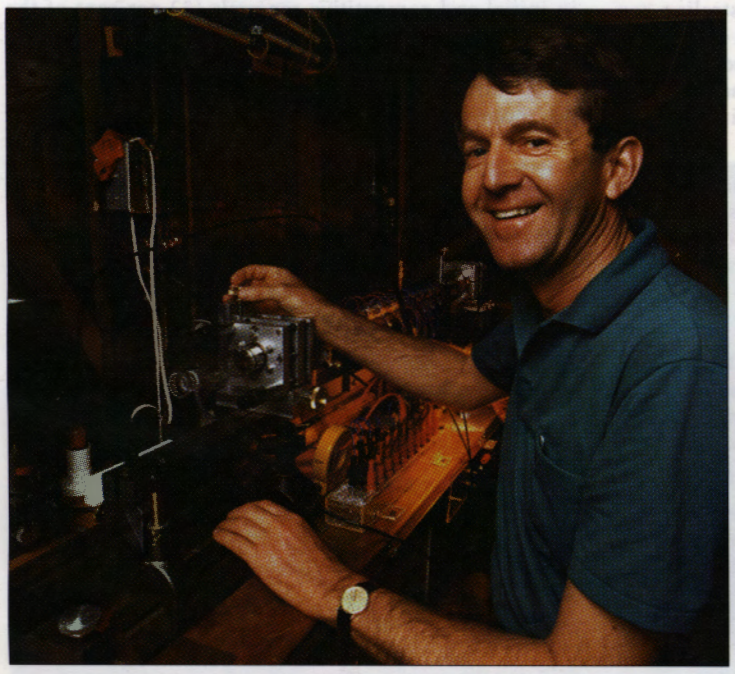
The laser could also be used in a technique known as immunofluorescence, in which mercury-vapour lamps are currently used to detect antibodies binding to cells. The antibodies, tagged with fluorescent dyes, show up under light of varying wavelengths (see background of picture at right for an example).

The very fine focus of the laser also makes it potentially suitable for photolithography to produce microelectronic circuits. A microcircuit is chemically etched from a surface covered with a light-sensitive material called photo-resist. The lines of the circuit are cut into a mask, and light is shone through the mask to expose the material.



Picture: ADRIAN DWYER Background transparency courtesy of Dr Jennifer Rolland

Pictured holding the laser tube prototype are Dr Rod Tobin (left front) and his Hungarian collaborator Dr Karoly Rozsa. At rear are their colleagues Dr Donko Zoltan and Mr Ken Peard.



Mr Ken Peard with a prototype of the ultraviolet laser.

As microcircuits have continued to shrink, manufacturers have moved to shorter wavelengths of visible light. Blue light is currently used, but finer circuits will require ultraviolet wavelengths. At this end of the light spectrum, any blurring of the beam can cause the exposure of the photo-resist to smear, resulting in a defective circuit.

Monash is considering applying for a patent for the Tobin-Rozsa laser. Already, an Australian company has expressed interest in commercialising the design.

"Normal research grants support the development of the science of an original concept, but to develop a commercial prototype will require additional investment," Dr Tobin said. "With adequate funds, we believe we could be ready for production in three years," he said.

Research liftout: *A chance collaboration*

IN THIS ISSUE

NOW & THEN

25 YEARS AGO

A report on the university building program notes the completion of the Law School, the "Circular Lecture Theatre Block" and the Religious Centre. On the drawing board and under construction were an Administration Annex, Education Building, Main Library stage two, and the "Great Hall".

15 YEARS AGO

Monash has urged the Universities Council to establish a new scheme of university research fellowships to reverse the 'brain drain'. In its 1979–81 triennium submission, the university says many of our best graduates travel overseas for further experience because of a lack of research opportunities in Australia.

5 YEARS AGO

Professor Graeme Davison questioned the value of university faculties adopting business models of management, as proposed in the Dawkins Green Paper on higher education. He said while efficient use of resources was vital, the replacement of elected deans and chairmen by chief executive officers, as recommended, would affect morale and efficiency.

THIS MONTH LAST YEAR

Five cooperative research centres are to be set up at Monash following the second round of Federal Government grants. More than $11 million will be given to the CRCs, all of which are in the Faculty of Engineering. The centres will research advanced ceramics processing, polymer blends, hardwood fibre and paper science, catchment hydrology and maritime engineering.

THE SPIKE

■ Olympic history repeats?

The School of Marketing, which is hoping to secure the 1995 World Marketing Congress, is already on a short list of only two contenders to play host to 500 of the world's leading marketing academics.

With the final decision due in May, supporters including the Lord Mayor of Melbourne and the Melbourne Tourist Authority are hoping that history doesn't repeat. The other city? Atlanta.

■ Two times, three times tables

The number of students receiving government allowances has doubled over the past five years, and trebled over the past ten, with the rapid increase in students either staying in secondary education or entering university, according to Department of Employment Education and Training (DEET) figures.

The total number of students assisted by Austudy last year was around 464,900, compared with 224,793 in 1987 when the scheme began. In 1988, 152,025 students received study assistance.

Fifty-one per cent of Austudy recipients are tertiary students. Of these, 36 per cent receive the living at home allowances; 28 per cent, away from home allowances; 30 per cent, independent allowances; and 6 per cent, education supplement allowances. DEET says the growth in Austudy also reflects a broadening of eligibility for assistance.

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Montage is published by the Monash University Office of University Development.
Views expressed by contributors in *Montage* are not necessary endorsed by Monash University.
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Articles may be reprinted in whole or in part by permission of the editor.
Editor: Greg Williams, Public Affairs Department, phone (03) 565 2085, fax (03) 565 2097.
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Graphic artists: Peter Bartelt, Phil Scamp.
Macintosh layout: 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. VBG0435.

Science takes CRC honours

The Science faculty's successful CRC applicants (from left) are Professor Barry Hart, Professor Gordon Lister, Dr Sam Lake, Dean of Science Professor Ian Rae, Professor John Hamill, Professor Ian Nicholls and Dr David Karoly.

Monash has been granted funds for six new Cooperative Research Centres (CRCs) in the third round of Federal Government grants to promote links between industry and universities.

The university dominated the round, in which 18 centres were funded. About $35 million will be spent on the new centres – four in the Faculty of Science and two in the Faculty of Engineering – next year.

In the second round announced early in 1992, the Engineering faculty was awarded $11 million for five centres. Over seven years, funding is expected to total $255 million.

The six new centres (see box) will undertake research in southern hemisphere meteorology, Australian geodynamics, freshwater ecology, international floriculture, new methods for power generation and telecommunication network technologies. The Dean of Science, Professor Ian Rae, commented that in addition to directing four centres, researchers from the faculty also were involved in the power generation CRC.

"The success of the faculty in competitive schemes emphasises not only the quality of its staff and their research proposals, but also the maturation of government plans to divert money from recurrent funding of universities into competitive schemes," he said.

"Thus, science finds itself having to reduce staff numbers to meet its recurrent budget at the same time that its leading scholars are granted access to substantial grant funds."

He said that following the faculty's success with ARC large grants, in which science staff were awarded $894,500 in initial and competitive renewals (32 per cent of the Monash total), several proposals were funded under the ARC Mechanism B and C grants. Science also gained two of the three grants under the new Committee for the Advancement of University Teaching scheme.

Southern Hemisphere Meteorology (Dr David Karoly, Centre for Dynamical Meteorology, Department of Mathematics). To undertake meteorological research of the southern hemisphere. Programs will focus on the ozone layer, global transport modelling, and southern hemisphere climate dynamics.

Australian Geodynamics (Professor Gordon Lister, Victorian Institute of Earth and Planetary Sciences). To understand the tectonics, structure and geochronology of the Earth's crust, particularly how sedimentary basins and crystalline terrains have evolved.

Freshwater Ecology (Professor Barry Hart, Water Studies Centre, Department of Chemistry, and Dr Sam Lake, Ecology and Evolutionary Biology). To provide an ecological basis for the sustainable management of Australian temperate region surface waters, provide information to support freshwater management, and improve understanding of key processes in Australian freshwater ecosystems.

International Floriculture (Professor John Hamill, Genetics and Developmental Biology). To improve the understanding of genes controlling flower differentiation and to develop methods for efficient genetic engineering of commercial species.

New Technologies for Power Generation from Low-rank Coal (Professor Tamarapu Sridhar, Chemical Engineering). To develop new, efficient, cost-effective and environmentally acceptable technologies for electricity generation from low-rank coals.

Research Data Network (Professor Fred Symons, Department of Electrical and Computer Systems Engineering). To conduct research and education programs in telecommunication network technologies applications and services. The Monash program, one of four, will look at the high-speed network applications interworking and performance issues involved in the design and operation of new data network.

Pilot project to tackle uni places shortage

Professor Robert Pargetter launches the Year 13 project.

VCE students will be given the chance to take first-year university subjects under a new pilot project launched by Monash.

The university has introduced Year 13, which allows students who miss out on tertiary places to study first-year university subjects, including those offered through Open Learning, at school.

The project, which has received a $1.4 million grant from the Department of Employment Education and Training (DEET) Reserve Fund, will involve nearly 1000 students at more than 20 schools this year. An expanded program will operate in 1994. Swinburne University of Technology will receive $1 million for its pilot program.

According to Deputy Vice-Chancellor, Professor Robert Pargetter, the pilot project offers Year 12 school leavers a great opportunity to study tertiary subjects.

"The project eases the pressure off Year 12 school leavers to repeat studies and provides students with guaranteed credit transfers into degree courses," Professor Pargetter said. "Year 13 increases the options available to school leavers and the response from schools has been incredible."

He said the Year 13 program would be developed by a school to centre around and support students studying Open Learning subjects. "Monash will assist schools to develop support schemes for year 12 leavers who wish to access tertiary education through Open Learning," he said.

Under the Monash plan, students who successfully complete Open Learning subjects, will receive credit transfers if they enrol at a university or TAFE college.

Monash will provide a range of support services to assist schools, including briefing sessions for each Open Learning subject offered, study materials, teaching staff development programs, regular school visits to advise students on credit transfers and future pathways, as well as undertaking research and evaluation of the project.

Schools taking part in the Year 13 project who choose not to charge student fees (apart from the Open Learning charges) will be provided with financial assistance to cover establishment and teaching costs, and to improve library and computer facilities. Monash has guaranteed that up to 100 places in the Bachelor of Arts will be available in 1994 for Year 13 students who successfully complete relevant subjects. More students than this may be admitted.

New media open up to university study

A new era of university education was launched last month with the official signing of the Open Learning project agreement between the Federal Government and Monash University.

The Government has given $28 million to the Monash-led consortium to establish the Open Learning project. A further $25 million will be provided for separate technology support and Austudy payments.

The signing of the Open Learning project agreement by the Minister for Higher Education and Employment Services, Mr Peter Baldwin, and Monash Deputy Vice-Chancellor and Head of the OLAA, Professor Robert Pargetter, ended more than two months of negotiations.

Mr Baldwin said the signing was a milestone, marking a new era of higher education which is open, accessible, and provides flexible study arrangements and credit transfers. "This will pave the way for thousands of additional students to undertake university study at the pace and place of their choice," Mr Baldwin said.

Open Learning, which has received more than 15,000 inquiries since December, will be offering 19 units for first semester starting in March. This will increase to 75 by the end of the year, with up to 150 units available by 1995.

Open Learning Agency of Australia (OLAA) is the name of a Monash-owned company through which a consortium of Australian universities will offer subjects via several study methods, including print, television, radio and computer.

The Vice-Chancellor of Monash University, Professor Mal Logan, said Open Learning was set to revolutionise higher education in Australia. "Open Learning provides access to quality university education to everyone," he said.

"The study opportunities will enable students to complete a university degree either through a unique study method or by a combination of off- and on-campus study."

For first semester, Open Learning students will be able to study subjects including accounting, anthropology, Australian studies, Australian environmental studies, marketing, mathematics, politics, French, statistics, psychology, religion, Spanish, and science and technology.

Students may complete a degree in two ways: by using their Open Learning credits to enrol in a university course on campus, or applying for a degree on the basis of their Open Learning studies.

Monash has introduced a Bachelor of General Studies and a Bachelor of Business Studies, which are particularly suited to Open Learning students.

On enrolling, Open Learning students are provided with a package of study material. Some subjects also use television, radio or computer-based learning methods.

Pictured at the Open Learning launch are (from left), Curtin University VC, Professor John Maloney; Monash Deputy VC, Professor Bob Porter; Charles Sturt VC, Professor Cliff Blake; Executive Director of Open Learning, Mr Tony Pritchard; the Minister for Higher Education and Employment Services, Mr Peter Baldwin; Deakin University VC, Professor John Hay; University of South Australia VC, Professor David Robinson; and Monash Deputy VC, Professor Robert Pargetter.

Pictured with the *Dinosaurs of Darkness* kit are (from left) cast-maker Ms Lesley Kool, and teachers' information book cowriters Ms Sanja van Huet and Ms Cindy Hann.

Dinosaurs in the classroom

Dr Pat Vickers-Rich spent a large part of last year engrossed in hypsilophodont and ornithomimosaur femurs, labyrinthodont bones and plant fossil samples.

She was helping to bring dinosaurs into the classroom. The resulting *Dinosaurs of Darkness Science Activity Kit* has been designed to help teachers of primary students in Years 3–8.

Dr Vickers-Rich, of the Department of Earth Sciences and Ecology and Evolutionary Biology, cowrote the teachers' information booklet with geography teacher Ms Cindy Hann of Wesley College, and Ms Sanja van Huet of the Science Teachers' Association of Victoria.

The kit investigates some of the world's most interesting dinosaurs: those that lived near the South Pole and are found fossilised in 110 million-year-old rocks in the Otway and Strzelecki Ranges on Victoria's south coast.

Dr Vickers-Rich says that when the word dinosaur is mentioned in a primary classroom it receives the instant attention of most students.

"Unfortunately most kids only know about overseas dinosaurs, and not the unique forms which lived in cold or icy conditions near the South Pole," she said. "Dinosaurs found in Victoria lived in complete dark for several months each year."

Launched late last year by the Minister for Science and Technology, Ross Free, the kit includes durable epoxy casts of a variety of dinosaur bones, rock samples from different environments in which the dinosaurs lived, maps illustrating past geography of Australia, overheads for use in the classroom, a geological time scale, activity sheets for classroom use, and a 145-page teachers' manual.

Everything that a teacher needs to explain how fossils form, how sediments are deposited and form into rocks, how erosion takes place to expose fossils, how to identify bones, why dinosaurs are extinct, and many other questions and issues are presented in a way that primary-aged students can understand.

The activities in the kit require students to become scientists by using their powers of reasoning, deduction, data analysis, comparison and observation.

"We want to directly involve as many Australian students in some sort of scientific adventure so they will see us for what we really do and not as people in ivory towers who have no connection with the rest of the world," Dr Vickers-Rich said.

Dinosaurs of Darkness also stresses to school teachers that science isn't just for people in elaborate laboratories. In the kit's programs, children work with samples that are readily available and that they collect themselves.

The authors have made themselves available for further consultation. They plan to hold annual in-service sessions to upgrade the kit. To obtain a kit, contact Dr Vickers-Rich in the Earth Sciences Department, or fax extn 75 4903.

