# MONTAGE

NEWS FROM THE CAMPUSES OF MONASH UNIVERSITY

VOLUME 4 ISSUE 3 MAY 1993 16 PAGES


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**The problems with a globalised world**

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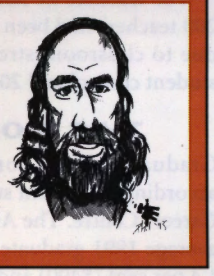

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**Blocking the paralysing nerve killer**

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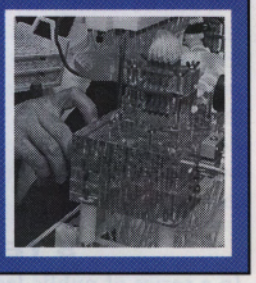

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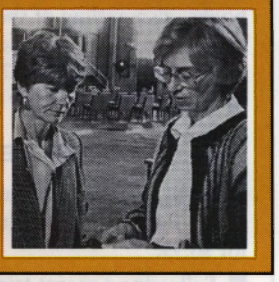


# Flu cure in sight

Scientists at Monash University's Victorian College of Pharmacy have synthesised a potent new drug that may cure and prevent influenza.

The drug has already been tested successfully on ferrets, a species highly susceptible to human influenza viruses.

The British pharmaceutical company Glaxo and its Australian partner, Biota Holdings, plan to trial the drug in human volunteers later this year.

The breakthrough came when a research team at the College of Pharmacy, led by Dr Mark von Itzstein, discovered a compound that prevents the virus spreading by locking it inside infected cells.

The antiviral compound has been described by Professor Peter Andrews, of the University of Queensland's Centre for Drug Design and Development, as "a breakthrough rivalling the discovery of penicillin."

Conventional vaccines used to prime the immune system to recognise the latest forms of the virus become useless as soon as new forms of influenza emerge.

The challenge for the team was to design a compound that neutralises all forms of the flu virus.

In 1983, a pocket-like feature – consistent in each new form of influenza – was identified by Dr Colman and Dr Varghese of the CSIRO's Division of Biomolecular Engineering.

Dr von Itzstein's team has custom-designed a compound that jams itself tightly into the pocket.

The compound is the result of a 15-year research project that has involved more than 20 researchers from CSIRO, Australian National University and Glaxo.

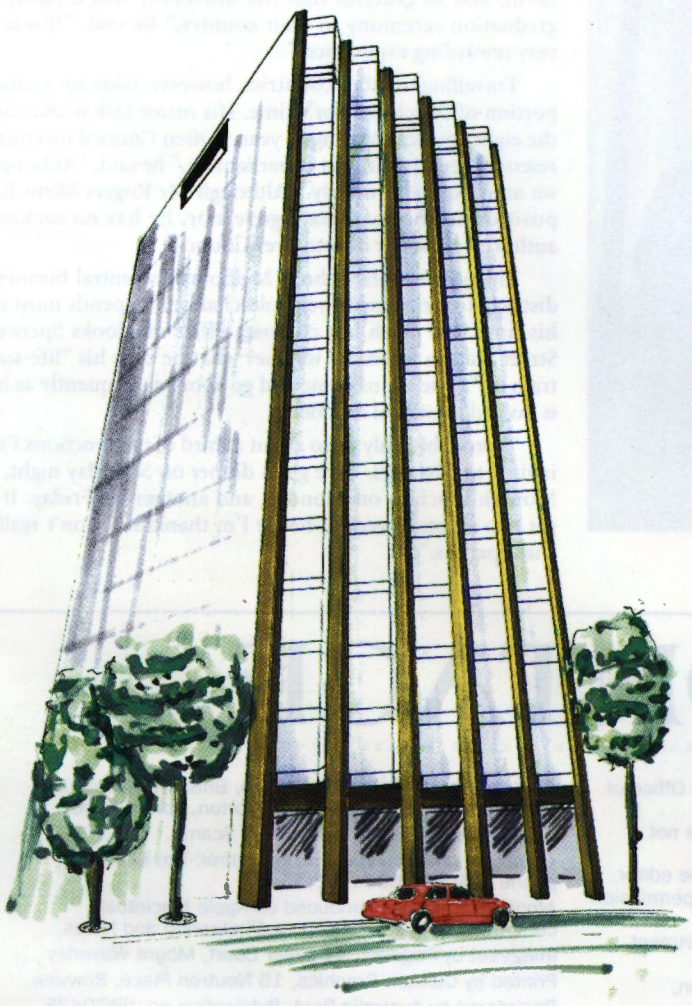
***Research liftout:*** *full story*

# *Facing winter with a facelift*

**Gloomy winter mornings will be a touch brighter for Clayton commuters thanks to the efforts of eight Monash students who took part in a community art project to give Huntingdale Railway Station a facelift.**

**Monash staff and students, who make up a large proportion of the station's users, will enjoy the familiar landmarks depicted in the new murals. The group's work features the Notting Hill Pub, union nights, and the Clayton campus student newspaper *Lot's Wife*.**

**Local secondary school students and project organisers have also contributed to the artwork.**



# New city office for Monash

The Monash University Foundation has acquired a 14-storey office building in the heart of Melbourne's CBD at a cost of $10 million.

To be known as Monash Central, the Collins Street tower will become the university's new city headquarters in August following the expiration of the lease on the present Monash City Centre, at the corner of Flinders Lane and Exhibition Street.

Monash Central is next door to the Melbourne Club, opposite the Regent Hotel, and within a few minutes walk of Parliament and major business houses.

The Monash University Foundation is a trust that operates for the benefit of the university.

The foundation has purchased the building from Westpac Properties at a time when the CBD market is at one of its lowest points.

Monash intends to use four of the floors itself – the remaining floors are already leased and the rent returns will provide a steady source of income.

The university's general manager, Mr Peter Wade, says the new development will not only be a good investment move by the university but also provide more space than the already overcrowded operation in Exhibition Street.

The Open Learning Agency of Australia, which already occupies one and a half floors of the university's Exhibition Street building, will also move into the new Monash Central complex.

Apart from the Open Learning HQ, the university uses its city headquarters for seminars and lectures, as well as offices for city-based staff and corporate-related activities.

The new Monash Central complex was previously known as the Standard Chartered Bank Building.

**IN THIS ISSUE**

# NOW & THEN

### 25 YEARS AGO

*Some things never change ...* To make room for more student places, the Main Library will be transferring part of its stock to the Law School. The reorganisation of books, dismantling of shelves, carpet repairs, as well as a shut-down of air-conditioning makes it necessary to close the library from 23 to 27 May. The librarian regrets the inevitable inconvenience to users.

### 15 YEARS AGO

The first record on the new Robert Blackwood Hall label, which features pianist Brian Chapman, is now available for $6.99.

■ Following a recent trip to Turkey, Associate Professor Arthur Williams of the Department of Mechanical Engineering wrote: "My first talk had to be cancelled because a professor was shot by a student the previous day. On the day of the talk, the university buildings were 'occupied' by extreme left wing students, one of whom was also shot (we believe fatally). My second talk was also cancelled at several hours notice as the engineering buildings were 'occupied' by extreme right wing students who were protesting that they were unable to study because of the disturbances caused by the extreme left wing students. I do not think this occupation resulted in any shootings, but the Rector closed the entire university for a week thereafter."

### 5 YEARS AGO

In a series of public lectures titled 'Becoming better parents and teachers', Associate Professor Maurice Balson, of the Faculty of Education, said: "Seventy-five per cent of families fight before breakfast"; "the curse of the earth is a good parent"; "praise is the enemy of children"; and, "you can't overpower a power-drunk child."

For teachers he had this to say: "In 1987, more than 200 teachers had been on sick-leave for more than a year due to classroom stress", and "teaching is 80 per cent student control and 20 per cent teaching."

### THIS MONTH LAST YEAR

Graduate salaries continue to ride out the recession, according to a recent survey conducted by the Course and Careers Centre. The Australia-wide survey found that on average 1991 graduate salaries had increased by between 1.4 per cent ($400) and 9.4 per cent ($2700) over the 1990 figures.

## THE

### ■ Conventional conventions

The program for a conference organised by the Rationalist Society of Australia rationally notes that speakers' time slots are subject to alteration. But what disclaimers would we see at conferences of other -ists?

**Existentialists:** speakers' time slots exist only within their own finite boundaries.
**Nihilists:** speakers' time slots probably don't exist.
**Communists:** speakers' time slots are owned by the people.
**Capitalists:** speakers' time slots are the property of the speakers and will be charged out at an hourly rate determined by the speaker.
**Anarchists:** speakers' time slots are whenever they bloody well feel like it.
**Deconstructionists:** speakers' time slots can be studied as time slots within their own social context.
**Revisionists:** speakers' time slots are open to later interpretation.
**Economic rationalists:** speakers' time slots are either goods or services.

### ■ Serpents, spirits and suspicion ...

"Do you want a dead brown snake?" inquired the caller of the Public Affairs Office. "I've got it in the fridge." She explained that the late reptile attacked her son on a local golf course. The teenager, apparently, had riposted with an eight-iron. The snake and accompanying divot were later hooked (and sliced?) by the Department of Anatomy.