Young scientists hardest hit by research cuts

Cuts in grants for Australian medical research will escalate the 'brain drain' and place further strains on university research funds.

The Associate Dean (Research) in the Faculty of Medicine, Professor Mollie Holman, said 1993 funding from the National Health and Medical Research Committee (NH&MRC) had taken a nosedive.

In the latest round, new and existing grants were cut overall by 2 per cent and the success rate for applications was the lowest on record. In addition, there were severe cuts in funds for new applications, especially those for technical and research assistance.

"The success rate for new project grant applications has dropped from 30 per cent in 1992 to only 19 per cent for 1993," she said.

Monash fared better than the national average with 28 per cent of projects approved, although this was down from about 40 per cent in 1992.

"The NH&MRC funding this year was such a shock because it fell down so suddenly," Professor Holman said. "It's so wasteful when you think that 80 per cent of all work that went into those applications has been wasted."

The total value of grants, both continuing and competing, awarded to Monash was $5.118 million, compared with $5.507 million last year

"The medical researchers who have been hardest hit this year are our brightest and best," Professor Holman said. "Last year, 20 young scientists received the prestigious R. D. Wright award; this year it is only 13.

"Unsuccessful applicants are all likely to go overseas. It seems ironic with all of the recent talk by our politicians of 'a clever country' that such a situation should be tolerated.

"Unless something is done now to reverse the trend in the run down of medical research in Australia, the brain drain will escalate. The clever country will without doubt lose some of its cleverest people."

Professor Holman said that for the past 10 years the success rate of applications for NH&MRC project grants had remained between 30 and 40 per cent. "It seems that the dramatic shortfall in Commonwealth funding for medical research was caused partly by the increase in expenditure on superannuation, together with the significant increase in salaries that occurred last July.

"Furthermore, the impact of new initiatives begun during the previous triennium, when the scheme was expanding, were not funded in the 1992–93 Budget. As late as November, there was still a shortfall of $3.4 million."

An extra $2 million was obtained to offset the superannuation problem, but the remaining $1.4 million was covered by the two per cent across the board cut. Professor Holman said the reduction was worrying, given the uncertainty surrounding research funding in 1994.

Monash projects funded by the NH&MRC include a study by Dr Ben Canny, of the Physiology department, of pituitary gland cells that control the body's response to stress; and one by Associate Professor Barry McGrath, of the Monash Medical Centre, of kidney hormone systems that cause salt and water retention in patients with heart failure. Dr Rob Widdup received an R. D. Wright Fellowship. The university received three grants for large items of equipment for research relating to birth defects, particularly Down's syndrome.

Major unis to work on closer ties

A unique agreement between Monash and the University of New South Wales will have a significant impact on research, teaching and international activities.

The Vice-Chancellor of Monash, Professor Mal Logan, said that both universities had a similar history, extensive research skills, ethnic diversity among students and staff, and were major players in the education of overseas students.

Under a memorandum of agreement, signed last week, the universities will cooperate in the following ways. They will:

- pursue joint activities in the offering of a Foundation Studies Certificate (or equivalent) in Asia, with particular emphasis on Indonesia;
- jointly examine the likely implications of offering common Foundation Studies courses elsewhere;
- explore the possibility of joint representation in specific countries overseas;
- mutually audit the academic and administrative function of schools, departments and administrative units;
- participate in staff exchange for purposes of professional development; and
- where appropriate, cooperate in the development of software and administrative procedures.

Professor Logan said the two major universities would also be able to present, where appropriate, a joint voice on matters relating to research, the quality of teaching and international activities.

Between them, the two universities have about 70,000 students and staff.

The Vice-Chancellor, Professor Mal Logan.

Letters to the Editor

Feral pest 'monopoly'

From C. H. Tyndale-Biscoe, Director, The CRC for Biological Control of Vertebrate Pest Populations

In two articles in your September issue you reported on Dr Yan Gao's studies on controlling the fertility of wild mice and Professor Short's ideas on how these results might be used to aid in the reduction of some of Australia's major pest species.

You quoted Professor Short as saying that research funding for controlling feral animals was being monopolised by the CSIRO, whose techniques would not be ready for a number of years, while he had something right now that could control rats, mice and foxes.

First, the CSIRO does not monopolise research funds for feral animal control. The Division of Wildlife and Ecology has been engaged in research to control feral mammals for 40 years. Its studies included rabbits, mice, dingoes, water buffalo, wild pig and, to a lesser extent, feral cats. Many of these studies have provided the essential knowledge of the species' ecology, social behaviour and physiology on which to build resilient means of control.

Two recurring problems in trying to develop effective control methods have been the species' ability to evolve responses that enable it to overcome the agent – bait shyness, disease resistance – and the difficulty of finding cost-effective ways to distribute the agent of control. Five years ago we came up with a novel concept that might address both these problems – a species-specific immunocontraceptive that would be delivered in a species-specific virus that spreads through the population.

To test the feasibility of this idea requires the input of many disciplines: reproductive immunology, endocrinology and ethology, virology, molecular biology, immunology, and field ecology and mathematical modelling. None of these are easy and all require able and committed scientists and very substantial resources.

Being a novel idea, it took several years to get funding to test this. It involved substantial redirection of existing resources with the Division of Wildlife and Ecology, additional CSIRO funds obtained by hard competition with other divisions, Rural Industry funds obtained in open competition, and funds from the Endangered Species Advisory Committee, again in open competition.

From this base, we developed a proposal with colleagues at the Australian National University, Agriculture Protection Board of WA, and the Department of Conservation and Land Management in WA for a Cooperative Research Centre (CRC). This was successful on the second round in December 1991.

This large multidisciplinary centre is now in a position to test the new concept in a rigorous way. It is the result of the commitment of many scientists and extensive competitive review; to denigrate this as a monopoly of resources is inaccurate. Professor Short also says: "CSIRO does not yet have any idea how to control the fox. CSIRO can't tackle the rabbit without first tackling the fox."

This is not accurate either: we are studying both species at the same time as part of the ecological program of the CRC is a large field study in WA examining the interactions between foxes, rabbits and small marsupials. Another study is in the planning stage to be done in NSW in collaboration with the Department of Agriculture.

Second, Professor Short claims to have a method to control rodents and foxes without any of the bother that has beset everyone else who has worked in this difficult field. Interference with reproduction using steroids has been tried before and a major problem is that, since sex steroids are crucially involved in sexual and social behaviour, affected individuals lose their status in the population are replaced by other unaffected individuals.

Another important feature of wild rabbits, learnt from earlier work at CSIRO, is the profound importance of social status in the warren for successful breeding. Similar patterns have been shown in foxes in Scandinavian studies. The antiprogestins that Professor Short refers to may be more effective than steroids in reducing the fecundity without affecting behaviour but it will take far more than a year to do the necessary research in a wild population.

A particular problem in moving from the preliminary research to application is that RU486, being an abortifacient, is a prohibited drug in Australia. To find an antiprogestin that is specific to the mouse, the fox, or the cat, and satisfy the Australian regulatory authorities that it may be broadcast widely in the countryside will also take several years.

The problem of distribution still remains. Putting out baits is a labour intensive and costly business and must be carefully assessed against the actual benefit. Therefore, on all these counts the claim to have "something right now that could control rats and mice" is inaccurate at best and raises false hope in those who have to cope with the depredations of pest species.

We have learnt over the years that there are no quick fixes for the control of pest species – that is the reason they are such a problem and why we are committed to the long haul in the search for a truly effective approach to biological control of vertebrate pests.

Hugh Tyndale-Biscoe
Canberra, ACT

'Ghoulish' transplants

From John Gill, Systems Programmer, Administrative Management Information Systems (AMIS)

I would like to make some comments on the article that appeared in the November 1992 edition of *Montage* titled 'Transplant miracles expose moral grey areas' by Lynn Gillam.

While I hold no disregard for the article as such, I do take great offence at the second paragraph which states:

"And yet, for one person to receive a transplant and a chance at life someone else must die, usually suddenly and violently, in the prime of life. To be waiting for a transplant is to be waiting for someone to be killed …"

While this is, unfortunately, the case in some instances it should not be stated in such a way as to make the transplant recipient appear to be the grim reaper, hovering over any unsuspecting person, just waiting for them to die. The person is already dead, the fact that they then become a transplant donor is an event after the fact.

Once a person has died they no longer need the use of any organs. The fact that these organs can then be transplanted into another person, for the express purpose of improving that person's life, should be seen as a great thing and not something that should be discouraged or devalued.

It is statements such as this that create a false impression of the moral situation of the transplant recipient, be it kidney, heart or lungs. We should not be darkening the outlook of transplant recipients or others.

This statement could easily influence the feelings of a potential transplant recipient towards themselves in a negative and possibly damaging way. All cadaver transplants are done from totally anonymous donors and as such the recipient has, at no time, any contact with the donor or the donor's family.

Often people who have received transplants go on to have productive and useful lives in the community, when they would otherwise be condemned to a machine-bound life. Even at Monash we have people who have completed both undergraduate and postgraduate courses, made possible only through an organ transplant.

Organ transplants and their recipients should never be seen as a ghoulish or grotesque procedure, but instead a gift of life from one person to another. To picture a recipient as someone just looking for death to occur not only downgrades the stand a recipient has as a person, but produces a false and misleading view of the real situation.

John Gill
Clayton

Becalmed in a sea of hectic activity

More than 8000 new Monash students will taste the calm before the study storm during Orientation Week.

Five days of orientation activities, beginning on Monday 22 February, have been planned for the university's Clayton, Caulfield, Gippsland, Frankston and Parkville campuses.

The chairman of the joint orientation program committee, Dr Ian Ward, said Orientation Week filled a vital role within the university community. "Monash offers one of the largest student introduction programs in Australia, and is the first university to offer first-year student camps and student guides," Dr Ward said.

A feature of the week-long program is the diverse range of displays and activities planned by the clubs and societies, supported by academic information sessions, a host scheme and guided tours. Activities include boating on the Yarra, picnics, and weekend camps at Somers and Torquay.

"The diversity of events planned for the program is enormous and includes cultural, sporting, and academic activities," Dr Ward continued. "I think Orientation Week captures the spirit of Monash and becomes the official launching pad for the academic year."

Each campus will hold an official opening ceremony followed by academic information sessions and activities. Gippsland students will be given an overview of the campus and a bus tour of the local area.

Pondering: Orientation Week offers one of the largest activities programs in Australia.

The Pharmacy College, which is taking part in Orientation Week for the first time, will offer tours of the Parkville campus, picnics, river cruises, and boating at Studley Park. Frankston, Caulfield and Clayton campuses will present student theatre, sporting competitions, and street performers and buskers.

"The whole idea of Orientation Week is to make the transition to university life less intimidating," Dr Ward said. "The emphasis is on having fun and making new friends." Full Orientation Week programs will be available on each campus.

Host scheme eases the shock of the new

Students new to Monash will have their culture shock eased, thanks to a small army of student guides hosting first-time visitors to the university.

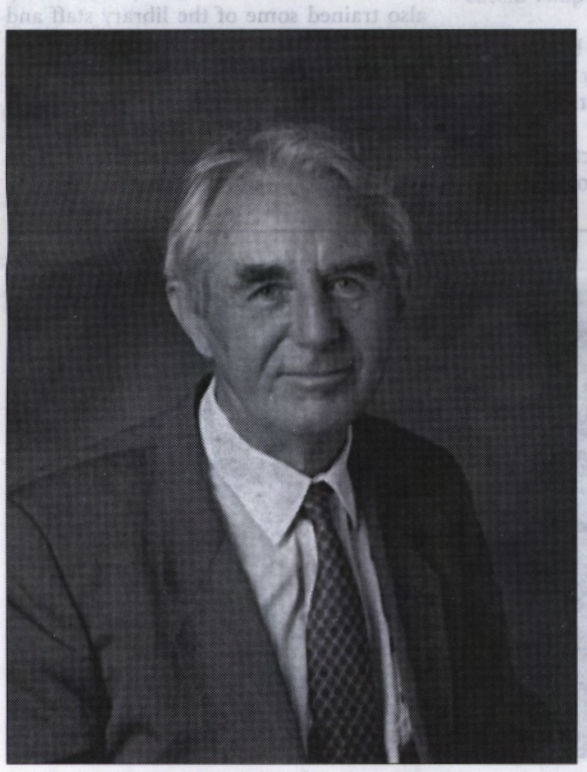
Hundreds of Monash students have volunteered to host more than 8000 new students during Orientation Week.

The host scheme, the only one of its kind in Australian universities, was introduced several years ago to help new students make friends and find their way around the campuses.

Host day at Clayton will feature a barbecue, tours of the university, games, sporting competitions, a visit to the movies, as well as evening entertainment. Other campuses will also hold similar activities.

The hosts are also involved in six weekend summer camps, held at Somers and Torquay during February. Host organiser, Mr Jeff Mentiplay, believes that new students benefit from the activities.

"The whole idea is for new students to meet other people and have fun," he said. "It allows students to make the move from school less intimidating and to become familiar with the layout of the campuses."



Professor Gus Sinclair: under his deanship, the faculty has grown and become more outward-looking.

A decade of economic change

When Professor Gus Sinclair reverted to the role of research professor early this year, it marked the end of a 10 year term as Dean of the Faculty of Economics, Commerce and Management (ECOM).

During Professor Sinclair's deanship, the faculty has seen many changes. The Bachelor of Commerce and Bachelor of Accounting degrees have joined the Bachelor of Economics to form a highly regarded set of programs combining economics, accounting and management studies.

The Graduate School of Management, which Professor Sinclair established, has developed its MBA into one of the leading programs of its kind in Australia. "This has brought prestige to the university and the faculty as a centre of graduate management education," he said.

The ECOM faculty has attracted Australia's leading economic modelling team from the University of Melbourne. It has received funding for its Public Sector Management Institute, National Centre for Health Program Evaluation and Key Centre in Industrial Relations.

Professor Sinclair first came to Monash in the 1960s as a senior lecturer in economic history. He returned in 1983 as Dean of the Faculty, at that time under its original name of Economics and Politics.

He says the faculty has become more outward-looking. "We were the first university faculty in Australia to establish a full fee paying overseas students program," he said. "We were keen to respond to the governmental initiative because it provided a means of retaining our strong international flavour without depriving Australian residents of places."

The establishment of offshore delivery of the faculty's courses is a particularly exciting development, he says. Since 1988, the first year of the faculty's undergraduate program has been taught at Sunway College, Kuala Lumpur. This was a radical development for Monash at the time and has become a model for other projects.

But perhaps the faculty's biggest change will occur in the middle of this year when ECOM and the David Syme Faculty of Business merge.

Professor Sinclair attributes the time this merger has taken to come to fruition to marked differences in the culture of the two faculties. He does not expect that the merger will diminish the present healthy diversity of degrees at the undergraduate level, and hopes that it will lead to the development of a coherent graduate program.

He says, looking to the future, Monash needs to strike a successful balance between taking account of continuing changes in its external environment and keeping in view the more enduring values which determine a university's standing as a centre of learning.

Law students taste banking

Law students have been going to lunch with Australia's top banking executives to soak up the ambience of corporate life.

So far, more than 100 law students studying banking and finance have taken part in the full day visits to major commercial banks in the city.

At these visits, groups of about 20 third- and fourth-year students attend lectures given by senior bank management on the activities and function of each bank and trends for banking in Australia. The students then have the opportunity to meet with the high-ranking executives at an informal boardroom-style lunch.

Associate Professor Wickrema (Wicky) Weerasooria, who teaches the subject of Banking Law, says the visits have considerable goodwill, business and promotional value for both the banks and the students.

"The students are exposed to the culture of banking," he said. "It's very unlikely that a university student would normally come into contact with senior bank management. Most would only meet a bank teller or perhaps their bank manager."

The banks get a chance to meet with senior students who soon will be practising as lawyers or working in corporate institutions. "They are their potential customers as well as their future employees," Dr Weerasooria said.

It was important that students were given experience of the marketplace. "Unless we do that we are talking technicalities rather than the realities of banking," he said. "They are actually meeting the decision makers so they gain some idea of what's happening."

Some students may change their opinion of the banking sector following the visits. "They can now put a human face to the image of corporate banking in Australia, which has recently been taking a heavy dose of bank bashing," he said.

"There are a lot of public perceptions about banking that are generated by the media and consumer groups and it would not be fair for students to leave university without having the chance to make up their own minds."

Associate Professor Wicky Weerasooria (fourth from left) with a group of third and fourth year law students on a recent bank visit.

The students do an assignment on the bank visits as a part of their coursework. "It's been so well received that now they try to come for more than one visit," Dr Weerasooria said.

Examining anatomy on cue

An interactive computer learning program for first-year medical students has been developed by two undergraduates in the Faculty of Medicine.

As a third-year project, Mr Zeev Duieb and Mr Andre Corniou set up a system for the study of histology (cell structure) and anatomy. Using high quality colour images, the program probes the students' knowledge and then provides a rating of their performance.

Mr Duieb says the IBM-compatible program updates the current system where students examine histology slides during practical classes and are then assessed on their ability to identify images of tissues projected onto a screen.

"With the interactive computer program, which uses questions taken from previous exams, students can test their own knowledge whenever and as often as they like," he said.

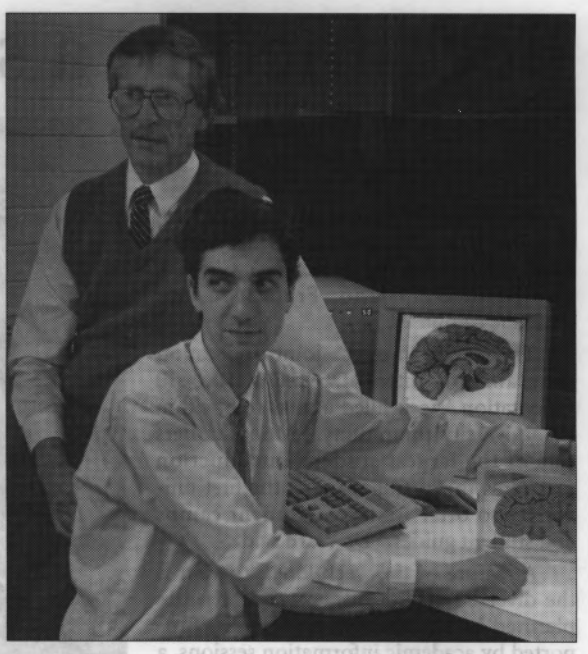
"The computer becomes the teacher and the student gets hands-on computer experience. It is now a necessity for medical people to use computers," Mr Corniou added.

"The earlier students become comfortable with them, the better."

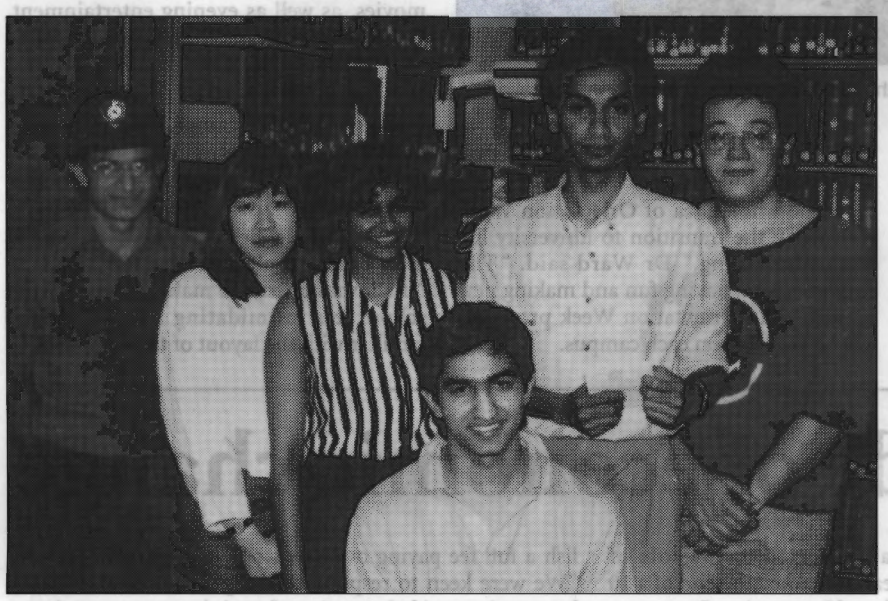
Computer interactive programming is one subject option available to third-year students under the Faculty of Medicine's new curriculum. Supervisor of the option, Professor David Barkla, says this sort of programming hasn't been done before by medical students in Australia.

The main advantage of the program is that a broad range of images – including photographs, slides, drawings, and those taken directly from a microscope – can be provided at just one outlet. Mr Duieb and Mr Corniou transferred the various images onto the program using digital image acquisition techniques.

At present, only one computer in the faculty is running the program but as further resources become available the program will be installed more widely.



Pictured with an on-screen brain section from the interactive program are (left) Professor David Barkla and one of the students who developed the system, Mr Zeev Duieb.



Happiness is a touch screen

Six final-year computing students have made it easier to find out about the Biomedical Library with an innovative touch screen system.

The information service was designed as part of their last major group project. BLIS (Biomedical Library Information Service) provides information on where to find or how to use the reference system, catalogues, photocopiers, audiovisual equipment, a telephone or a quiet discussion area.

The system is expected to be most useful at busy times, when library users will be able to access basic information without waiting in a queue.

Students in the group (pictured at left) were Elly Budidjaja, Pedro Gonzalez, Noorali Kherani, Udaya Gammanpila, Priyanka Paranagama, and Deenesha Wickremasinghe.

Subject librarian Ms Vivien Bernath says that working with the students was most enjoyable.

"The group was extremely dedicated to the project and spent many hours in developing this helpful system," she said.

"In addition to the final product, they also trained some of the library staff and provided a maintenance manual so that we can update the system when required."

The system is the first in the Monash libraries to use touch screen technology. The Hargrave Library has an information system called HARRI.

A summer of science

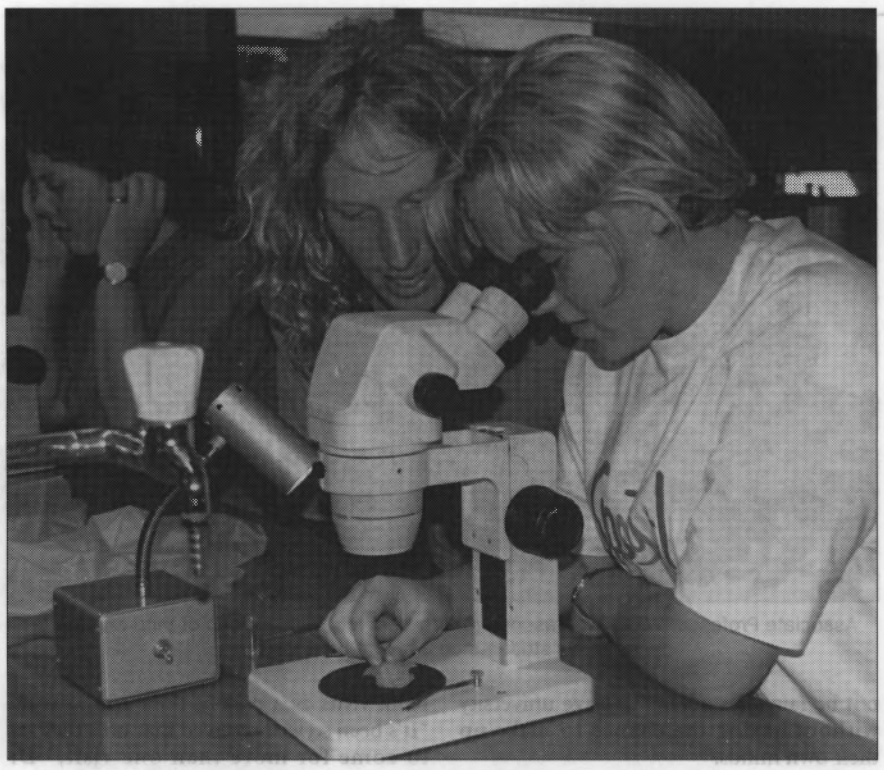
Almost 190 students from metropolitan, country and interstate secondary schools last month attended a science summer school at Clayton campus.

The fourth annual school for students beginning Year 10 was organised by the Australian Science Industries Association, Rotary and the Faculty of Science and was sponsored by Siemens. Throughout Australia, more than 2500 students attended 21 similar summer schools.

Course director, Mr Graham Miller, a retired secondary school principal and physics teacher, said the Year 10 students were just about to make important decisions about courses in their schools.

"We hope that the summer school will introduce them to the breadth and diversity of courses and careers in science," he said. "We believe that if they persist with science at school they will then be better able to select appropriate tertiary science courses, leading to careers in science-based areas."

Students attended lectures by Monash academic staff, including Professor Roger Short, Dr Andew Prentice and Professor Roy Jackson. They took part in hands-on laboratory work and visited university departments, the Telecom Research Laboratories, the Monash Medical Centre and CSIRO research divisions.



Secondary students take part in a hands-on laboratory session.

For the first time, school leavers were interviewed for the medical student intake.

More than marks in medicine

Monash's medical students were this year selected on their motivation and their ability to talk to patients, as well as their marks.

For the first time, many school leavers were interviewed by the Faculty of Medicine for selection into medicine and judged on communication skills, personality and motivation.

The new approach aims to ensure that the university produces doctors who can work as a team and who listen to their patients. It will also help choosing between students clustered around similar grades in the VCE. Some top scoring students gained entry to Monash on academic merit alone. Those with VCE scores marginally below this group were interviewed.

The interview, conducted by a panel of three people (a faculty member, a Monash medical graduate and a lay person), was worth up to eight marks. This score was combined with the student's VCE score to rank the interviewed students for selection.

"Fifty years ago communication wasn't a formal part of the curriculum, but a lot of doctors were very good at it," said Dr Michael Kidd, who runs Monash's communication program. "Then suddenly we got all this wonderful technology, and everyone in health tended to focus on this.

"The focus moved away from patients and their needs, leaving them dissatisfied. But medicine is not just physical, it is psychological and social, and doctors ignore those things at their peril."

Dr Kidd said teaching students to listen was often one of the hardest and most important skills. A government standing committee report recently found that overprescription of pharmaceuticals was due to poor doctor–patient communication and advocated communication skills training for medical students.

Monash reader in anatomy Dr Peter Tutton, who ran the selection interviews, said many students still applied for medicine only because of their marks.

While high marks in the sciences were good predictors of aptitude in written university exams, interview scores and English marks were better predictors of success in oral examinations where everything went through the lens of communication skills.

RESEARCH
MONASH

Recovering Koorie food lore

Before Europeans arrived in Australia, Aborigines practised a form of casual farming that made the most of abundant natural plants. But European agriculture and grazing rapidly changed the land and much traditional knowledge was lost.

Dr Beth Gott: "The settlers ... hated the bush and they looked on the Aborigines as people who had done nothing to change the environment."

Australia's Aborigines were nomads who did not practise agriculture or build permanent dwellings – at least, this is what history and hearsay would have us believe.

Dr Beth Gott, who has made an extensive study of the pre-European diet of Victoria's Aboriginal tribes, offers a very different view of how Victoria's Aborigines lived before the coming of the white man.

She has pieced it together by searching through historic records and personal accounts of white people who lived during the century when catastrophic change occurred to a culture that had evolved over 40,000 years.

Her research has shown that Victoria's Aborigines knew the state's plants and ecosystems so intimately that they were able to make an easy, almost sedentary living. Certainly, they lived in a sustainable relationship with the land, but it was a land that they had extensively modified over the millennia to suit their own ends.

"Most people have a view of Aborigines as being constant nomads, moving from place to place," Dr Gott said. "But this image is derived from the desert Aborigines who had to keep shifting because plant and animal resources are sparsely distributed in the arid zone.

"Early accounts from Victoria, for example by William Buckley, an escaped convict who lived with Victoria's Aborigines, showed that they would stay for several months in one place because the resources were very rich, especially in the western district.

"There was plenty of permanent water – some of the lakes and streams have now vanished – which offered very large numbers of waterbirds, a plentiful supply of eels, lots of small mammals, which have now largely disappeared, as well as vegetable food.

"The western district is the one that I suspect has been most transformed by European settlement; the settlers had an urge to Europeanise the landscape. They hated the bush and they looked on the Aborigines as people who had done nothing to change the environment."

Dr Gott says she set out to examine what might have happened to Victoria's 'bush' as a consequence of Aboriginal activities before the Europeans arrived.

Contemporary accounts suggest that half their diet consisted of animals, while the remainder was drawn from hundreds of different plants, some of which also served utilitarian purposes. Their staple diet came predominantly from beneath the soil surface: from storage organs such as tubers, bulbs, and corms.

"If you look at the literature, there are a whole series of references to roots as staple foods," Dr Gott said. "It appears to have been the case for most of south-eastern Australia and the south-west of Western Australia where winter rainfall predominates. The plants grow in winter and flower in spring, and then die back to resting tubers and other underground storage organs to survive the dry summer.

"People with a European mind-set see winter as being the unfavourable season, but for Aborigines it was summer because that was the time of water scarcity. When you look at small herbaceous plants, you realise that tubers were available virtually year round, although some were more palatable in certain seasons."

Dr Gott says the most frequently mentioned staple food was a yellow-flowered native dandelion called murnong (*Microseris lanceolata*), which actually tasted something like a radish. Early explorers reported that millions of murnong plants covered some areas of the landscape. Major Thomas Mitchell described the plains west of the Grampians being turned yellow by flowering murnong in spring.

The Murnong, a yellow-flowered native dandelion, was previously abundant all over Victoria.

Bracken was a source of starch: shoots were laid in fire ash, then pounded to remove carcinogens

"Edward Curr, an early settler in the Barmah area, described how the wheels of drays used to turn these plants up by the bushel," Dr Gott said. "When Europeans introduced sheep into Victoria, they ate not only leaves, but dug up the shallow tubers and the plants rapidly became scarce.

"Moonin Moonin, an Aborigine from the Melbourne area, reported that cattle and sheep had eaten all the murnong around the Merri Creek area within five years of Melbourne being settled. The Aborigines knew what was happening with their food supply."