Another caller that day wanted to know if Monash could help him rid his home of a troublesome ghost. Seems the ectoplasm (great stuff, according to Don Marquis, to mend broken furniture with) had followed him from a previous address. Having advised the caller of a certain lack of expertise in the area, the staffer passed on the only rational contact number: that of the Victorian branch of the Skeptics' Society.

Paw security: "Does Monash have a forensic scientist? My dog has been receiving death threats and I want to find out if my neighbour is responsible ..."

### ■ The only healthy option

Occupational Health and Safety may have to fine-tune its evacuation procedures. When a PC on Clayton campus caught fire recently, it was a case of computer operator and fire warden first. Trouble was, they were one and the same person.

# Taking counsel from Council

*Australia is governed by a group of elected representatives – so too is Monash. But who are the politicians of the university? In an occasional series of personality profiles,* Montage *will introduce the university's decision makers.*

Many people equate the role of university chancellor with that of a company chairperson. In fact, the role is that of a diplomat, spokesperson, or figurehead.

Monash's chancellor and chairman of Council, Mr Bill Rogers, who took on the job 15 months ago, describes his job as a titular role, saying that he is more like a state governor than anything else.

Mr Rogers' links with Monash go back to 1956. As a young solicitor, he assisted in the legal work for the acquisition of the Clayton campus site, and the establishment of the university. His firm in the 1950s has since amalgamated to form Arthur Robinson and Hedderwicks, which still act as the university's solicitors.

On 21 March this year, Mr Rogers retired from his position as partner of the firm. He says this will give him more time to devote to Monash. But despite his retirement, a formidable list of commitments still beckons. He is chairman of Woodside Petroleum, the AMP Society's Australian Board of Advice, and Monash's nominations committee. He holds other directorships including membership of AMP Principal Board, BHP, and Amcor's Paper Division.

Mr Bill Rogers.

One of the most important issues in the coming year, says Mr Rogers, will be the way universities deal with the VCE. He also believes universities will have to come to terms with their changing roles.

"I think Melbourne University is lobbying very hard to become more of a postgraduate, research-based university," he said. "Obviously there's a lot of money associated with research, and so there are fiscal as well as educational reasons for trying to attract those activities. But whether one university should try to attract that kind of work at the expense of another is a difficult question."

Monash's push into the Asian market is a move that Mr Rogers finds exciting. He says that in the Asian community, Australian degrees are probably worth more in bargaining terms than a local university degree. "Degrees from Monash are highly sought after, particularly in Malaysia, Singapore and Hong Kong," he said.

At last year's Singapore graduation, the chancellor, along with other university dignitaries, enjoyed dinner with graduates following the ceremony.

"The students seemed overwhelmed that we sat with them, and so grateful that the university was holding a graduation ceremony in their country," he said. "It was a very rewarding experience."

Travelling to other countries, however, takes up a small portion of the chancellor's time. His major task is chairing the eight council meetings a year. "Often Council meetings resemble lengthy sittings of parliament," he said. "Although we aren't quite as unruly." Although Mr Rogers likens his position to that of a state governor, he has no sacking authority or power of veto over Council.

Thirty-five stories above Melbourne's central business district is where the 67-year-old chancellor spends most of his time. His plush but compact office overlooks Spencer Street Station where he watches what he calls his "life-size train set". The trains come and go about as frequently as he is invited to official functions.

"I probably only go to about a third of the functions I'm invited to," he says. "I've got a dinner on Saturday night, a Monash function on Monday, and another on Friday. If I get two nights a week at home I'm thankful. I don't really chase parties."

MONTAGE
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# Clayton's driving force

**Staff and students alike have probably already met Jim, Reg, Fred, Bill, Ray, Andy, Alan, Bill, Graham, Wally, Mike, Les, Rod, Henry and John.**

**Members of the 15-strong transport group on Clayton campus are the drivers of shuttle buses around Clayton, intercampus and security bus services, mail runs, courier services and VIP transportation, to name a few of their daily duties.**

**The men also shift office furniture, set up examination tables and chairs, deliver examination papers, remove furniture, and maintain a fleet of 20 cars, four buses and one truck.**

**Acting transport coordinator Mr Reg Townsend believes the drivers are a vital part of the university operations. "The shuttle bus services give us a high profile around the campuses but this is only part of our daily routine," Mr Townsend said. "We are involved in a lot of activities that help things run smoothly."**

**Transport coordinator Mr Jim McDonald, a veteran of 20 years service at Monash, is off work as a result of ill-health.**

Pictured (from left): Drivers Mr Bill Callan, Mr Bill Taylor, Mr Henry Halabut, Mr Ray Davidson, Mr Rod Carrington, Mr Alan James, Mr Les Haden, leading hand Mr Reg Townsend and mechanic Mr John Hubble.

# Rural health care to get government grant

A graduate diploma/masters program in rural health care practice for doctors and nurses will be established at Monash thanks to a Commonwealth Government grant of $120,000.

The grant, allocated under the Rural Health Support Education and Training Program, will fund a joint project between the Gippsland campus School of Health Sciences and Centre for Rural Health.

The project team of Associate Professor Tony Barnett, Professor Roger Strasser and Dr Gurpal Sandhu will establish the program as part of the existing distance education health care courses once the project has gained formal approval from the university.

"The new course aims to build on the curriculum framework of the three distance eduction graduate diplomas already offered in Community Health, Gerontics and Family Medicine," Professor Barnett said.

It is expected that the first intake of 20 students will commence in first semester next year, with selected students currently enrolled in existing postgraduate programs invited to transfer to the graduate course in July.

The course, which will be initially offered to doctors and nurses, will feature course work common to all professional groups, as well as units directed to specific disciplines.

Professor Barnett believes the new course will help overcome the problems of distance and inaccessibility experienced by rural health care professionals.

"A major problem experienced by rural health care professionals is participating in relevant tertiary courses," he said. "The new course will help fill this vital role."

# Button joins Monash

Former senator and minister for industry, technology and commerce John Button (above) has been appointed a professorial fellow at Monash University.

Professor Button will take up his position at Monash in June following his recent retirement from politics.

Professor Button will play a vital role in Monash's well-established alliances with the commercial sector and will work with senior academics in the David Syme Faculty of Business to build mutual cooperation between the university and key businesses.

He will also play an integral part in the university's expansion in Asian markets, and his high profile political past will provide a wealth of expertise in this area.

Monash's vice-chancellor, Professor Mal Logan, described the appointment as "tremendously exciting".

"There is no doubt that he will bring with him an enormous amount of talent that will benefit the university," Professor Logan said. "His appointment reflects the importance the university places on working directly with business.

"Being able to fully analyse feedback from the business sector is particularly important for two reasons.

"The first is that information received from business can be applied into formulating the best and most appropriate courses for all our students. This means that Monash graduates will be more in tune with commercial demands.

"The second point is that a strong working relationship with business enables many of the university's high achievements in the area of research to be fully developed, hopefully to the extent of contributing to a better standard of living for Australians."

Professor Button entered federal politics in 1974 and became industrial minister in the first Hawke Government in 1983.

# Nursing a dream

Author of the classic novel *Innaminka* and well-known identity on Clayton campus Sister Elizabeth Burchill graduated MA in Australian Studies from Monash University last month.

The MA in Australian education, religion, leisure and tourism is her third academic degree.


Ready for graduation, Sister Burchill stands outside the Elizabeth Burchill Room in the Main Library containing books and references in Australian studies.

Sister Burchill is an extraordinary figure in the history of Australian nursing. She began nursing in the early 1930s and served with an ambulance unit during the Spanish Civil War. Her skills took her to the Second World War theatres in Egypt and Palestine, the rugged north coast of Canada, and to many remote parts of outback Australia.

She has worked as a radio announcer, established the first full-time infant welfare clinic in Darwin, and written five published works on the history of nursing. Last year she released *Australian nurses since Nightingale: 1860–1990,* which traces the origins of modern nursing. Her most famous book, *Innaminka,* will eventually be made into a film. "I hope this happens in my lifetime," she says. "That would be very exciting."

Sister Burchill, who keeps her age a secret, is proud of her achievements. "I have certainly made the most of my life," she says. "But there are still things I would like to do.

"My philosophy has always been 'keep on keeping on', and, 'don't count the years, make them count'," she says.

A room in the Main Library containing books and references in Australian studies has been named in Sister Burchill's honour. The references contained in the Elizabeth Burchill Room may be of use in achieving her next dream.

"I have always wanted to complete my PhD. When I was little I dreamed about being a doctor, though not the academic kind. Maybe I will be one after all ..."

# School leaver intake up

Preliminary estimates of 1993 higher education enrolments in Australia show commencements by school leavers have increased 5 per cent over 1992 figures. This increase has been reflected in Monash University enrolments.

Announcing the preliminary estimates, the Minister for Employment, Education and Training, Mr Kim Beazley, said: "The majority of institutions have taken a responsible approach. They recognise the importance of providing opportunities for school leavers to go on to higher education.

"The increase in school leaver enrolments shows a healthy reversal of the decline experienced in 1992," he said.

Since 1988 the number of students in higher education has increased by about 40 per cent. More than 580,000 students are enrolled in Australian universities.