Before Europeans arrived, women in dry-land areas went out in small parties armed with digging sticks to dig up small tuberous plants. Dr Gott says these plants have a characteristic tendency to grow in clumps if left undisturbed. Women would dig in these patches but leave a number of plants behind and the remaining plants would grow better; a practice similar to a horticulturist thinning out seedlings so that the remainder will grow larger.

The Aborigines also ate large numbers of orchid tubers. Dr Gott has conducted an experiment with a small species of greenhood orchid in which she removed several hundred plants from a small area about a metre square, and then watched for regeneration. Within 14 months the plants in the patch had re-established their former numbers – obviously from tubers that Dr Gott had missed or by growth into the cleared area.

She says there is evidence that Aborigines knew well to leave some plants to regenerate the dug patches. Neighbouring plants would invade from the edges of cleared areas, others would propagate by seed that germinated in the loosened soil of the patches, and surface litter turned into the soil during digging made the ground more fertile.

In practising this casual form of agriculture, Victoria's Aboriginal tribes extensively modified the soil over huge areas; early settlers remarked on the very loose nature of the soil and its fine tilth. With the advent of hard-hoofed European grazing animals, the loose soil was compacted, hindering regeneration. The combination of loss of soil structure, and competition with alien grazing animals would have had serious effects on the tribes' food supply.

Dr Gott says there is also evidence that the Aborigines made extensive use of controlled burns, which had the effect of returning nutrients to the soil in ash, and of creating the extensive tracts of open, grassy box-ironbark woodlands that led Major Mitchell to refer to central-western Victoria as "Australia Felix".

She assumes that Victoria's Aborigines were using similar practices to those used in south-west Western Australia, where the elders of the tribe supervised the controlled burns. If the fires went in the wrong direction, green branches were used to beat them out.

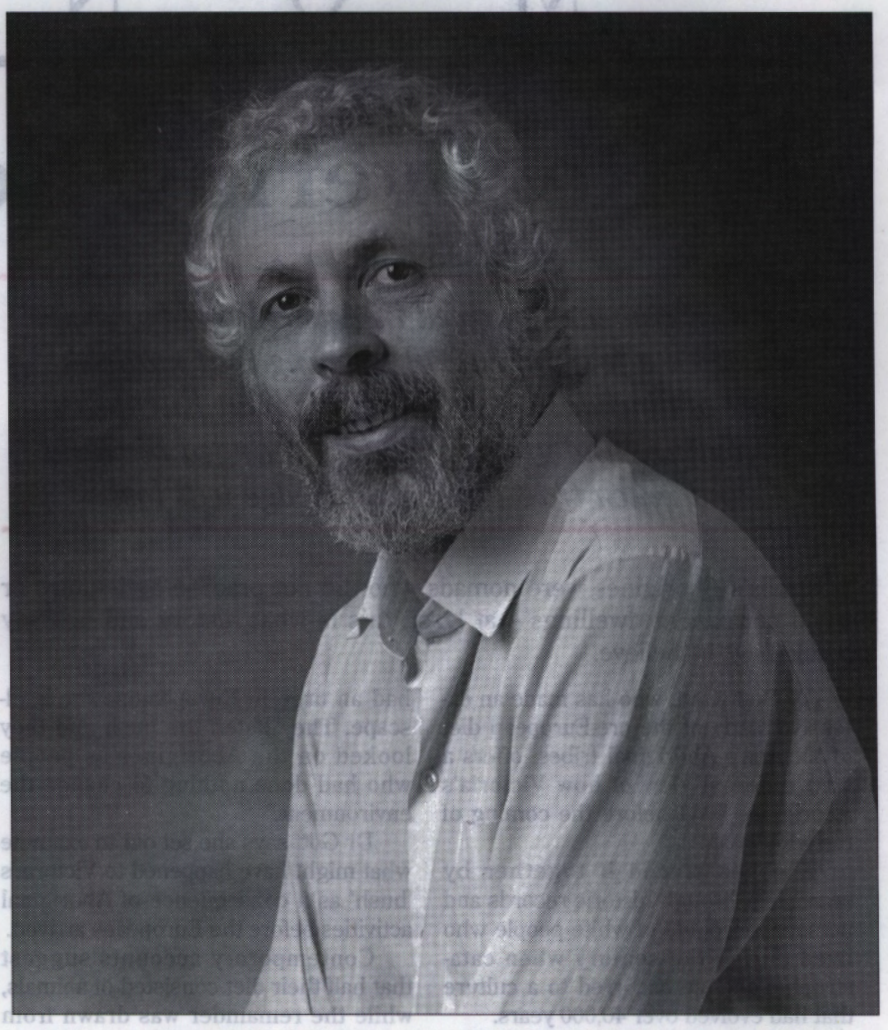
"It was not a random business; it was informed by people's knowledge of how the vegetation would respond," Dr Gott said. "They were very careful not to burn when plants were in flower or seeding. Late summer, when the plants were dormant underground, was probably the optimum period."

Dr Gott says that after the Ash Wednesday fires at Anglesea in 1983 orchids and other plants that had apparently vanished from the landscape came up in their millions, apparently stimulated by the heat of the fires.

Continued on Research Monash 4

Digging deep for climate clues

In sheltered areas of Victoria's western plains about 100,000 years ago, pockets of rainforest flourished. So why did it die out? Fossil pollen buried in ancient lake sediments could provide the answer and help clarify our understanding of the greenhouse effect.



Dr Peter Kershaw: the deepest of the new sedimentary cores could preserve a record of the climate and vegetation of the past 500,000 years

Deep sedimentary cores from crater lakes in western Victoria are showing that Victoria's vegetation has undergone dramatic changes, even in quite recent prehistory.

Dr Peter Kershaw's recently established Centre for Palynology and Palaeoecology, in the Department of Geography and Environmental Science, in conjunction with the Victorian Geological Survey, has recently extracted some of the deepest continuous sedimentary cores ever obtained from terrestrial sites in Australia.

The cores are from Lake Wangoom, Lake Terang, Pejark Marsh and Yallock Marsh, between Warrnambool and Terang – all extinct volcanic crater lakes. Dr Kershaw says because they are not fed by streams, the crater lakes act as natural rain gauges and the deposited pollen clearly reflects the surrounding vegetation. They are therefore ideal sites for reconstruction of past climate and vegetation.

He says the palaeoclimatic record preserved in these crater lakes assumes considerable importance as scientists attempt to determine whether human influence on a global scale – the enhanced greenhouse effect – is changing the Earth's climate. Without a record of past climate change it will be difficult to sift out the greenhouse 'signal' from the background 'noise' of natural climate change.

Dr Kershaw excavated cores from similar crater lakes on Queensland's Atherton Tableland during the 1980s. They provided evidence that humans were deliberately firing the rainforest from about 38,000 years ago, causing its replacement by eucalypt forest. These cores from Lynch's Crater and Strenekoff's Crater contained a record of climate and vegetation change over two complete glacial cycles – about 180,000 years.

The deepest of the new cores from Yallock Marsh, near Garvoc, extends 100 metres. Dr Kershaw believes it is likely to span at least three glacial cycles – probably more – and could preserve a record of the past half million years. Several of the other cores appear to go back at least 100,000 years, he says.

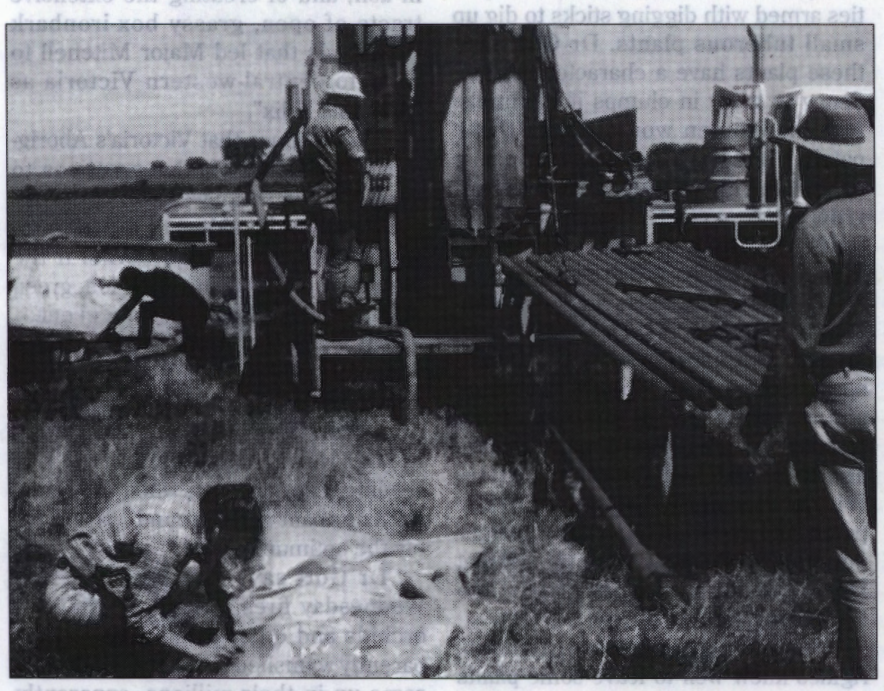
Recent evidence suggests that glacial periods occur in rhythm with so-called Milankovitch cycles, caused by long-period variations in the Earth's orbit around the Sun and changes in the tilt of its axis, which variously increase or decrease the amount of heat energy falling on the planet. The Milankovitch cycles follow three basic rhythms which can either counteract or reinforce one another; the longest takes 98,000 years to complete and corresponds to a major glacial-interglacial cycle.

Changes in rainfall and fire frequency drive changes in vegetation patterns which are reflected in the sedimentary cores as variations in the relative frequency of different types of pollen and fern spores; charcoal particles indicate the frequency of fire.

"One of the interesting findings is that we are now sure there was rainforest, at least in patches, on Victoria's western plains," Dr Kershaw said. "The pollen values we are getting for Antarctic beech (*Nothofagus*) from the Lake Terang core, analysed by research student Ms Donna D'Costa, are high enough to suggest that it existed in sheltered areas of the plains, where today it occurs west of Melbourne only in small patches in the Otway Ranges.

"Given that we are in a high-rainfall phase today, which would favour the spread of rainforest, nobody had contemplated finding rainforest on those plains in quite recent times. People felt that the soils might not have been conducive to rainforest development, but it seems that this was not so.

"It fits into the picture of a relatively recent, severe contraction of rainforest elements as part of a more general decline in rainforest during the past 15 million years; this recent contraction fits the picture of Aboriginal fire use. When you bring man-made fire into that picture, you're looking at a different landscape. The whole balance between vegetation, soils and ground water is altered."



The Victorian Geological Survey's drill rig in operation on Pejak Marsh, near Terang. In the foreground, PhD student Ms Kate Harle wraps the collected cores, which could preserve a record of the past 500,000 years.

One of Dr Kershaw's PhD students, Ms Kate Harle, is studying the 105-metre core from Yallock Marsh. By comparison, the Lynch's Crater core from north Queensland was only 60 metres deep and spanned two glacial cycles.

The core contains bands of volcanic ash, the signatures of past eruptions in the region, that will help serve as reference points to date the intervening sediments. Dr Kershaw is interested in comparing the climate record of the Yallock Marsh core with the one obtained by the late Dr Gurdip Singh from Lake George, near Canberra.

The Lake George sediments show an abrupt transition around 130,000 years ago from forest dominated by fire-sensitive Casuarina, to a eucalypt-dominated fire-tolerant vegetation. Dr Singh interpreted this as evidence of the arrival of humans – a controversial theory that has gained recent support from Dr Kershaw's own discovery of a similar transition around 140,000 years ago in a marine core extracted from the continental shelf east of Cairns.

The oldest accepted date for human colonisation of Australia is about 55,000 years, from a site in Kakadu National Park in the Northern Territory. Although some scientists consider a doubling of the age of human colonisation unlikely, Dr Kershaw has challenged them to explain how climate change alone could have produced such a transition, when there is no evidence for a similar transition during the preceding million years.

If the Yallock Marsh core yields a fire-driven transition of comparable age to Lake George and the Barrier Reef core, it would be further evidence for a much earlier human habitation of Australia. The 130,000 to 140,000 year date proposed by Dr Kershaw coincides with the penultimate glacial when global sea levels were much lower than at present. Exposure of the extensive continental shelf areas within the Indonesian region would have reduced water gaps between islands and facilitated human migration into Australia.

Dr Kershaw says Australia's palaeoenvironmental record is different from most other places in the world: while there was relative stability for some 200,000 years elsewhere, Australian records show great instability and a pattern of regional or absolute extinctions in plants adapted to wetter climates. "Something different was happening in Australia," he said.

Ms Harle says the fact that rainforest colonised the western plains in the past – in what are thought to be similar climates to the modern day – provides evidence that human use of fire over thousands of years restricted the spread of rainforest. She has picked up two intriguing pollen signatures from the Lake Wangoom core: that of Huon pine (*Lagarostrobus*), now restricted to Tasmania, and one of the few eucalypts with highly distinctive pollen, *Eucalyptus spathulata*, which grows today only as a mallee in Western Australia.

Palynologist Dr Helene Martin, of the University of NSW, has found *E.spathulata* pollen in eastern Australian sediments as far back as the late Oligocene, some 25 million years ago. It is possible that *E.spathulata* once occurred in wetter forest and developed the mallee habit in response to drying of the climate.

"Until now everything has been done in terms of broad climate-vegetation relationships," Ms Harle said.

"We now have the capacity to look at these regional records in much more detail so that we can investigate the dynamics of plant communities and regional extinctions."

Fitting in the outsiders

The decision to integrate intellectually handicapped children into normal schools in Victoria provoked much controversy a decade ago. But despite being a subject of worldwide concern, very little research on the effects of integration has so far been done.

When a new Victorian Government in 1983 began integrating intellectually handicapped children into normal schools, the policy was controversial. It is a measure of the complex social issues involved that it still is.

The move, partly a cost-saving measure, was also based on the belief that such children would benefit more from contact with normal children than from being isolated with similarly handicapped children in special schools.

"Nobody specifically said what the aims of integration were," says Associate Dean of Science and Interim Head of the Sub-Faculty of Nursing, Professor Stella Crossley. "The question is: how successful is integration?"

Professor Crossley, of the Department of Psychology, decided to conduct a study to evaluate the results of integrating children with Down's syndrome into normal pre-schools. "I took some of my Honours students into Melbourne pre-schools to look at the behaviour of handicapped children who were being integrated," she said.

"The teachers wanted to know what research had been done into the subject that might help them. We had to tell them there was very little research into the subject, and not much more has been done since then.

"I recently attended the International Congress of Psychology in Brussels, at which 62 countries were represented. The subject of integration drew so much attention that I realised it is a worldwide problem."

Professor Crossley said she and her researchers decided to focus on Down's syndrome children because they represented a fairly homogeneous group, although with considerable variation in their individual abilities. Assuming that the aim of integration programs was to bring handicapped children into the presence of their normal peers so that they could learn by observing them, the researchers decided to study the children using the well-established technique of time-referenced recording of their molecular behaviour.

In this method the specific behaviour of each child is noted at regular intervals of a few seconds and categorised for later analysis. The categories include 'look at teacher', 'smile at teacher', 'look at peer', 'cooperative behaviour in group', 'standing and looking' and 'solitary play'.

"Research suggests that it is very important for children to interact with their similarly aged peers from the viewpoint of their emotional, social and cognitive development, including their language skills," Professor Crossley said. "We wanted to know if the Down's syndrome children were actually interacting with similarly aged normal children or sitting out on the fringe."

The researchers studied 62 different children in 62 kindergartens. The focus on single handicapped children was deliberate; they did not want their observations confounded by the behaviour of other handicapped children.

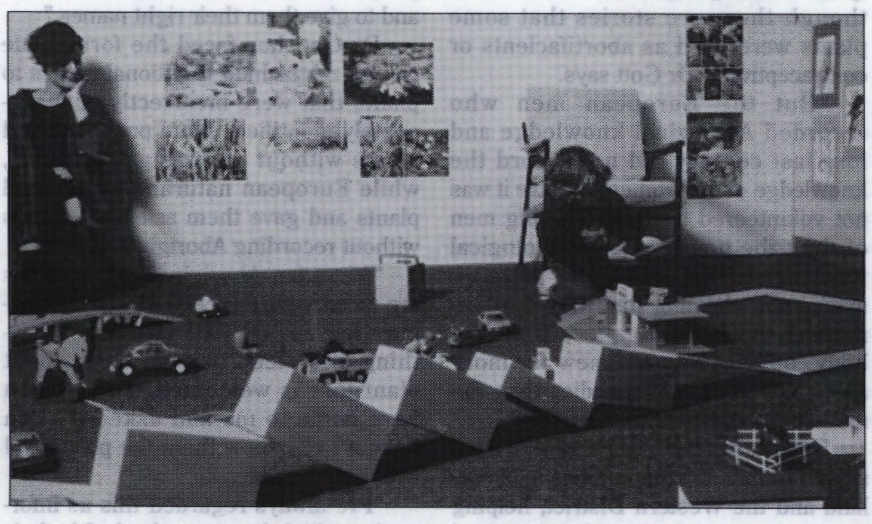
The behaviour of the Down's syndrome children was compared with that of normal children, matched as closely as possible for sex, birth order and age. The handicapped children tended to be three to five months older than the normal children, reflecting their slower intellectual development.

The first two studies were made entirely inside the structured environment of the kindergarten classes, ignoring free play in the outside environment. There were significant differences in behaviour: the handicapped children looked much more often at the teachers than did normal children, they smiled more often at the teacher and engaged more often in solitary play.

For their part, the teachers paid more frequent attention to the handicapped children, and for longer intervals, which included giving them help and more time to complete tasks. (Subsequently the researchers realised that one possible reason why the handicapped children tended to be more solitary was that the extra time spent with the teacher deprived them of time with their normal peers).

Professor Crossley said that, interestingly, the normal children did not behave differently towards the handicapped children. "So any parent who is concerned that their child is disadvantaged by the presence of handicapped children in their child's school can be reassured," she said.

One significant difference the researchers noted was that – although



In the Psychology department's laboratory playroom, a child plays in the presence of an adult who is a stranger to the child.

Professor Stella Crossley: found significant differences in the behaviour of handicapped and normal children, both at play and in kindergarten classes.

Down's syndrome children enjoyed role-playing as much as normal children – when they indulged in role play it was frequently in a more passive manner: they would be patients when the normal children were being doctors and nurses. Professor Crossley says the researchers wondered if the same patterns would be repeated in external play, when the teacher was observing but not interacting directly with the handicapped children.

Applying the same study techniques for outside play, they found that normal children were much more mobile and vocal when they were not interacting with teachers, and indulged in more group play. The handicapped children were more solitary, preferring to be onlookers, and seemed timid in the face of boisterous group play.

"If the results of integration are to be improved, perhaps play should be more structured to encourage more group interaction, and perhaps the teachers shouldn't worry if the handicapped children fail to finish their tasks. They should be allowed to go off and play with the others," Professor Crossley said.

Down's syndrome children sometimes spend two years in kindergarten. She says in such cases it would be interesting to see if their learning and socialisation benefits from this more prolonged exposure to similarly aged normal children.

Recently, the researchers set up another study in the special laboratory playroom at the university and invited eight mothers with Down's syndrome children and eight mothers with similarly aged normal children to participate. The children were observed two at a time in crossover pairings: Down's with Down's, Down's with normal, normal with normal.

Professor Crossley says one of the main issues of debate over integration is whether children interact more with other children at the same level of intellectual or physical function. Are deaf children better off learning with other deaf children or with normal children?

"It is true that non-handicapped children in contact with handicapped children learn what it means to be different, but if it is true that children's development benefits from contact with children at the same level, then integration might not be a good idea," Professor Crossley said. "Our study did not answer this question because we found little child–child interaction in any of the pairs observed. We need to study more children over a longer period of time in future research."

She says that adults frequently comment on the friendliness of Down's syndrome children. Certainly they are, but noting their tendency towards solitary behaviour in the presence of their normal peers she poses the question: would normal children have the same perception as adults of Down's syndrome children?

She points out that because of their handicap Down's syndrome children receive more attention from adults and may interact with them more frequently than with normal children of their own age. This raises other questions pertinent not just to the subject of integration, but to society's broader treatment of Down's syndrome children.

Does excessive contact with adults help or hinder the social and cognitive development of Down's syndrome children? Is the apparent inability of Down's syndrome children to participate in group play with normal children just a function of their handicap, or partly the consequence of meeting more adults (doctors, nurses etc.) in infancy?

Professor Crossley says that for teachers the choice is either to leave the handicapped children alone more so as not to distract them from joining in group play when it occurs, or to organise group play sessions to encourage social participation. Research is necessary to determine which strategy best suits the needs of all children.

Chance plays part in laser advance

An international research collaboration has led to the development of a new type of ultraviolet laser. When perfected, the device could be used to inscribe ultrafine circuits on computer chips and even perform laser surgery on individual cells.

Science sometimes moves ahead in mysterious ways. Take the collaboration between Dr Rod Toxbin and Dr Karoly Rozsa, which led to the development of a new ultraviolet laser tube, as a case in point.

Zhigang Zhang, a Chinese research student in Dr Tobin's group in the Department of Physics, came up with a cathode design – an improvement on one originally devised at a Hungarian physics institute by Dr Rozsa. The student contacted him seeking advice.

Dr Tobin was able to use part of the Australian Research Council Grant for his work on ultraviolet lasers to sponsor a working visit by Dr Rozsa to Monash.

Dr Rozsa spent four months in Dr Tobin's laboratory over the 1991–92 summer. The work was so promising that Dr Tobin took one month's sabbatical leave to visit Budapest last year to work with his Hungarian colleague.

Another member of the Monash research group, Ken Peard, who is on leave from the Victoria University of Technology, visited Dr Rozsa's laboratory for three weeks to make joint experiments.

The second visit to Monash by Dr Rozsa late last year culminated in the successful operation of the UV laser. Dr Rozsa is to visit Monash for a third time in April and Dr Tobin has applied for funds from the Department of Industry, Technology and Commerce to go back to Hungary in September.

"It has been a very effective collaboration," Dr Tobin said. "We have both contributed ideas and expertise. In the space of one year we came up with solutions to problems we had both encountered.

"In my past work, I've looked at things solely from the scientific point of view. But in this project we also looked at where the commercial demand was and found that there was interesting basic science in the applications too.

"Projects like this, where the end result is to be a commercial product, provide wonderful opportunities for students. University science should, wherever possible, provide this sort of research training through projects that support the development of industry."

"Whenever we can, we should exploit opportunities to assist the advancement of other branches of science and to support commercial developments. In this way, we can fulfil our obligations to our students and to the wider community."

How the laser tube works

In the Tobin-Rozsa laser tube, atoms are knocked off a metal cathode – a process called sputtering – and then excited to high energy levels to make the metallic ions in the tube lase.

The tube is based on a novel design for a highly efficient, hollow cathode coated with a layer copper, gold, or silver that works at a lower duty cycle, in which the cathode is being sputtered only about one per cent of the normal time. The benefit is that its life – and that of the laser – can be prolonged by a factor of up to 100.

Existing metal ion UV laser tubes, which operate at around 300 to 400 volts, tend to be short-lived because their hollow cathodes erode rapidly. The metal vapour is produced within the cathode, and so the ionisation and energy-discharge is concentrated there.

The new cathode design employs a geometry that results in a significantly higher voltage. This has two important benefits. The concentration of sputtered metal atoms and the intensity of the ionisation is increased. The net effect is that a lower discharge power is required, resulting in higher efficiency.

The tube uses helium or neon gas to transfer the electrical charge to the metal atoms. Sealing a cathode tube during fabrication demands a high degree of skill; the tube must be bakeable so that it can be purged of contaminants. Dr Rozsa and Dr Tobin have come up with a system that employs vacuum-brazed metal-ceramic seals, necessary to achieve a sealed-off tube.

When they have perfected and fully tested their prototype, they plan to perform tests to determine the tube's working lifetime. They are confident of obtaining a tube that will perform for at least 1000 hours – the requirement for a practical commercial device. Another benefit of the laser is that there is no warm-up time; it can be pulsed on within 1/1000th of a second.

Diet's subtlety revealed

From Research Monash 1

She believes Aborigines knew of and exploited the fire adaptations of the Australian flora; the extent of the fire-adapted flora probably owes much to Aboriginal burning practices.

The people who lived in those pre-European landscapes were quite different from those depicted in the photographs of the latter half of the 19th century. Contemporary accounts describe them as strong and athletic – men commonly reached six feet tall – very intelligent, quick in their perceptions, with acute eyesight and exceptionally fine teeth.

Quite possibly, pre-European Aborigines were healthier than the Europeans of the day. "We have descriptions of a well-nourished people, who had managed over 30,000 years to sustain their food resources," Dr Gott said.

The marsupials they hunted provided low-fat meat, or meat low in saturated fats, and they also ate large amounts of greens. Like people in many other hunter-gatherer societies, the Aborigines were able to lay on fat rapidly when food was abundant.

The 'sparing gene' that allowed the Aborigines to lay down body reserves in times of plenty became a liability when European authorities confined them to reserves and gave them a diet that consisted of little more than flour, tea and sugar, augmented by dripping and saturated animal fat.

They put on fat rapidly and, because they could not supplement the carbohydrate-rich diet with traditional plant foods, many fell victim to the 'sugar': late-onset or insulin-resistant diabetes. Dr Gott says Deakin University nutritionist Professor Kerin O'Dea has shown that with a return to a traditional diet and more exercise there is a remarkable decrease in late-onset diabetes in Aboriginal communities.

Dr Gott's research has revealed an interesting subtlety to Aboriginal diet that even nutritionists have not appreciated. "When you list the plants that they were eating, they divide about 50:50 between plants that store starch (polymers of glucose) in their underground organs, and those that store fructans (polymers of fruit sugar, or fructose).

In the modern western diet the Jerusalem artichoke and perhaps onions are among the few vegetables that store their food energy as fructans. Fructans are broken down in the gut by microbial fermentation. The gut flora of the average European seems adapted to break down starches rather than fructans, and people eating fructan-rich foods tend to suffer indigestion.

Aborigines coped well with a diet high in fructan-rich tubers, which break down to produce short-chain fatty acids. Such acids are thought to play some role in regulating insulin-glucose metabolism, although the scientific literature on the subject is sparse.

Murnong, the most commonly consumed plant, was high in fructans, as were plants such as the vanilla lily, chocolate lily and fringe lily. Other lily-type plants – early nancy (*Anguillaria*), milkmaids (*Burchardia*) and the aquatic water ribbons (*Triglochin*) and cumbungi (*Typha*) – provided starches.

Bracken (*Pteridium*) was also a source of starch: the northern hemisphere species of bracken contain carcinogens that can be broken down by a combination of heat and treatment with alkalis.

Dr Gott says Aborigines apparently knew of bracken's hazards because they would lay the shoots in the alkaline fire ash and then pound them to extract the starch before eating.

*The fruits of the kangaroo apple (*Solanum laciniatum*) turn yellow and then a dull orange when ripe; they are probably poisonous when green.*

"The population never outran the available resources. Among women, the hunter-gather practice of long and frequent suckling controlled ovulation, although there are stories that some plants were used as abortifacients or contraceptives," Dr Gott says.

"But the European men who recorded Aboriginal knowledge and lore last century did not record the knowledge of the women because it was not volunteered to them. The big men of the tribe practised a psychological form of curing people by palming stones and claiming that they were removing the bad influences from the body, but the women knew far more about the real plant remedies than the men because they used them daily."

Dr Gott has been working with Aboriginal women in communities in Gippsland and the Western District, helping them to recover the knowledge of food plants and herbal remedies that was lost last century. "It was lost because the authorities of the day confined the Aborigines to reserves and forbade them to use the language," she said. "This lore is not written down and the only way to retain it and pass it on is to show young people the plants growing in the field and to give them their right names."

Dr Gott has faced the formidable task of reattaching traditional names to plants that were incorrectly or inadequately identified; some people named plants without collecting specimens, while European naturalists collected plants and gave them scientific names without recording Aboriginal names.

"Victorian Aboriginal communities are faced with the necessity of rebuilding their culture," Dr Gott said. "Anything I can feed back to them about plant lore is welcomed. The women have come to me and asked if I can help; if I can show them the plants and where they grow.

"I've always regarded this as information which has to go back. It's their knowledge and it should freely go back to the communities."

For many years, traditional western medicine has viewed other medical cultures with scepticism. Slowly, the profession is opening up to outside influences. Meditation is even part of the curriculum.

Contemplating meditation as medicine

Medicine students will be better able to cope with stress now that meditation has been added to their curriculum, according to senior lecturer Dr Steven Sommer.

Dr Sommer and lecturer Dr Craig Hassed, of the Department of Community Medicine, together introduced meditation into the medical course last year. This year, meditation units will be available in the course's first, third, fourth and sixth years.

The units are intended to benefit the students, both personally and professionally, because they commonly have problems dealing with the stress of their studies, and their future patients may also benefit from meditation as medicine.

Students have assessed the units as being of great personal value. On a five-point scale, they rated them 4.3.

"Doctors' psychological health in general is terrible," Dr Sommer said. "They have four to six times the suicide, drug and alcohol abuse rates of the general community, due largely to the fact that they must deal with stressful issues every day and yet appear calm and in control at all times.

"They also have a problem about who to go to when they want help. They feel awkward about going to another doctor and other doctors feel awkward about seeing them." Only now is meditation becoming a more accepted form of treatment by traditionalist doctors. Dr Sommer says in the past it was disregarded because it didn't fit the "pill for every illness" model of medicine that most medical students around Australia have been taught.

"Slowly medicine is moving away from this model as the profound effects of more holistic methods become apparent," he said. In one study published in the British medical journal *The Lancet*, breast cancer sufferers had doubled their life expectancy using meditation as part of a cancer support group.

Dr Sommer, who runs weekly meditation groups, has also had results confirming the benefits of "stilling the mind". For example, one patient who suffered severe weekly migraines for more than five years reports that since learning meditation she has not had a migraine in nine months, and some asthma patients have managed to reduce their drug intake by half.

One technique that Dr Sommer teaches involves focusing on the breath while visualising light coming through the body. He says the key to meditation is not to block any thoughts that may come, but simply to learn to observe them and allow them to pass. It is learning to mentally "let go" which allows the release of both psychological and physical tension.