Other details to emerge from the preliminary estimates include:

- 69,000 school leavers have enrolled in tertiary education nationally;
- enrolments increased in most states, the largest being 5.6 per cent in both Victoria and Queensland;
- total enrolments are likely to reach 583,000, a 4 per cent increase on 1992;
- females make up 54 per cent of total enrolments;
- higher education postgraduate enrolments have increased by 14 per cent.

# No writers' block in the East

*Myrna Kostash, visitor to the Department of German Studies and Slavic Studies, travelled extensively in Eastern Europe from 1984 to 1988. Her aim was to meet the writers of her generation – the sixties – to find out what motivated them to speak against their oppressive governments, and what course their lives had taken since then. As Myrna describes here, what she found not only shocked her, but also set the massive changes of the early 1990s in a new perspective.*

"Meeting the writers I so admired involved a series of shocks for me because I had several assumptions about them and my generation.

"I assumed that because I'd felt this incredible solidarity with them in their struggle with Soviet imperialism, that they would have felt the same for us in our struggle against the Vietnam War and capitalism. But they didn't feel this at all. They didn't understand what our grievance was against our system.

"Another shock came when the romantic notion that we had about writers in the East was shattered. Western writers had envied writers in the East because they were seen to be the martyrs of their nations, tribunes of the people and held in high esteem within their own culture. Indeed, quite the opposite situation existed - writers were expected to make pronouncements and be prophetic, something they absolutely hated. They envied the position of the writer in the West, who could live a private life. We envied each other's positions as writers.

"Writers in the West didn't undergo the hardships that the Eastern writers did. In Czechoslovakia some were imprisoned, but this wasn't the norm. Mostly, writers were restricted in the work they could find. For them this 'punishment' was almost a gift because they were left to write in peace.

"They could then share their writing among a small group of appreciative friends and have nothing to do with 'fame'. It was almost like they formed their own parallel world to the official one. They got their poems and books read, they put on plays in living rooms, and held illegal rock concerts in the country. They almost ignored what the official world was doing.

"For them the parallel culture was where they could live as honest human beings. If they had tried to make a career in official literature, they would have been hopelessly compromised. It was a bit like being a hippy in the West. They didn't want to change things. They were not revolutionaries, they just wanted to be free to think and express their ideas.

"It was also a shock to discover the antipathy of the Eastern bloc people with respect to each other. For example, a lot of Polish people felt contempt for the Czechs because they felt they had never defended themselves. The Poles on the other hand were in a perpetual state of uprising.

"For me, what had always been a general Slavic identity and culture turned out to have many warring identities within it. When things began to fall apart after 1989, especially in Yugoslavia, I can't say I was totally surprised.

"One of the prevailing ideas I came across in the 1980s was that the individual countries had once belonged to a greater European culture. The Eastern writers felt that the Soviet empire was responsible for kidnapping them from the strength of this united culture. This explains why each country has tried to find its own way back to Europe since the collapse of the Soviet Union. Slovenia, for example, declared its independence and tried to rejoin Europe through its connections with Austria.

"The last time I was in the Ukraine in 1988, nobody had any idea that things would change in the way they did. It wasn't until the early 1990s when all the changes happened that the people realised how much they had come to rely on being able to hate the Soviet Union. Suddenly, when it collapsed, the 'bogeyman' wasn't there any more and they were left with the realisation of all the work that needed to be done. Schools, hospitals, roads, finances, water, communications and just about everything else was, and to a large extent still is, in a state of disrepair. The work that needs to be done is colossal."

Incoming chairperson of the Writers' Union of Canada, Myrna Kostash.

Myrna Kostash's book about her interviews with the writers and dissidents of Eastern Europe in the 1960s will be released at the end of this year. *Bloodlines: Imagining Eastern Europe* is her fourth book.

In June she takes up the position of chairperson of the Writers' Union of Canada, the largest writers' association in the country.

*In the next issue of* Montage, *Mr Serhy Yekelchyk will write about the current state of affairs in his country, the Ukraine.*

# Frankston campus boss gives bay a fillip

Most members of staff wear many hats and Professor Ray Anderson is no exception.

Professor Anderson is campus director at Frankston and head of the Early Childhood and Primary Education School. Since joining Monash in 1968, he has held numerous positions at Frankston and Clayton, including lecturer, senior lecturer, head of department, dean of education, and acting associate director (Academic Programs and Student Administration).

Professor Anderson has seen many changes on Frankston campus, including four names.

"When I started, the campus was known as the Frankston Teachers' College, then the State College of Victoria, then the Frankston campus of Chisholm, which more recently amalgamated with Monash," he said.

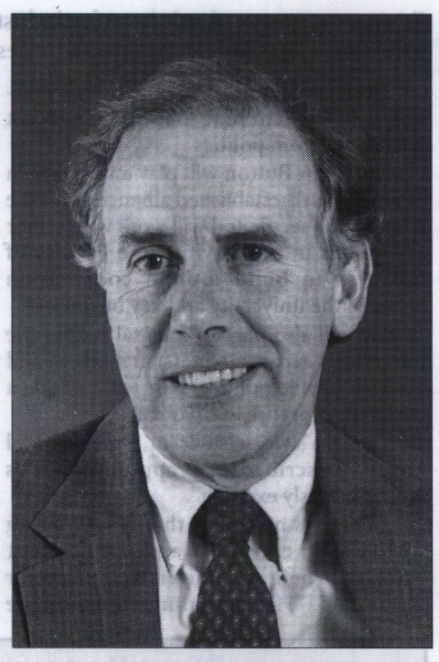
Professor Anderson, who believes the Frankston campus is unique, says that he has the best of both worlds. "We are a regional campus with our own distinctive programs, but close enough to central administration at Clayton," he said. "This allows for easy flow of communication and convenient access."

A monthly campus development meeting, chaired by Professor Anderson, represents all groups and helps promote the flow of information across all parts of the campus.

"No major campus decisions are made without involvement from the group and it works very well," he said.

"It is an exciting time at Frankston. The opening of the new technology building and theatre in March was a great boost, and work on the community centre begins next month," he said.

He believes the centre will overcome the problem of limited student facilities on campus. "It is vital for Frankston. Without it we will struggle to foster any kind of student life like that on Clayton or Caulfield campuses."



Professor Ray Anderson.

Professor Anderson says Frankston provides a quality teaching program to its 3000 students. "As the faculties consolidate, more permanent staff are based at Frankston and student numbers increase. This has helped to create a unique campus identity," he said.

Most of the academic units at Frankston are now schools, headed by professors who have considerable budgetary responsibilities.

"The heads of schools now meet on a regular basis to foster academic growth and serve as a forum to exchange ideas, consider combined degree possibilities, and keep up to date with faculty activities," he said.

"We have also established strong links with the local community through the George Jenkins Theatre and visits to schools."

# Examining privacy protection

Privacy protection in telecommunications will come under scrutiny during a 12-month research project by a Monash academic.

Mr Greg Tucker, Faculty of Business coordinator at Frankston, will examine the implications of international developments in privacy protection in the Australian telecommunications sector.

The research is funded by a $9000 grant from Telecom. Only 15 submissions out of 118 applications for 1993 Telecom grants were funded.

Mr Tucker believes domestic privacy regulations may impede the use and development of international telecommunications networks services in Australia. "The exact nature and style of the privacy framework structure in the telecommunications in Australia will depend, in part, on overseas developments," he said.

Two directives on data protection, which have been proposed by the European Commission, may affect Australian regulations. The first is a general data protection directive which applies to all sectors, including telecommunications, while the second relates specifically to regulation of the telecommunications sector.

"It is evident that any structural changes required by these directives may require some adjustment to the way in which carriers or service providers conduct their business," Mr Tucker said. "These directives, which are in their final stages, will have obvious implications for the use of international telecommunications networks and associated services by other countries. For example, what information will these networks be permitted to provide and to what country?"

The research findings will be available at the end of the year.

# Mathletes turn to Monash

The search for Victoria's brightest mathematics students is under way again this year, with Monash people playing a major role.

A selection committee of the Australian Mathematical Olympiad Committee (AMOC), headed by mathematics reader Dr Hans Lausch, met at Monash last month to determine the top 10 Australian secondary students of the 1993 Asian Pacific Mathematics Olympiad.

Twenty other students were also invited to attend intensive training in mathematics problem solving and tests in Sydney in April. Six competitors will then be chosen to represent Australia at the 34th International Mathematical Olympiad (IMO) in Istanbul, Turkey, in July.

Monash staff and graduates have had a long association with the olympiad. A former professor of mathematics, now Emeritus Professor G. B. Preston, has served as chairman of the selection committee; and readers Dr Emanual Strzelecki (now retired) and Dr Lausch have been involved in problem solving training.

Monash alumni involved in AMOC activities include Mrs Judith Downes, who is treasurer; Dr Michael Evans (Scotch College), who is helping in the design of the Maths Challenge for Young Australians, a mathematics enhancement program that reaches almost 15,000 students; and IMO 1989 silver medal winner Mr Mark Kisin (University of Sydney), who is an AMOC mentor and tutor.

Monash second-year science student Mr Angelo Di Pasquale, twice IMO bronze medal winner (1990–91) is currently tutoring one of the three potential IMO team members from Melbourne.

The AMOC is a subcommittee of the Australian Mathematics Trust and is associated with the Australian Academy of Science. For more information about AMOC programs, contact Dr Lausch on extn 75 4477.

# Applied engineering for the human body

Engineers don't just build bridges — they also design and develop replacement parts for the human body.

First-year materials engineering students at Monash University were introduced to the field of biomaterials (the use of non-viable materials for medical devices intended to interact with biological systems) at a lecture featuring Mr Boneparte.

Mr Boneparte, on loan from the Therapeutic Devices Branch of the Department of Health in Canberra, demonstrates the many advances that have been made thanks to the ingenuity of engineers.

According to senior lecturer Dr Mary Gani, almost every part of the body, with the exception of the brain, can be augmented to some degree by surgery and the use of prostheses (devices that replace a body limb, organ or tissue).

Implants are widely used in many areas of surgery. They can be used to replace a part of the anatomy that has been damaged, diseased or worn, such as arthritic joints, heart valves, corneas and breasts; to correct congenital abnormalities, such as spinal curvature or blockage of the ventricles in the brain; to help the healing process, for example by using plates, rods and nails for fractured bones; and to improve the function of an organ such as an irregularly beating heart.

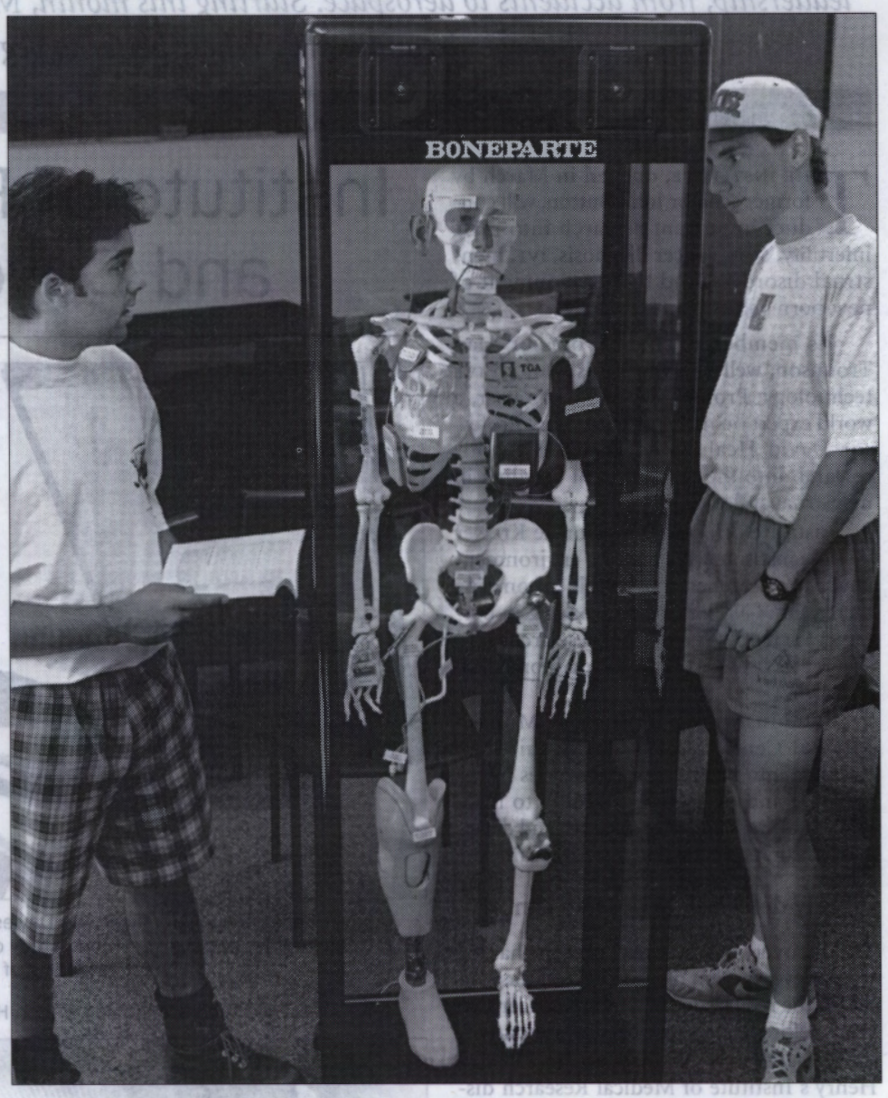
It is the responsibility of materials engineers working in the multibillion dollar biomaterials industry to develop 'replacement parts' that will function in the most hostile environment known to engineers – the human body.

As Dr Gani explains, the body has superb mechanisms for rejection. It is only in the last 40 years that the use of artificial materials to repair the loss of function in various parts of the body has become widespread. More than 50 prosthetic devices are now in use and as many as 40 different materials have been found to be suitable.

However, these advances follow thousands of years of investigation. The first recorded use of biomaterials in surgery was 4000 years ago when an Egyptian surgeon is credited with using stitches to repair wounds. The Egyptians also used copper plates to heal skull wounds. This may have been a dangerous practice as it is now known that copper corrodes in the body, producing toxic copper irons.

One of the more novel attempts was the use of ants' pincers to suture intestinal wounds in India about 3000 years ago. This cannot have been a pleasant experience for the patient, as the ant was incited to nip the wound, thereby closing the wound with its sharp pincers.

More recent prosthetic materials include stainless steel, alumina, carbon, and glass ceramics.




Right: Monash Materials Engineering students are introduced to Mr Boneparte, a human skeleton with a difference: he has been fitted with a wide range of prostheses, including an artificial ear, eye and nose, a heart pacemaker, a stainless steel bone plate to keep a fractured bone rigid, a total hip replacement, polymer veins, and an artificial leg.

"STEP INTO MY OFFICE..."

# Susan Harrison

Award restructuring and enterprise bargaining for academic and general staff are just two of the big issues Ms Susan Harrison and her team in Personnel Services are facing in the 1990s.

As director of Personnel Services, which comprises about 40 persons working in areas such as administration, employee relations, staff development and equal opportunity, Ms Harrison is responsible for developing and implementing personnel policy decisions.

Ms Harrison regards human resource policy and programs as an integral part of the university's development.

"Policies must be closely linked to strategic plans and supported by line and personnel managers if they are to be effective," she said. "Our policies focus on quality customer service, productivity, employee involvement, team work and workforce flexibility."

Good human resource management is a vital element in the success of any organisation, Ms Harrison said.

At present, Personnel Services is negotiating with general staff unions to adopt a single salary classification structure. This has involved converting 200 job classifications into just 10 levels, but Ms Harrison is confident the results will be well worth the effort.

"This reclassification will break down artificial boundaries and lead to a more flexible system within which people will be able to plan, develop and change their careers," she explained.

Ms Harrison holds an arts degree from Monash. After working in private industry for several years, she returned to the Clayton campus to work in the staff branch. It seems her efforts must have been appreciated. When she rang for a reference 10 years later – after leaving the university to raise a family, manage an antique shop, and run a chartered yacht in Queensland – she was promptly offered a position, which has led to her recent appointment as director.

During her most recent12-year stint at Monash, Ms Harrison has seen many significant changes. She said the 1990s are proving to be particularly challenging, especially in relation to handling complex human resource matters in the changing environment of a large-scale multicampus university.

As one of the university's few senior female administrators, Ms Harrison is understandably keen to see more women achieve higher levels of management.

"Often women do not apply for senior jobs because they do not feel confident. Formal and informal mentor programs are important if women are going to start to move through the ranks," she said.

Personnel Services recently held an information session for women academic staff members on preparing for promotion. The speakers were senior academic women who talked about their own experiences.

Ms Harrison is also keen to see the introduction of more extensive job-related training for general staff.

"By acquiring new skills, staff can enhance their career paths. Our task is to have in place policies that enable the university to attract the right staff. Through sound personnel policies we can also develop and motivate staff so that they can participate actively in the directions being taken by the university. It is also up to individuals to invest in their own careers."

In addition to special training programs, Personnel Services is examining its own levels of service. "We are continually working to improve our service and administrative procedures. It is necessary to understand and anticipate the expectations and needs of our customers."

Personnel Services has recently moved towards a faculty-based emphasis.

"Previously, staff were responsible for looking after a particular type of role across all faculties. Now, staff are appointed to service a specific faculty or department. The move has led to a greater understanding of the unique culture and requirements within each faculty, and has been very well accepted."

Ms Harrison and the Personnel Services team are based in the Science and Technology Park on Blackburn Road. (Equal Opportunity may be found on the first floor of the Gallery building, Clayton campus.)

Director of Personnel Services, Ms Susan Harrison.

# Local flower industry set to bloom

Australia's cut flower export industry is set to flourish as a result of genetic manipulation techniques developed by the new International Floriculture Cooperative Research Centre (IFCRC).

Monash University's Centre for Agricultural Biotechnology is one of 10 partners in the IFCRC. The Monash centre is largely responsible for developing techniques to control flower colour, fragrance, development, longevity, and gene transfer.

Once these variables become controllable, flowers can be supplied during non-growing periods in the northern hemisphere, delivery will be possible soon after the flowers are harvested, and the local industry will be able to cater to the desires of the Asian market.