Dr Steven Sommer: turned to meditation after becoming disillusioned with the health system. "We need to open our minds to the limitations of the models we are using, and recognise that there are other ways of discovering the truth about health."

"Meditation actually wakes you up, it leaves you feeling alert and motivated," Dr Sommer said. "Fifteen to 20 minutes can actually give you more rest than several hours of sleep.

"Having learnt meditation, people sleep better, their self-esteem goes up, and relationships often improve because people listen more to their partners than to the superfluous thoughts taking place in their minds. It would take me hours to list all of the benefits; suffice to say the side effects are all good."

Despite these benefits, however, recognition of meditation by traditionalist doctors was virtually non-existent a few years ago. "What we have tended to ignore in our medical culture is empirical science, using experience," Dr Sommer said.

"Chinese medicine, which is based on empirical experience, has been around for thousands of years and yet it is only now that acupuncture and meditation are beginning to be considered legitimate forms of medicine. To disregard thousands of years of empirical science would be unscientific.

"We need to open our minds to the limitations of the models we are using, and recognise that there are other ways of discovering the truth about health. This is not to say that we should accept all new ways of treating illness blindly, but be open to subjecting them to investigation and practice to test their merit."

It was just such a process that brought Dr Sommer to an understanding of meditation as medicine. A six-year Monash medical degree and a two-year residency at the Alfred Hospital had left him disillusioned with the health system.

He recalls: "I often found myself in confrontation with others because their agenda was political, and not necessarily to the benefit of a patient. Following my residency, I really began to question whether medicine was the correct profession for me and so I took a year off in 1987 to travel."

While in Israel he discovered meditation. On his return, Dr Sommer sought out scientific confirmation and found there were over 400 research papers on the medical benefits of meditation.

He believes that "in the clear calm of the meditative state, the body comes to balance and all blockages and interferences to a natural healthy state are removed. The body's own healing mechanisms are facilitated. Once the mental unrest of an anxious and burdened mind is alleviated a healthy body and mind are more easily attained."

His views are becoming more widely accepted, and even supported, by the medical community. This year Dr Sommer has been asked to run a course on meditation for the College of General Practitioners.

For further information, contact Dr Sommer or Dr Hassed on 579 3188.

Information explosion raises privacy questions

International trends in privacy and data protection have come under scrutiny in a report by a Monash academic.

Mr Greg Tucker, Faculty of Business Coordinator at Frankston, has spent six months as a research fellow at the Organisation for Economic Cooperation and Development (OECD) in Paris. His report, *Privacy and Data Protection – Issues and Challenges*, was released late last year.

It looks at the mechanisms for protection of personal information in the 24 OECD member countries, including the US, Canada, Australia, Japan, and European and Scandinavian countries. The report also examines trends in privacy and data protection and reviews the OECD guidelines, which are used as the framework for privacy protection by the member countries.

As a result of his research, Mr Tucker, who is also the author of *Information Privacy Law in Australia*, was invited by the Faculty of law at Hitotsubashi University to present a series of lectures in Japan. He also made a presentation to Kanagawa Prefecture (the equivalent of an Australian state), which is at the forefront of data protection regulation in Japan, and met with representatives of the credit reporting industry.

"Privacy protection is a very hot issue in Australia at the moment and the lecture series in Japan gave me a valuable insight into another country's regime and culture," Mr Tucker said.

He believes that cultural differences between countries play a major role in the development and implementation of privacy protection laws. "It is important to stress that the adoption of privacy and data protection regimes varies considerably depending upon the cultural and legal background of the country," he said.

There had been many positive steps taken worldwide over recent years in self-regulation and privacy and data protection. "Australia uses a mixture of legislation in some sectors and industries and self-regulation or coregulation in other sectors," he said.

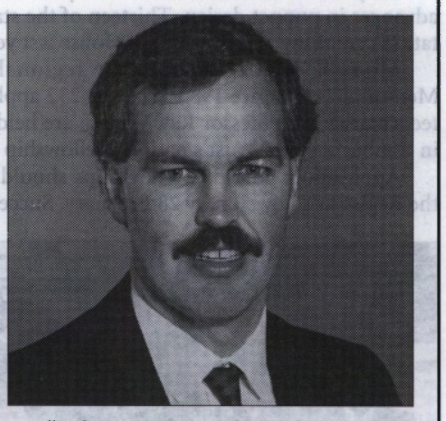
"Some industries, like direct marketing and telecommunications, have developed or are developing their own forms of self-regulation. However, there is no overseeing body to ensure that codes of practice are adhered to and are able to be enforced where breaches occur

"The trend in Australia is towards development of such codes of practice, and these usually arise out of fear by an industry or sector that legislation will be imposed if some self-regulation is not actively developed and applied."

The OECD privacy guidelines, developed in 1980, were adopted by Australia in 1984, with formal legislative action taken in 1988 – the Privacy Act.

In his research at the OECD, Mr Tucker developed a check list of value-added codes of conduct to assist and encourage workable codes of practice. He said that privacy legislation existed to ensure that personal information was not being abused and that when it had served its purpose, it was destroyed.

"One current example of the misuse of personal information is the report of the Independent Commission Against Corruption in NSW," Mr Tucker said. "Privacy legislation is designed to protect personal information on the individual, which is held in many forms.



"Information may be gathered about individuals through the use of plastic cards, passports and the tax file number. In many cases, there is no awareness that data is being collected."

No comprehensive privacy legislation existed in Australia, nor was it planned. Mr Tucker believes Australia will continue to adopt privacy laws on a piecemeal basis. "This will lead to unnecessary complications and make the law less accessible to those who it is designed to protect: you and me," he said.

▼ One in a hundred

The first female plumber to be employed by Monash's maintenance department, Ms Tammy Foster, won the job ahead of more than 100 male applicants.

Ms Foster, 24, has been working as a plumber for almost eight years, having completed her apprenticeship at the Mercy Maternity Hospital in East Melbourne. She has worked as a self-employed subcontractor in roofing and maintenance, as well as for a commercial guttering firm.

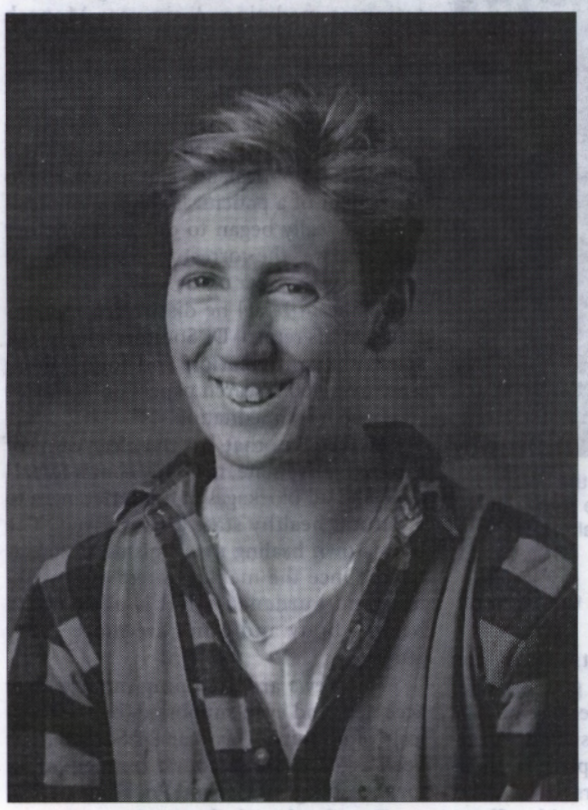
"Like any other profession, you have to know the trade; being a woman doesn't change that," she said. "Other colleagues tend to want to know what you're capable of and what you're willing to do. I want to be seen to be good at my job, whether I am a man or a woman.

"I don't think women should have advantages. I wouldn't want to be seen differently as a plumber. I know I competed against 131 other male applicants for the position but I believe I got the job because of my capabilities."

She is always being asked: How do you cope with the guys? "Well, the fourteen plumbers at Monash and others in the various shops are fabulous," Ms Foster said. "The guys have been great and accepted me as part of the team.

"The older ones tend to be more curious, as when they were in their trades in their younger years, it was not the done thing. For the younger plumbers, they are more used to it. At first, I had some hard times with guys on the job but I learnt a lot from those experiences and can handle anything else that comes my way."

Outside her work, she is a cricketer who has played at state level for six years. She trains five nights a week, plays on Sunday and coaches in between.



▲ Talking science

Monash zoology graduate Ms Caroline Peters is one of a dozen top science graduates chosen to participate in a scientific communication course at the Australian National University.

Students enrolled in the one-year Graduate Diploma in Scientific Communication are assisted by scholarships provided jointly by the ANU, the Shell Company of Australia and the National Science and Technology Centre – Questacon.

The course teaches them public speaking skills, how to work with the media and handle interviews. Its aim is to teach students to be competent, confident communicators of science and technology to the general public and to be proficient in writing for scientific media.

The scholars spend half the year taking a miniature version of Canberra's Questacon exhibition to regional and remote areas of Australia. In between the month-long tours, they study various forms of communication.

So far, 50 science communication graduates have followed careers in Australian and overseas museums, teaching, the media, scientific research and public relations.

■ Administration award

The Assistant Registrar, David Syme Faculty of Business, Ms Judith Willmore has been awarded a $5000 Caroline Chisholm General Staff Award.

She will visit the US and Canada in August to study faculty administration and links with central administrative areas in multicampus institutes. Ms Willmore will be looking at the procedures, systems and technology at universities and business schools with particular reference to best practice.

▼ New union president

Mr Trevor Stiles, 24 (pictured below), has been elected President of the Student Union at Caulfield, representing students at Caulfield and Frankston campuses.

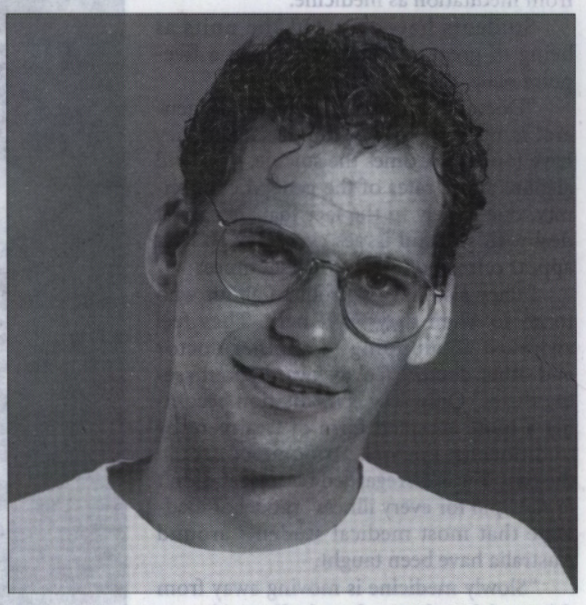
Currently finishing a BA in politics with a minor in sociology, he says the union intends to become more representative of the part-time, postgraduate and mature-age students this year. "They have their own needs as students and, as equal members of the union, they should be represented and accommodated," he said.

At Caulfield, the renovated C Block coffee shop – renamed Merlins – will be open for first semester, providing an inviting cafe area, complete with an outside, sheltered seating area. Merlins will open from early morning to late at night.

At Frankston, construction of the new student complex, including a bistro area, gym and recreation facilities, will get underway.

"Other, more distant, plans include acquiring two floors in the new teaching complex at Caulfield for a bistro and merchandising bookshop," he said.

Before being elected president, Mr Stiles worked as the deputy president in 1992 and as the vice president in 1991.



■ Library service honoured

Librarian Mrs Joan Streitberg-Hodgson has been awarded the medal for 25 years of service at Monash. Paralysed at the age of 14 by a stroke, she doggedly fought to regain her mobility and speech and continue her education.

She began her career in librarianship as an assistant in the Peninsula Regional Library Service at Rosebud, eventually taking over the full-time librarian position. She studied for library qualifications by correspondence, private study and RMIT lectures.

In 1967, she joined the cataloguing department at Monash and, while still working full time, began a Bachelor of Arts, which she completed in 1972. She is now a senior member of the Technical Services Department.

▼ Churchill Fellows 1993

Fifteen Victorians are among 70 Australians awarded 1993 Churchill Fellowships for a variety of investigative projects and overseas study.

Projects to be undertaken this year range from support for homeless people to advances in puppet design. Thirteen of the state recipients are pictured below at a presentation ceremony at Government House last year.

Monash, which has been the regional headquarters of the Winston Churchill Memorial Trust since 1983, received 232 applications. Interviews by the regional committee, chaired by Professor Ray Martin, are held at the university and final selection is made in Canberra by the trust's national fellowship committee.

Applications for 1994 fellowships should be received by the University Secretariat in the Registrar's Division by 28 February. Successful applicants are notified in June.

▲ Gippsland head named

Professor Barry Dunstan has been appointed acting Pro Vice-Chancellor responsible for the day-to-day operations of the Gippsland campus.

His appointment follows the retirement of Professor Tom Kennedy as Gippsland's chief executive.

From 1 January, the former University College has become fully integrated into the university and is now known as Monash University Gippsland Campus.

Hi-tech garbage removal comes at a price

Pay-by-weight garbage removal could provide a new incentive for household waste minimisation, according to Monash researcher Mr Frank Fisher.

Mr Fisher, of the Graduate School of Environmental Science, said an ongoing pilot study into the viability of such a system, run in conjunction with the Melbourne City Council, was already showing reductions in the amount of garbage put out for collection.

More than 1000 households are being encouraged to reduce their waste by separating, recycling and composting in return for a potential reduction in their council rates, according to the weight of garbage collected.

Next month, the council will create an Australian first when a state-of-the-art garbage collection system is tested in 500 houses. Waste will be collected in the usual 240-litre or 120-litre bins by hi-tech garbage trucks.

The bins – with microchips attached – are weighed and the data is electronically recorded. Under a user pays system, the ratepayer would be billed for collection of garbage over a predetermined amount. This would result in a reduction in cost for some households.

Mr Fisher believes that, if successful, a pay-by-weight scheme would benefit ratepayers, the environment and councils, whose costly landfill levies would be reduced.

"We are noticing results in our study; waste is already being reduced in these households," he said.

"By paying the annual council rates, people are removed by their lack of interaction with the processes. They do not know where their rubbish goes or how much of their annual rates are devoted to this service.

"With the pay-by-weight proposal, people will have direct feedback and actually get an account for their rubbish removal. Bottles, plastics, paper and cans put out for recycling would not be charged and, with many recyclables such as cans, money is even returned from their sale."

The pay-by-weight study is just one of the projects undertaken by the newly established Centre for the Innovation of Waste Management. The centre formalises the role the graduate school was already taking in the area of waste minimisation. Developed in April 1991, the study is investigating logistical and social problems associated with pay-by-weight garbage removal.

Mr Fisher said problems included industrial issues, such as what effect a reduction in garbage would have on jobs for garbage removalists. One answer could be the consequent growth in the recycling industry, which could generate wealth and employment. Other factors include technology development and social issues including the potential problem of householders dumping rubbish into public containers to reduce the weight of their own garbage.

As well as determining the method for removal of rubbish and what people actually put in their garbage (a messy job for the researchers), the study is testing the acceptability of the scheme and participants' attitudes towards recycling and waste minimisation.