The executive director of the university's Australian Agriculture Research Unit, Mr Michael O'Keefe, said one of Japan's largest hotel operators often purchased carnations for weddings from Australia, but the colour of the flowers had to be "just right".

"Our genetic manipulation techniques will mean that the flower industry will soon be like the fashion business in that we will have designer flowers," Mr O'Keefe said.

The university's School of Marketing is also involved in the IFCRC, and is responsible for developing commercial strategies to maximise the returns from the international marketplace.

At present, 10 per cent of Australia's cut flower industry, worth about $A250 million annually, comes from export sales. Industry sources believe exports will expand by 20 per cent each year.

The IFCRC has been granted $18 million over five years to develop genetic manipulation techniques for flowers.

*Most are called centres, others have been christened institutes, units or facilities. Whatever the designation, all provide a focus for university research into a special area. At Monash, this can range from telecommunications to timber, from language to leadership, from accidents to aerospace. Starting this month,* Montage *will present an occasional look into the workings of these hubs, nubs and nodes. Where better to begin than one of our latest centres of attention?*

CENTRE OF ATTENTION

# Institute of Reproduction and Development

THE INSTITUTE, opened in March by former senator John Button, will conduct important research into male infertility, SIDS, cancer diagnosis, IVF, menstrual disorders, and the development of new-born babies.

Its members include Professor Alan Trounson, well known for his work in IVF technology; Professor David de Kretser, a world expert on male infertility; and Professor David Healy, who is noted for his research into the regulation of bleeding in menstrual cycles.

Institute director Professor de Kretser says the institute will create an environment in which researchers will be able to combine their skills. "No individual working in biological sciences has all the resources and skills at their fingertips to solve a biomedical problem.

"The institute's location at Monash Medical Centre is also ideally suited to translate into health care discoveries in the institute and overseas pertaining to male and female reproductive systems, and developments in perinatal and neonatal care."

## Early detection of ovarian cancer

The discovery of a new sex hormone has led to the development of a clinical test that can detect the recurrence of ovarian cancer two years before its presence becomes apparent.

A team from the institute and Prince Henry's Institute of Medical Research discovered the hormone, inhibin. It is the first new sex hormone to be discovered in 20 years, and is found in the ovaries of normal women.

According to Professor David Healy, of the Institute of Reproduction and Development, and Professor Henry Burger, of the Institute of Medical Research, the measurement of inhibin levels in the blood may indicate if a woman is at risk from cancer of the ovaries.

"Although we cannot determine yet who is at risk from ovarian cancer, once the cancer is clinically suspected and surgically removed we can use a blood test for inhibin to detect any possible recurrence," Professor Healy explained.

"This new method not only helps doctors take early steps but it gives the patient some peace of mind."

Six women out of 10 die within five years of developing ovarian cancer.

## What price a baby's life?

Significant improvement in the survival prospects of premature babies has raised many questions about the cost of medical intervention.

Above: Senior technical officer Ann Davies uses a centrifuge to isolate testicular cell types in order of density. A close study of testicular components leads to a better understanding of testicular function.

Below: Technical officer Sharon Hutton sterilises media by filtration.

The institute's Professor Victor Yu says that greater understanding of the physiology of the premature baby, specialised training for medical and nursing staff, and improved facilities in perinatal centres have all contributed to the improved outcome for premature babies.

In Victoria, even extremely low birthweight (ELBW) babies below 1000 grams now have about a 40 per cent chance of survival.

"Not only are more of these babies surviving but also fewer of the survivors are suffering disabilities," Professor Yu said.

"Taking into account their ability to contribute to the community, the cost of their treatment works out at around $5000 per quality life-year gained. The equivalent costs are significantly higher for organ transplantation programs, such as bone marrow (two times higher), kidney (three times), heart (five times), and liver (eight times).

"The cost per life-year gained of coronary bypass surgery is 26 times higher, and coronary care 40 times.

"While 90 per cent of ELBW babies go on to live a life without severe disability, survivors of other high-cost, high-technology health care programs have a shorter lifespan and a poorer quality of life.

"If we set aside our responsibility to parents and their newborn babies and consider the issue from a purely economic point of view, the price of saving a baby's life is small and extremely cost effective."

## Sleeping through a serious study

Sleeping children are helping Monash scientists discover possible contributing factors towards common paediatric problems such as behavioural difficulties, low school performance, and growth disorders.

Over a period of one night or afternoon, infants and children are carefully monitored while asleep in a specially set-up laboratory in the university's Department of Paediatrics at Monash Medical Centre.

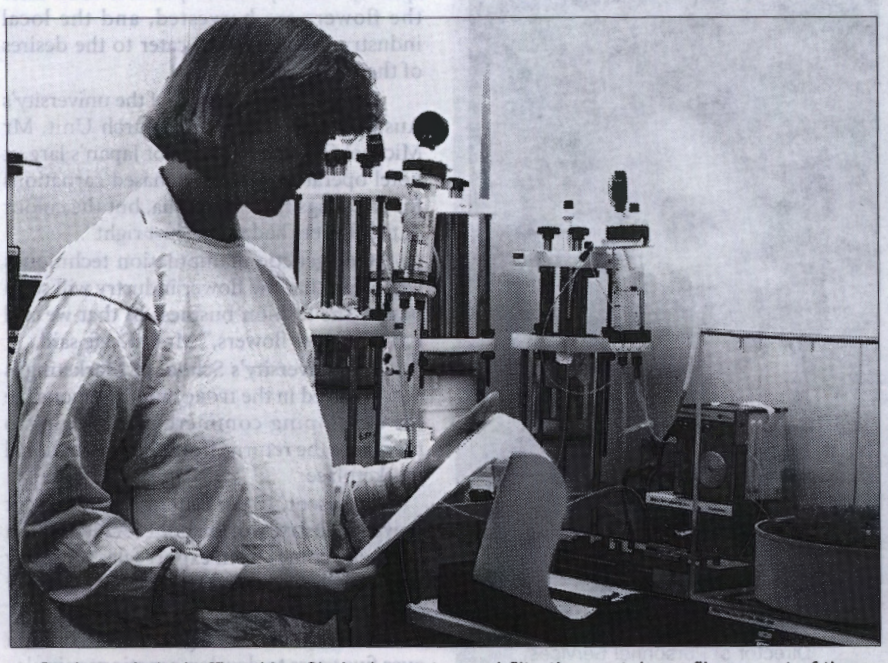
"The lab gives researchers the opportunity to follow parameters, such as electrical activity of brain waves, REM (rapid eye movement), air movement through the nose and mouth, and the activity of muscles around the neck," says Associate Professor Michael Adamson, of the university's Institute of Reproduction and Development.

The sleep laboratory consists of a child's bedroom on one side of a partition and an array of recording devices, to which the subject is connected via a web of electrodes on the other.

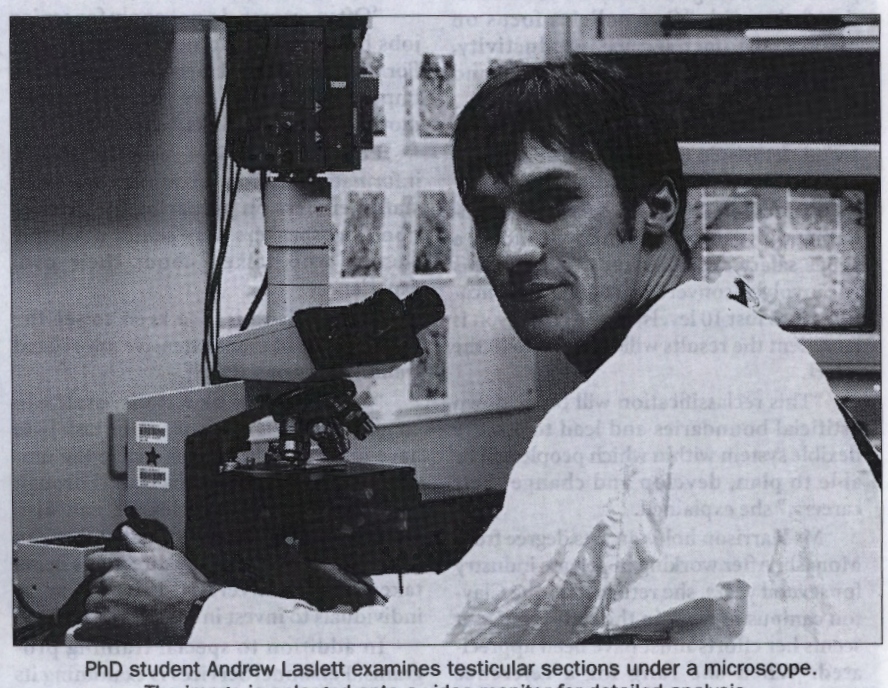
"A lot of problems occur during sleep, such as snoring, which is caused by narrowing of the airways. Snoring can cause a disruptive sleep pattern, and may indicate a more severe problem called obstructive sleep apnea (OSA). Studies overseas suggest OSA is a bigger problem than once thought. A baby who fails to thrive in the first year may be suffering from the problem. It also can cause crankiness in children and lowers their performance at school," Professor Adamson says.