Mr Rob Curnow, of the Applied Psychology department at the Frankston campus, is conducting psychological and social studies into these issues and his results are giving an extra dimension to the overall social, psychological, political, physical, technical and institutional background of the proposal.

The Centre for Waste Management's consultancy work includes a project for KPMG Peat Marwick looking into 'difficult to recycle' products such as prunings, construction and demolition materials, road materials, rubble and soils. KPMG Peat Marwick is making an economic analysis of these products and the potential industry involved.

The centre is also involved in establishing a national municipal waste minimisation research database that will provide an overview of waste minimisation projects to date.

Toasting success: Monash toastmasters celebrate recent competition wins.

Speaking of fear ...

Public speaking has often been described as a fear worse than death.

Twenty Monash staff and students, however, have faced this fear and have taken on a new skill that is proving to be enjoyable, while giving increased self-confidence and presentation skills. The group is the Monash Toastmasters club, part of the famous Toastmaster International public speaking group with members worldwide.

Monash Toastmasters, established just over four years ago, meets twice each month. It is part of District 73 which includes clubs from Western and South Australia, Tasmania and Victoria. The prime function of the club is to develop members' speaking, listening and presenting skills. It focuses on 'learning by doing' with positive feedback.

Newcomers need not be scared. They can observe the group for as long as they want before they actually make a formal public address. This initial speech is known as the 'ice breaker' where people talk about the thing they know about most in the world: themselves.

Members then progress through different kinds of speeches including voice variation, body language, vocabulary and organising a speech. Although Toastmasters is not designed as a competitive group, there are competitions for those who are interested in presenting their skills in a more pressurised environment.

Ms Coralie Ewert, of the Engineering faculty, recently won an award for the most humourous speech at the club level. She will now progress to the next level, a competition between the four surrounding clubs in the area. Another winner was Ms Marianne Gemperle, of the Language Centre, who won the dramatic reading presentation at an area level and will now go on to a divisional championship.

"What I have found is that people are so supportive," Ms Ewart said. "They make suggestions for improvement in a positive light, and give evaluations. This makes an enormous difference for it can be the scariest thing just standing in front of 20 people and speaking.

"When you sit down, you are just glad you got up and did it. The positive evaluation makes you feel that you got something right. Next time you can improve, and even if you don't people are not critical. They know how hard it is and are happy for your improvements and successes."

"People in this sort of environment get out what they put in," said club president Mr Doug Rash, of the Chemistry department. "We try to give as many people the opportunity to learn more self-confidence and overcome the fear of public speaking.

"There really is nothing better than the adrenaline rush after a speech, knowing you have put yourself on the line and feel a great sense of satisfaction for your effort."

To join the Monash Toastmasters or for more information, phone Mr Rash on extn 75 4579 or Ms Gwen Rowe on extn 75 5008.

Computer lab on the case

A state-of-the-art computer laboratory established at the Frankston campus will assist students with research and employment opportunities.

Monash, the Victorian Education Foundation (VEF) and the Information Engineering Facility (IEF) have created a computer laboratory to cultivate skills, research and employment opportunities in Computer-Aided Software Engineering (CASE).

"Establishing the computer laboratory reflects the university's aim to provide students with relevant theoretical and practical knowledge, so they can be productive when they reach the work force," head of the School of Computing and Information Technology at Frankston, Professor Phillip Steele, said.

Annually, the Frankston laboratory will provide 70 final-year Bachelor of Computing (Information Systems) students with hands-on experience in using the IEF's commercial CASE tools. The three-year course is designed to educate students for professional careers in computer systems analysis, systems design and application development.

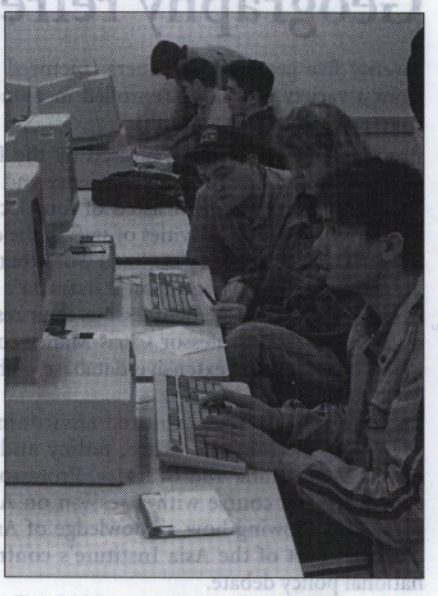
The laboratory is part of Monash's ongoing strategy to combat a skills shortage in this field, with VEF assisting with funding and the IEF providing more than $500,000 in products, training and services.

"The university has a real commitment to developing CASE knowledge and this commitment will produce graduates who are well versed in the leading edge CASE technology, utilising the most advanced tools," Professor Steele said.

The establishment of the Frankston laboratory follows the Caulfield campus lead, which started a CASE teaching program three years ago.

Professor Steele said current technology trends were having a significant impact on how information systems are being developed. "To ensure courses are effective and graduates well trained, universities must note new trends and take positive action," he said.

The VEF, a state government initiative funded through a one per cent payroll tax surcharge, promotes worthwhile educational facilities. The IEF is the CASE tools division of Texas Instruments.



The CASE laboratory at Frankston campus.

Bereavement support centre

A new centre to develop education and support services for bereaved people has been launched at the Frankston campus.

The Peninsula Bereavement Support Project – run jointly by the Department of Applied Psychology, Frankston–Mornington Peninsula Hospice Service and Peninsula Community Health Service – is funded by the Victorian Health Promotion Foundation.

Clinical and community psychologist, Ms Karen Spehr, said the centre's role was to provide strong community support. "Coming to terms with the death of someone close is very painful," she said.

"There is no timetable to recover from grief, no magic cure, no easy way to accept the loss. Grief can even be a health hazard. Increased rates of death, suicide, illness, accidents and drug and alcohol use are found among the bereaved."

Ms Spehr said research had shown that support programs for the bereaved had helped people come to terms with their loss. "Educating people about the grief process creates an environment where it's okay to talk about how they feel," she said. "It reduces the sense of isolation that most grieving people feel.

"All bereaved people need support, care and attention. We all need to know how to help others and how to help ourselves in grief. We need to learn how to reach out."

Education talk on the menu

Secondary school principals have been having their say on education at a series of dinners held over the past year at Monash.

"It is essential that the university maintain two-way communication with secondary schools so as not to be ignorant of trends and their concerns in education," the Vice-Chancellor, Professor Mal Logan, who hosts the dinners, said.

"We have had overwhelming support from the principals who are interested in the contact with the university. I hope, as a result of the functions, to set up a principals reference group to meet regularly and provide feedback on Monash programs and schools' systems."

The six dinners have brought together principals from different areas in Melbourne to meet with the vice-chancellor and members of Monash staff. Discussions have centred on the VCE, International Baccalaureate, admission policies, TV Open Learning and verification procedures.

The events follow on from the launch by the Office of University Development of a revamped *Schools Update* which Monash sends to principals and careers teachers each term. This is part of an overhaul of Monash's liaison with schools. Further details of this program will be released this year.

Geography refresher

Twenty-five geography teachers (pictured above), drawn from a variety of schools, enrolled in a one-day refresher course at Monash last month.

The course, jointly organised by the Department of Geography and Environmental Science and the Geography Teachers Association, consisted of four lectures based on the current research activities of staff in the department.

Dr David Dunkerley outlined work that he and graduate students have begun on Australia's arid interior, describing the management lessons their research has produced. Associate Professor Chris Maher covered research issues based on his extensive database of house prices in Melbourne.

Dr David Mercer explored environmental futures, reviewing current literature, policy and development trends in Australia and overseas. Professor John McKay concluded the course with a session on Australia's links with Asia, showing how a knowledge of Asian geography has been part of the Asia Institute's contribution to the national policy debate.

The lectures provided teachers with an intensive overview of four different areas of modern geography. In discussion, it was apparent that the material would be relevant in a number of areas of the school curriculum.

The course is seen by the department as a step towards a more substantial effort to enhance the professional development of teachers, an area that has attracted federal government attention. Teachers were interested in attending a regular series of lectures and classes as part of formally recognised professional development activities. The Geography Teachers Association and departmental staff will soon discuss ways of implementing a program.

"The US and the UK have acknowledged geography as a core curriculum subject," said Dr Kevin O'Connor. "Regretfully in Australia, we are moving in the opposite direction. In the discussions of the proposed national curriculum, geography is not being included in core subjects such as English and maths.

"This seems a backward step for the education of young Australians. It is essential for knowing and understanding more about our surroundings environment and how to handle and maintain them. We are walking away from this need and will be left with people who are ignorant of their land and will not be in the position to protect and take care of it."

Dragon dance

A traditional lion dance (pictured above) was performed by the Chinese Association of Victoria at the 1993 Lunar Festival, organised by the Centre for International Students at Caulfield campus. Highlights of the celebrations, heralding the Year of the Rooster, included Chinese horoscopes, the lion dance, a martial arts display and traditional red new year envelopes.

Top supervisor prize

Associate Professor Marian Aveling of the Department of History is the Monash Postgraduate Association's (MPA) 1992 Supervisor of the Year.

The award has been introduced to recognise what executive officer of the MPA, Ms Margaret Sloan, describes as "one of the most demanding tasks that academic staff undertake".

All postgraduates were given the opportunity to nominate their supervisors. From the nine submissions received, Dr Aveling was chosen based on the clarity and depth with which her positive attributes had been described.

The anonymous students who nominated Dr Aveling wrote: "A good supervisor is heaven-sent, a bad supervisor a disaster. Postgrad life is much easier when you don't have to grapple with chapters returned late or unread, or a supervisor who is unsupportive or unavailable."

They described Dr Aveling as "approachable, amiable, caring and understanding" but nevertheless demanding and critical where necessary.

Dr Aveling (pictured below) received the award and certificate from Ms Sloan at a surprise morning tea in the History department staff room.

Arts & Minds

Regional theatre takes the Alex lead

The Monash University theatre subscription season will this year branch out into regional Victorian centres, following the success of last year's productions at the George Jenkins Theatre in Frankston.

Performing arts centres in Geelong, Ballarat, Bendigo and Warragul will take up the Frankston lead and develop their own subscription seasons, using productions from the Monash stable.

Making professional theatre available to patrons in regional areas has always been a dream of Alexander Theatre manager, Mr Phil A'Vard. "The season at the George Jenkins Theatre has been a great success, in business and patronage terms," he said.

"The season broke the predicted income budget and exceeded the previous year's attendance. It has also allowed people from the Peninsula areas access to professional theatre that they never had before. Now they can go to theatre once a month in their own area rather than taking the long trip to the city theatres.

"Developing the season at the Alexander Theatre was based on the same idea – spreading the access to theatre goers on this side of town. Going to the other regional centres will be a great step forward for the encouragement of arts patronage in Victoria."

The fourth annual season of professional theatre at the Alexander and George Jenkins Theatres included five plays and one opera. Four of the program's productions were presented in Frankston. Productions in the 1993 theatre season will be announced soon.

Uni radio tunes into FM

Successful test programs and changes to broadcast legislation may see the university union radio station 3MU broadcasting on the FM band by the end of the year.

The station, which currently broadcasts a daily wire service in the union building between 8 am and 6 pm, ran a series of test programs on FM last year. Station manager, Mr Peter Freeman, said the week-long FM broadcasts were a great success.

"The tests went very well, with about 800 calls for song requests, people making comments on the programs and offering positive feedback," he said. "The station will run a series of week-long broadcasts on FM throughout the year, including orientation week," he said.

"We are hopeful the changes to current legislation will allow 3MU to broadcast for up to 36 weeks a year," he said. "This will also bring us closer to obtaining a permanent broadcasting license."

Over the past year, the station has undergone an extensive refit, including renovation of the broadcast and production studios, and purchase of the state-of-the-art audio equipment. A grant of $60,000 was provided by the Monash University Union Board for the work.

The station, which also has a recording studio available for hire, is staffed by students and plays a mix of independent and mainstream music.

Distance conquered by video technology

Technology advances helped overcome the tyranny of distance when Australia's first educational video conferencing workshop was conducted late last year.

Monash, along with four other sites across Australia, including Deakin University (Geelong), Curtin University (Perth), Tanami Network in Alice Springs (Northern Territory) and the University of New England (New South Wales), linked up with Brisbane.

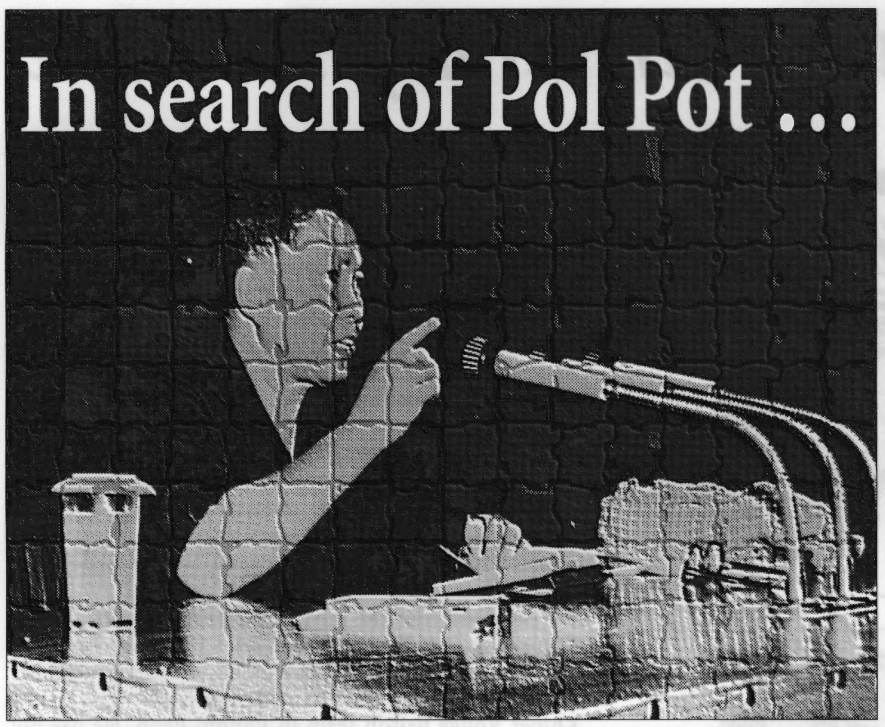
The video conference demonstration, which lasted three hours, was part of a national workshop held in Brisbane to discuss the impact of video conferencing on education and training.

Acting Director of the Teaching Services Unit at Monash, Mr Ian Thomas, believes the link-up is a great boost for remote education.

"The workshop was a great success and showed how flexible video conferencing is," Mr Thomas said. "It is exciting that people anywhere in Australia can be involved and it may mean less interstate travel to attend meetings.

"There is great potential for use in the university system and the success of the Brisbane workshop is very encouraging."

In search of Pol Pot ...



Pol Pot: a genocidal maniac is hard to find beneath a polite, charming and deferential mask.

Brother Number One *is David Chandler's third book within two years on Cambodia and its history. A political biography of the Khmer Rouge leader Pol Pot, it goes in search of the forces that shaped this shadowy figure, his communist revolution and its extraordinary, misguided violence.*

Pol Pot looms large in the recent tragic history of Cambodia. As leader of a radical and misguided communist revolution, he oversaw the deaths of more than one million of his nation's people in just four years.