"If OSA is diagnosed, sufferers usually respond to a tonsillectomy or adenoidectomy."

The sleep lab is also used to gather information in the fight against SIDS. "One of the possible causes of SIDS is thought to be obstruction. So in the laboratory we are looking at babies' arousal and how it is affected by different stages of sleep."



Senior technical officer Lisa Clarke inspects a gel filtration protein profile as part of the purification of inhibin and related reproductive hormones.



PhD student Andrew Laslett examines testicular sections under a microscope. The image is enlarged onto a video monitor for detailed analysis.

RESEARCH
MONASH

*Reducing the burden of paralysing injuries*

*Twentieth century waste as an artform*

# Beating the influenza blues

*Influenza has cost more lives this century than any other virus disease. Now, a potent new drug synthesised by Monash researchers may render this killer virus harmless.*

Scientists at Monash University's Victorian College of Pharmacy have synthesised a potent new drug that may cure and prevent all new and existing forms of the influenza virus.

In laboratory tests conducted by the British pharmaceutical company Glaxo, the Australian drug has been shown to completely protect ferrets, a species highly susceptible to human influenza viruses, against infection.

Glaxo and its Australian partner, Biota Holdings, plan to trial the drug on human volunteers later this year. Designed and synthesised by Dr Mark von Itzstein's team at the Victorian College of Pharmacy, the compound is the result of a 15-year research project that has also involved scientists from CSIRO, the Australian National University (ANU) and Glaxo.

Biota Holdings is a small Melbourne-based company that began funding research by Dr von Itzstein's team in 1986. Biota had previously acquired from CSIRO the intellectual rights to a crucial discovery about the structure of the influenza virus, made three years earlier by Dr Peter Colman and Dr Jose Varghese of CSIRO's Division of Biomolecular Engineering.

In the late 1970s, Dr Graeme Laver, a virologist at ANU's John Curtin School of Medical Research in Canberra, succeeded in purifying and crystallising one of the two proteins that makes up the influenza virus's protein coat.

The virus uses this protein, called sialidase, to cut itself free from the surface of infected cells lining the human respiratory tract. As the virus emerges from the cells, it is temporarily stuck to the cells' own surface proteins by a sticky substance called sialic acid.

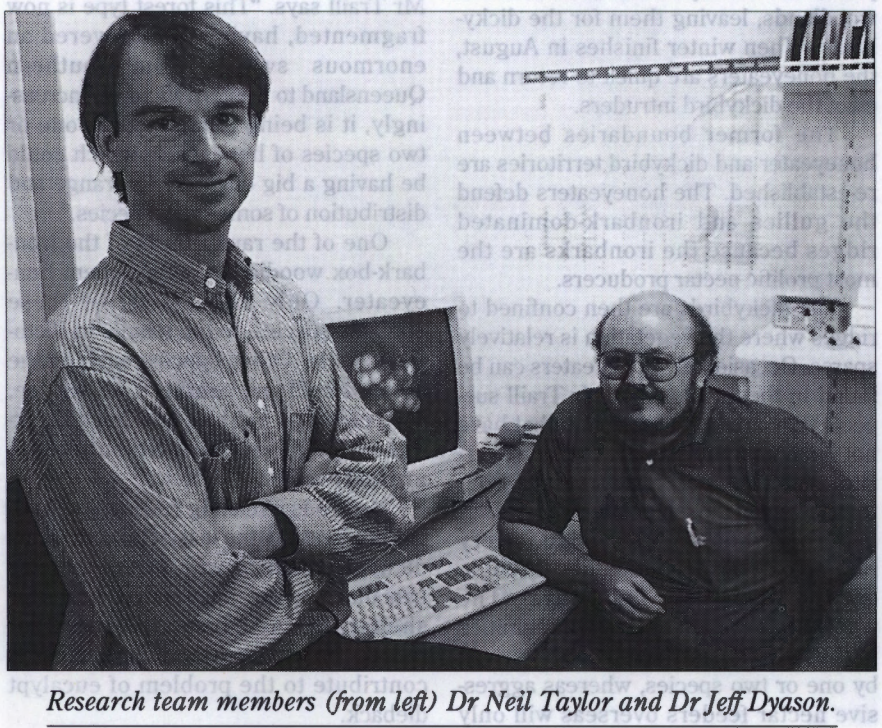
After the virus ends its replication cycle inside a human cell, it uses its sialidase protein more accurately to cut itself free from the sticky sialic acid bonds, then floats off to infect healthy cells.

At CSIRO, Dr Colman and Dr Varghese used a technique called X-ray crystallography to study the structure of different versions of the sialidase enzyme.

The influenza virus is notorious for changing the face it shows to the human immune system. It mutates frequently, changing either one or both of its two surface proteins – sialidase and haemagglutinin – so that the natural immunity induced by previous variants of the virus no longer protects against infection.

The immune system must develop a specific response for each new variant of the virus. For the same reason, conventional vaccines that prime the immune system to recognise the latest forms of the virus become useless as soon as new forms of the virus emerge.

Dr Colman and Dr Laver recognised that while the influenza virus makes frequent changes to its sialidase enzyme, certain elements of its structure must remain constant across all variants.



*Research team members (from left) Dr Neil Taylor and Dr Jeff Dyason.*

*Main players in the hunt for an antiflu drug are (from left) Dr Wen-Yang Wu, Dr Mark von Itzstein and Dr Michael Pegg.*

If, for example, the virus lost the vital element that slices through the sialic acid bonds, it would be permanently trapped on the surface of the infected host cell, halting its replication cycle.

A corollary of this insight was that if a drug could be designed to disrupt the activity of the sialidase enzyme, it would block infection. The challenge was to identify this constant feature within the enzyme's shifting landscape.

Dr Colman and Dr Varghese published a paper in 1983 in which they identified a pocket-like feature within the sialidase enzyme that never changed.

The pocket was identical in all strains of the virus, including those that caused the three influenza pandemics this century – the Spanish flu (1918), which killed at least 20 million people, and the Hong Kong (1957) and Asian (1968) flus, which killed several hundred thousand people.

The pocket, now known to be the enzyme's active site, fits around the individual molecules of sialic acid glues, and cuts through them to release the virus from the host cell's surface.

The crystal coordinates for this structure formed the core of the intellectual property that Biota acquired from CSIRO in 1986. Biota provided the coordinates to Dr von Itzstein's team, asking them to custom design a compound that would jam itself tightly into the pocket, neutralising the enzyme and blocking the virus's replication cycle.

The concept of inhibiting influenza sialidase had been around for more than 20 years, Dr von Itzstein said. A large number of compounds had been reported to be inhibitors.

On reinvestigation, many of these early compounds proved not to be sialidase inhibitors. Dr von Itzstein's team settled on the idea of synthesising a molecule based on nature's own design .

They reasoned that if nature had designed the pocket to accommodate molecules of sialic acid, it was logical to experiment with molecules of the same basic shape as sialic acid.

The challenge was to design an analogue that would fit into the pocket and bind more strongly than natural sialic acid. Indeed, if the compound was to work at the very low concentrations demanded of a human drug, it would need to have at least a million-fold competitive advantage over native sialic acid.

In 1986, the data obtained by Dr Colman and Dr Varghese offered only a blurry picture of the pocket. Dr von Itzstein decided not to wait for improved coordinates, and set his group about synthesising an analogue that his scientific intuition told him should show some level of inhibitory activity.

To their excitement, the Pharmacy College chemists found that the first compound, synthesised in 1987 and tested by group member Dr Michael Pegg, worked in living cell cultures in vitro. But the acid test was whether it would also work in living animals.

By this time, Biota had signed an agreement with Glaxo Australia. The new compound was sent to the laboratories of Glaxo's parent company in the UK for testing in rodents.

The custom designed sialidase inhibitor was administered as a spray into the respiratory tract of healthy animals. When they were challenged with various strains of the influenza virus, they developed no influenza symptoms.

*Continued on Research Monash 4*

# Battling for woodland survival

*More than 200 years of human interference has altered the delicate balance between Australian native species and their environment. Now, a study by a Monash biologist of the food chains of small birds and mammals is helping to explain why they are in decline.*

Small native birds like warblers, robins and whistlers are in drastic decline throughout Victoria's fragmented ironbark-box woodlands.

The most obvious reason for this decline is loss of habitat — some 90 per cent of the state's woodland has been cleared for agriculture. But, even in what remains, more than 50 species of small birds (known as passerines) continue to become rarer.

Mr Barry Traill, a PhD student in the Department of Ecology and Evolutionary Biology, has been observing a war in the woodlands – a struggle for living room and resources. The struggle involves not only native birds, but also native mammals like the brushtailed phascogale and the squirrel glider.

The conflict is ancient, and in pre-European times had produced a dynamic balance of power in which no species or group of species could gain more than a temporary advantage.

But 200 years of human interference in the woodland has profoundly altered that balance. While virtually all species have declined numerically, some have been relatively advantaged and now dominate the struggle for what remains.

Mr Traill began his PhD, supervised by Dr Alan Lill, by studying the contest between the sugar glider and their close cousin, the squirrel glider. The squirrel glider, *Petaurus norfolcensis*, has become rare, especially in Victoria, while the sugar glider, *breviceps*, is still fairly common. The two species are so closely related that they will interbreed in captivity.

## Competing for food

"Competition theory predicts that they should be partitioning resources in some way," Mr Traill says. "Squirrel gliders are larger and require a greater food intake.

"In normal seasons, there is a complete overlap in resources. In years when flowering is poor however, squirrel glider numbers are concentrated on the few remaining flowering trees, leaving sugar gliders relegated to what I assume are less profitable resources like acacia gum and insects.

"The larger squirrel glider tends to dominate on the best areas at all times with the sugar glider making do with the limited resources available," Mr Traill says. "My work indicates that the squirrel glider is more dependent on areas with good winter nectar sources.

"In poor flowering seasons, the sugar glider can't compete for the best resources and so survives by going for other carbohydrates, including lerps (the sugary wax shells exuded by sap-sucking psyllid insects).

"Like the yellow-bellied glider, the squirrel glider will also make cuts in the bark of grey box trees and lick the sugary sap that oozes out," he says. "There is a paradox here. It seems to me that in areas where the squirrel glider can thrive, it dominates the sugar glider, but sugar gliders can survive in a greater range of habitats."

The balance of power in the woodlands has been tipped, Mr Traill believes, because humans have systematically stripped the ironbark-box woodlands of mature trees containing hollows in which the gliders nest.

Mr Traill put artificial nestboxes in an area of woodland, but designed them with an entrance that allowed access only to the smaller squirrel glider.

Hollows are rare in most of Victoria's ironbark-box woodland as most of the trees are now no older than 80 years. This scarcity has led the two gliders and other animals to compete for the few available hollows.

Squirrel and sugar gliders are in less obvious competition with nectar-feeding birds and insects. They are sustained by the same nectar-rich eucalypt flowers prized by beekeepers. Much of Australia's best honey comes from hives in the ironbark-box woodlands.

A eucalypt forest and the plants in its understorey offer several sources of energy-rich carbohydrates. Nectar, sap, gum exudates and lerps may be exploited by several dozen insect species, 25 bird species and four mammal species – the two gliders, the brushtailed phascogale, and the yellow-footed antechinus (a marsupial 'mouse').

How nectar, the most prized resource, is divided up between the competing groups of nocturnal mammals and day-active birds and insects is unknown. Nobody has studied nectar flow rates in ironbark woodlands.

In Australia's banksia heathlands, birds and banksias have struck up a mutually beneficial relationship in which the birds provide pollination services in return for nectar. Maximum nectar flows coincide with the main periods of feeding activity in birds, in mid-morning and late afternoon.

When extending his studies to birds, Mr Traill found that a loose confederation of aggressive honeyeaters rule the fragmented woodlands, to the extent that they almost exclude the smaller passerines that birdwatchers lump under the affectionate title of dickybirds.

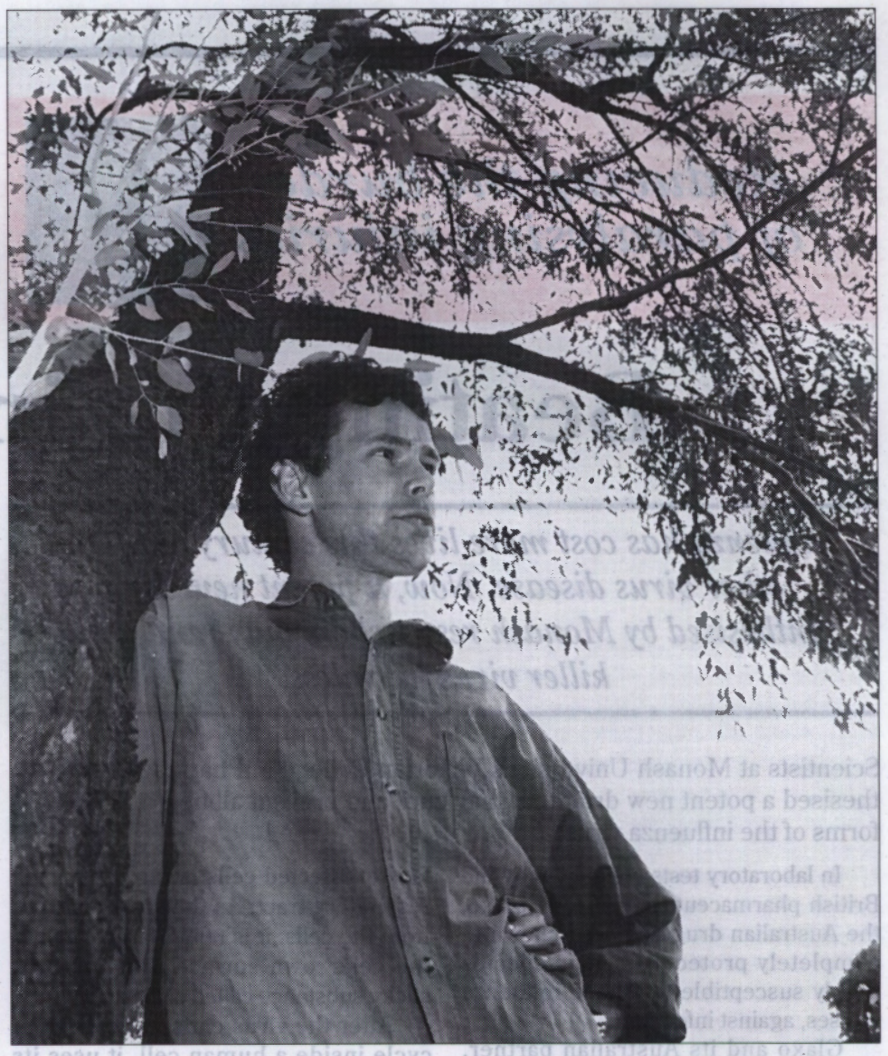
Fuscous honeyeaters (*Lichenostomus fuscus*) and yellow-tufted honeyeaters (*L. melanops*) aggressively exclude dickybirds like thornbills (*Acanthiza spp*), fantails (*Rhipidura spp*) and robins (*Petroica spp*).

This aggressive behaviour seems pronounced among Australian honeyeaters, although Mr Traill says it mirrors a worldwide tendency for nectar/carbohydrate specialists to be aggressive in defending their preferred resources.

This behaviour reaches a peak in one of the largest Australian honeyeaters, the social bell miner. The bell miner vigorously chases all other birds out of its territory. Its exclusion of insectivorous birds can result in insect pests causing severe damage to trees.

Mr Traill conducted his bird study in the Chiltern State Forest, a 4000 hectare tract of ironbark-box woodland about halfway between Wangaratta and Wodonga, one of the largest remaining areas of this vegetation type in Victoria.

The Chiltern Forest has for many years been a regrowth forest. Most of the original community was stripped during the gold-mining era of the 1860s, and even the regrowth was intensively used for timber until quite recently.



*Mr Barry Traill says a war for resources in Victoria's diminishing ironbark-box woodlands has led to the threat of extinction for many native bird species.*

Mr Traill says that honeyeaters are also aggressive towards other members of their own species. Fuscous and yellow-tufted honeyeaters form semi-colonial social groups in which monogamous pairs claim discrete core territories, with groups of pairs banding together to exclude intruders.

Like the bell miner, they will attempt to drive off all other species, including large ground-feeding birds like choughs and magpies. Despite their common name, these honeyeaters feed mainly on insects for much of the year because nectar is abundant only during the main flush of eucalypt flowering in winter.

## Winter escape

In winters when flowering is particularly poor, the honeyeaters abandon the woodlands, leaving them for the dickybirds. When winter finishes in August, the honeyeaters are quick to return and evict the dickybird intruders.

The former boundaries between honeyeater and dickybird territories are re-established. The honeyeaters defend the gullies and ironbark-dominated ridges because the ironbarks are the most prolific nectar producers.

The dickybirds are then confined to ridges where the vegetation is relatively sparse. Occasionally honeyeaters can be found in these areas, but Mr Traill suspects they are immature birds that have not been able to establish their own territories in the face of aggression from their own and closely related species.

"This wholesale exclusion is very rare among bird communities throughout the world," Mr Traill says. "The whole organisation of bird communities in these woodlands seems to be driven by one or two species, whereas aggressive nectar feeders overseas will only exclude congeneric species or competitors for the same niche, but will ignore the rest.

"It raises the question of why honeyeaters can do it and other birds cannot. There must have been intense selection for aggressive behaviour, because it's a big advantage to be able to exclude the competition."

Mr Traill suspects the behaviour may have begun when the ancestors of Australia's honeyeaters were almost exclusively nectivorous. As the honeyeaters diversified and some became more insectivorous, they may have found their aggressive behaviour. This may have then further evolved as a defence of nectar sources and a useful method of excluding a wide range of insectivorous birds.