More than a decade after the fall of his regime, and now at the head of a Khmer Rouge guerrilla army in exile, Pol Pot is still a menace and poses a threat to the fragile balance of power in a country still reeling from his inhuman policies.

But what of the man? The known details of his life are at best sketchy: born Saloth Sar in 1928, a comfortable childhood, three years of study in France, a short career as a school teacher, and then 12 years as a communist guerrilla and commander of the victorious army in Cambodia's civil war.

Unlike other communist leaders who adopted revolutionary names to conceal their identities while underground, such as Stalin ('steel') and Ho Chi Minh ('the enlightened one'), Saloth Sar took a new name *after* he had come to power, concealing his identity from the nation he was about to govern. The name Pol Pot had no independent meaning, and he only admitted to his other life after he had been overthrown in 1979.

In *Brother Number One*, Associate Professor David Chandler, research director of the Centre of Southeast Asian Studies, has painstakingly reconstructed a life that seemingly left few traces. Between 1986 and 1992, Dr Chandler interviewed people who had studied with Pol Pot, those who had known him in Paris, and his former students in Phnom Penh.

First-hand accounts

"I couldn't get any really good interviews from people who had worked with him as head of Cambodia in the 1970s," Dr Chandler said. "I think they were still scared to talk."

Nevertheless, he procured documents from Khmer Rouge cabinet meetings, which had not been seen before, and some of Pol Pot's speeches. Another valuable source was an archive of more than 4000 'confession' dossiers that came to light at the Tuol Sleng interrogation facility in Phnom Penh. Many contained valuable first-hand accounts of Pol Pot's personality and activities.

But for all of this, Dr Chandler admits that an overall assessment of Pol Pot has eluded him. "It wasn't a very coherent personality; he didn't want anyone to get a handle on him," he said.

"He was a completely political man. His personal life was planed down to the minimum. He was sane, but a lot of the time he was probably crazy and didn't know that he was. I don't think he was very bright.

"At the tail end of the 20th century, we see how bad an unleashed and unabashed communist leader can be. He was rejected by the entire socialist movement. They tried to deny he was a communist, but he was probably a better communist than they were.

"He had a vision of the total socialisation of the country. Granted, it was an absurd vision and hundreds of thousands of people were killed for it. He took on too many responsibilities. He was too proud to let go and too incompetent to handle his work."

Series of masks

Brother Number One paints a picture of a man who was friendly, austere in his habits, and described by all who knew him as polite, charming and deferential. No-one interviewed by Dr Chandler was prepared to associate the person they had known with the horrors of the 1970s.

"It has been impossible to penetrate what may be a facade, a series of masks, or a chosen repertoire of skills to discover a rougher, more diabolical, supposedly more genuine Pol Pot," Dr Chandler writes. "The man seems to suit his performance to the people he is with, making a 'genocidal maniac' hard to find.

"Indeed, the disjunction between his genteel charisma and the death toll of his regime is one of the mysteries that hangs over his career and poses serious difficulties in trying to make sense of his life. As a person, he defies analysis.

"Often in my research I had the uneasy feeling that Saloth Sar/Pol Pot was just outside my line of vision observing *me*. This elusiveness has been frustrating to me as his biographer but also indicates the kind of impression he has always preferred to leave, or to fail to leave, while proceeding in secret with incandescent revolutionary tasks."

Brother Number One: A Political Biography of Pol Pot is to be published in paperback by Allen & Unwin.

Overleaf: *The lingering twilight of an army in exile.*

Tantalising glimpses of Asia's white tribe

Reading *White Tribe of Asia* is like sneaking a look at someone's personal diary: it's tantalising.

This is the first book about Australia by an Indonesian, an interesting perspective given the fragile nature of recent links between the two countries. The fact that it was written originally for an Indonesian audience makes the viewpoint even more appealing.

The author, Ratih Hardjono, the Australian correspondent for the Indonesian daily *Kompas*, states her case at the beginning. "Australians may think that some points I make are not worth saying, or that they are made too sharply," she warns her readers. "But I have had to keep in mind that Indonesian readers have certain attitudes towards Australia, and certain feelings about the country."

In fact, the often-controversial book could almost be subtitled 'Everything you already knew about Australia, but were afraid to admit'. Take, for example, the author's impressions of Australian youth.

She writes: "While the beach has connotations of health and relaxation, it also contains negative implications. One development has been the gradual trend towards a certain laziness among the younger generation. Many young Australians have been spoilt by the increased opportunity for recreation and have embraced the idea of relaxation without also feeling that they also have to work."

The world of the urban Aboriginal is examined with similar insight: 'They sit chatting and moving from one house to the next; the whole street can hear the various conversations, for nothing is private ... Everyone wants to know about everyone else's business: who has been jailed, who has a case before the court, who is in love, and who has a job that enables him to eat properly.

"Their view reflects the course of their national history. There is no sadness, joy or hope. Their emotions appear to be static and fixed. The light in their eyes expresses nothing but emptiness."

The English edition of Ms Hardjono's book, a joint publication by the Monash Asia Institute and Hyland House, was launched at the Sydney Writers Festival last month by the Foreign Minister, Mr Gareth Evans. Already it has sold more than 1000 copies.

The institute's executive officer, Dr Joan Grant, said: "An important part of our publishing program is letting Australians know how we are perceived by Asian countries.

"We are trying to create a greater awareness among Australians of not only the fact that we are living in Asia, but also how our neighbours view us in terms of profitable and amicable relations. So far, the institute has published a series on Japanese views of Australia, and we intend to keep developing the theme."

Author of *White tribe of Asia*, Ratih Hardjono

Pieces of predictions

The work over the past decade of performance artist Lyndal Jones is traced through an exhibition of objects at the Monash Gallery next month.

The Prediction Pieces 1981–1991 covers a series of 10 works performed at diverse locations in Australia, Japan, the US and Europe, based on the nature of prediction. Through her body, voice and actions – both planned and impromptu – she has examined the impossibility of planning, forecasting, and even knowing, based on the known, the recorded, and history. The works range through social, psychological and physical relations, questioning our involvement with technology, nature and each other.

These solo and group pieces juxtapose slide projections, sound sequences, video and live performance. Each element operates as an independent system within the work. There is a conscious, minimalist use of pattern, repetition and variation to enable the audience to engage in the process of prediction.

The exhibition, which runs from 3 to 27 March, was originally mounted for the Museum of Contemporary Art, Sydney, and has been reconfigured for the Monash Gallery. Lyndal Jones was a recent recipient of the Australian Government's prestigious Creative Fellowship Award.

The gallery is open from 10 am to 5 pm Tuesday to Friday, and from 1 to 5 pm on Saturday. A catalogue is available for $10. For more information, phone extn 75 4217.

From *Prediction Piece 4*, 1981–82.

The lingering twilight of an army in exile

by David Chandler

ALTHOUGH THE KHMER ROUGE POSE AN OMINOUS threat to the peace in Cambodia, they are not a genuine military menace. The limits of their military potential is revealed by their recent flurry of small-scale attacks on United Nations personnel and scattered artillery duels with State of Cambodia forces. However frightening to the victims, these are not the tactics of a serious military threat.

Khmer Rouge armed forces have won only one major engagement since 1989, and none before that since the liberation of Phnom Penh in 1975. In two campaigns in Battambang in 1989–90, their forces withdrew in the face of attacks by the State of Cambodia. In Kompong Thom in June 1990, Khmer Rouge forces pulled out of the provincial capital after failing to seal off roads into the city from Phnom Penh.

Since the arrival of the United Nations Transitional Authority in Cambodia (UNTAC) in early 1992, Khmer Rouge forces have taken part in no major engagements, although artillery duels and minor incidents have sometimes been magnified in the press to the level of military campaigns. The Khmer Rouge's failure to go wholeheartedly into battle reflects their weakness, their caution and the constraints imposed by the peace process itself.

The Khmer Rouge's political strategy since the Paris accords in October 1991 has been one of caution rather than revolutionary flamboyance. Khmer Rouge priorities are to protect their leadership, to control their followers, to discredit Vietnam and to look for foreign support. Since the early 1980s, they have not favoured full-scale armed struggle, and the Khmer Rouge have made no attempt to recruit, arm and train sufficient new troops to start a war. In fact, scattered reports reaching UNTAC suggest that the Khmer Rouge armed forces have been reduced over the past two years. Presumably the Khmer Rouge leaders believe that Cambodia will fall into their laps in due time as a reward for what they consider to be their nationalist credentials.

While they have avoided full-scale battle, the Khmer Rouge have worked hard to improve their political position. They have made substantial territorial gains in the north-central province of Kompong Thom, and the adjoining, less hospitable province of Preah Vihear. Smaller units in Kompong Cham, Kampot and elsewhere have made serious efforts to endear themselves to local people despite – or perhaps by means of – occasional massacres of Vietnamese civilians.

These political tasks are being carried out by an armed force of less than 20,000 troops, according to UN military analysts. UNTAC planners assume that the Khmer Rouge are currently fielding two divisions, totalling some 2000 fighters, in Kompong Thom, and a similar number of front-line troops in western Battambang. Artillery barrages and mortaring are frequent in both areas. Small Khmer Rouge units operate in remote areas elsewhere but do very little fighting and pose no serious military threat. Support troops throughout the country are thought to number an additional 10,000 men and women. Many of these are employed in logging and other commercial operations.

Nationwide, the State of Cambodia (SOC) army outnumbers the Khmer Rouge forces by a ration of 3:1. Unlike the SOC, the Khmer Rouge have no motorised naval vessels, no aircraft and no helicopters. They have insufficient control of major roads to shift their units rapidly from one theatre to another. Although they are probably better led, supplied and psychologically prepared than their counterparts in the SOC, UNTAC analysts believe they are not strong enough to capture and hold a provincial capital or to conduct a sustained military campaign.

In spite of these purely military disadvantages, the Khmer Rouge's territorial position improved dramatically in 1992. The Khmer Rouge now control almost 20 per cent of the country, but most of these areas consist of inhospitable, poorly watered territory in the north and northwest, where they have recently taken over several gold and sapphire mines. The largest rice-producing zone they control is in Kompong Thom, whose provincial capital is less than 150 kilometres from Phnom Penh.

Kompong Thom is crucial for north–south overland communications between Phnom Penh and the Thai border and for travel between Phnom Penh and the Angkor runs in Siem Reap. By controlling the northern reaches of National Route 12, which runs from the provincial capital to Thailand, the Khmer Rouge have able to resupply their forces. Using depots in Thailand and sometimes as many as 20 six-wheel trucks per week, they have also relocated some 20,000 civilian dependents and supporters from camps in Thailand into provincial Kompong Thom. So far, SOC forces have been unable to impede this traffic. Khmer Rouge control of Route 12 threatens to cut northern Cambodia in half.

The Khmer Rouge intend to stay in Kompong Thom. Assuming that the UN-sponsored elections take place this year, an elected government will have to come to terms with the Khmer Rouge by staying out of the region or by granting the Khmer Rouge de facto administrative control.

Controlling parts of a province and defending it with a small number of troops is not the same as taking over the country. Despite the braggadocio of their pronouncements – on 9 January, for example, a Khmer Rouge broadcast stated that UNTAC had "totally, bluntly and shamelessly sided with the Vietnamese and their puppets" – the Khmer Rouge are not in a position to wrest power from the SOC, or from anyone else.

Pol Pot, 64, retains a close grip on the strategy and tactics of the Khmer Rouge. He remains a major asset for the movement. The awful conduct of the Khmer Rouge when they were in power, as well as Pol Pot's failure since 1979 to deliver any victories, does not seem to have changed his followers' reverence for him.

No successors for Pol Pot are being groomed. When he held power in the 1970s, his distrust of subordinates led him to preside over the assassination of some 20,000 of them in the Khmer Rouge interrogation facility at Tuol Sieng. Few if any high-ranking Khmer Rouge have been assassinated since 1979, but several have passed out of favour.

Only last year, the most competent and most visible Khmer Rouge military commander, Son Sen, dropped out of sight. Son Sen, a cabinet minister during the Khmer Rouge's years in power, is still supposedly part of the Khmer Rouge liaison team in Phnom Penh. He has not been seen in the capital or heard from by UNTAC officials since last April, although he surfaced briefly in June at an international conference in Japan.

Before his disappearance, Son Sen had displayed what seemed like a willingness to cooperate with the UN. That was Khmer Rouge policy at the time. Pol Pot may have considered such friendliness contaminating. Son Sen was also clearly a victim of the change of tactics proposed by Pol Pot at an important secret meeting rumoured to have taken place in April 1992. Soon afterward, the Khmer Rouge shifted from a policy of supporting the UN peace process to one of resisting UNTAC.

What prompted the change of tactics was the Khmer Rouge's failure to control the peace process, a failure that may also reflect the breakdown of foreign patronage for the movement. Throughout the 1980s, the Khmer Rouge enjoyed the active support of China and Thailand, and sub rosa patronage from the United States, which claimed to be following ASEAN's lead in isolating the SOC and its predecessor regime by giving 'non-lethal' support to their opponents.

The Paris agreements released the Khmer Rouge into the Cambodian political environment, where by and large they have failed to flourish. It seems likely that Pol Pot and his colleagues expected continuing support; instead, they were abandoned. The Chinese government and some elements of the Thai military, commercially allied with the Khmer Rouge since 1989, would probably like to see the movement participate, secretly or openly, in an elected government in Cambodia. After helping the Khmer Rouge to stockpile weapons and ammunition in 1992, however, they are unprepared to offer further military help. Interestingly, a similar sense of abandonment pervades the SOC vis-a-vis its long-term patrons in Hanoi.

In this atmosphere, Khmer Rouge leaders are understandably unwilling to undertake bold military initiatives. Instead, they seem to be content with probing UNTAC and SOC defences without provoking all-out retaliation. Kidnappings, mortar attacks and sudden incursions into villages all fit into this category.

The Khmer Rouge cannot afford to cooperate with the peace process, when doing so would weaken their political position, which derives from tight control over their people and die-hard opposition to the 'Vietnamese' government allegedly in power in Phnom Penh. Nor can they afford to be discarded from it and face the full brunt of an SOC attack – because they can't win that either. On balance, then, the Khmer Rouge military do not pose a major threat to the UN peace plan in Cambodia, although the movement itself retains its capacity to destabilise the country psychologically and to terrify the Cambodian people.

A more immediate threat to Cambodia's stability is the brutal comportment of the security apparatus of the SOC, recently condemned in a strongly worded letter to Hun Sen from the US-based Lawyers' Committee for Human Rights. Corruption, the personalisation of politics, economic chaos, and the cumbersomeness of the UN operation itself are other issues. Unfortunately, the genocidal Khmer Rouge still constitute Cambodia's only major 'story'. To keep the story alive, it must be assumed – against a good deal of evidence – that the Khmer Rouge are capable of making history repeat itself and sweeping back to power through force. That the Khmer Rouge believe the myth themselves is further evidence that their grasp of realities, never strong, has not become any firmer after 13 years as a government in exile.

Dr David Chandler is the research director of the Centre for Southeast Asian Studies. He is author of The Tragedy of Cambodian History *and the soon-to-be-released* Brother Number One: A Political Biography of Pol Pot.

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