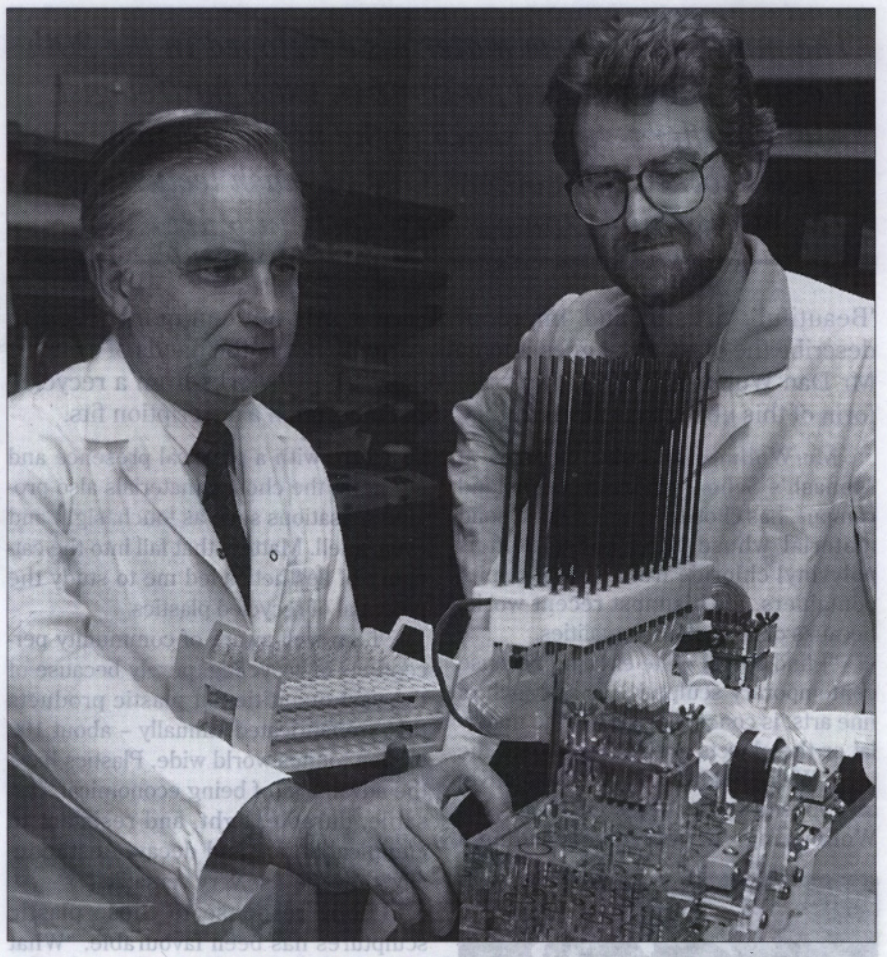
"My study emphasises that Australian ecosystems are quite different from those in the northern hemisphere," Mr Traill says. "This forest type is now fragmented, having once covered an enormous swathe from southern Queensland to western Victoria. Increasingly, it is being dominated by one or two species of honeyeater which could be having a big effect on the range and distribution of some rarer species."

One of the rarest birds of the ironbark-box woodlands is the regent honeyeater. Only about 1000 of these nomadic species, found mainly in Victoria, remain. Other species such as the crested bellbird, southern white-face, grey-crowned babbler and bush thick-knee also appear to have suffered a marked decline.

Nature is wreaking revenge on agriculture because the loss of insectivorous dickybirds, along with insect-hunting bats that also use hollows in old trees for shelter, leads to insect plagues that reduce the productivity of farmland and contribute to the problem of eucalypt dieback.

# Blocking the nerve killer

*Head and spinal injuries have massive physical, emotional and monetary costs to the community each year. A discovery by Monash scientists of a drug that reduces neuronal damage means these costs are set to be radically reduced.*



*Professor Bevan Jarrot (left) and Dr Phil Beart screen compounds for their receptor-blocking ability, using a receptor binding manifold.*

Luck played a big part in how tibalosine, one of the world's most promising compounds for minimising neuronal death after stroke or injury, was identified by two Monash scientists.

In the late 1980s, medical researchers discovered that in the hours and days after a severe spinal or head injury much neuronal damage results from a series of biochemical events that cause healthy nerves to be lethally overstimulated. Ever since this discovery, medical researchers have been searching for drugs to block the lethal cascade, sparing healthy neurons to minimise brain damage.

In 1989, two Australian scientists working in different fields stopped to chat in an Austin Hospital corridor. Their chance meeting led to Professor Bevan Jarrott and Dr Phil Beart moving to the Department of Pharmacology at Monash University to pursue their research into tibalosine, a novel NMDA antagonist (see box).

Professor Jarrott had studied tibalosine for a different reason five years before the fateful chat. He had investigated tibalosine's reputed anti-hypertensive properties, with limited results.

When Dr Beart stopped Professor Jarrott in the corridor at the Austin Hospital, Dr Beart had not heard of tibalosine. He wanted to know if Professor Jarrott had any ifenprodil, which is an NMDA antagonist. He needed it to test his idea that it could be labelled with radio-active iodine-125. The iodine-125-labelled ifenprodil could tag the NMDA receptors, allowing different regions of the brain to be visualised – a technique known as autoradiography.

The ifenprodil experiment worked. Dr Beart had developed an anatomical method for mapping NMDA receptors in the brain and a new assay technique for studying potential NMDA antagonists. But with a chemist's memory and eye for detail, Professor Jarrott noted that the ifenprodil molecule shared parts of its architecture with tibalosine, the drug he had discarded as an anti-hypertensive five years earlier. Might tibalosine also be an NMDA antagonist?

He gave Dr Beart some tibalosine to test his new assay technique. His hunch was correct – tibalosine proved to be a unique NMDA antagonist.

Tibalosine is made by a small Belgian drug company, Continental Pharma, which has been bought by Searle, the pharmaceutical arm of the chemical multinational Monsanto.

When Dr Beart had been supplied with tibalosine for his original experiments, Professor Jarrott had signed a standard agreement with Continental Pharma that gave the company first option to exploit any discoveries from his research. He wrote to the company for permission to present the new findings to conferences.

"They got very excited about the possibility of patenting tibalosine as a potential neuroprotective drug," Professor Jarrott said.

The company filed a use patent to protect the original discovery. In consultation with the Australian researchers, they identified 20 related compounds, variants on the basic structure of tibalosine, that could be tested to see if any might be a more potent NMDA-antagonist than tibalosine itself.

As expected, these compounds varied in potency, with some working better than the original form of tibalosine. By comparing the structural differences between these variants, Professor Jarrott and Dr Beart were able to home in on those elements of the structure that contributed most to potency as an NMDA antagonist.

The Monash researchers had a rapid screening technique, and a drug that promised to be a potent neuroprotector. But they didn't really understand how tibalosine interacted precisely with the NMDA receptor to prevent the neuron being overstimulated.

In 1992, Dr Beart took study leave to work at the Royal Danish School of Pharmacy in Copenhagen, which was investigating excitotoxic drugs using cultured nerves. Among the drugs that kill or injure nerve cells by acting through the NMDA receptor is the hallucinogen PCP, or so-called 'angel dust'.

The Danes had found that nerve cells exposed to excitotoxic levels of glutamate begin to synthesise to nitric oxide. This finding is very significant because nitric oxide has only recently been shown to be a natural neurotransmitter in its own right. It is a prime suspect as the initiator of the cascade of events that causes the death of adjacent neurons.

Professor Jarrott and Dr Beart believe this hypothesis is supported by the fact that tibalosine, an NMDA antagonist, seems to act by blocking the synthesis of nitric oxide. The stressed nerve cell is unable to send its potentially lethal signal to its neighbours.

High doses of amphetamine in laboratory animals cause the destruction of a special class of neurons in the striatum that secrete a natural calming agent called dopamine – the loss of these neurons is responsible for Parkinson's disease in human beings.

If laboratory animals are given several injections of tibalosine and then subsequently exposed to normally toxic doses of amphetamine, they exhibit minimal behavioural effects and loss of dopamine-secreting neurons in the striatum. In the Parkinsonian mouse model, NMDA receptors appear to be localised on the dopamine neurons.

The Monash researchers now know that tibalosine acts with great specificity on one part of the NMDA receptor, the so-called polyamine site.

The NMDA receptor was originally identified as the site where L-glutamate, one of the main excitatory neurotransmitters, binds to the neuron.

But the NMDA receptor's repertoire of activities extends beyond this simple one-to-one interaction. Indeed, the human brain's enormous flexibility originates at the level of individual receptors, where different modulators, working in concert through different components of the same receptor, orchestrate complex behaviour in the nerve.

Some drugs produce unwelcome side effects because they block the entire receptor, producing pronounced behavioural stimulation.

Professor Jarrott and Dr Beart believe that tibalosine works exclusively through the polyamine site – a modulatory site on the receptor.

This means that the nerve continues to function almost normally while tibalosine remains bound to the polyamine site, protecting it by a non-competitive mechanism against glutamate's toxic effects.

"Non-competitive antagonists that produce therapeutic benefits with no behavioural side effects are of great interest to pharmaceutical companies," Professor Jarrott said.

Three thousand Australians suffer head injuries every year that result in some degree of brain damage. Another 37,000 people fall victim to stroke. Others suffer paralysis from injuries to the neck and spinal cord.

The NMDA receptor has also been implicated in several other diseases of the central nervous system, including motor neuron disease, Huntington's chorea and epilepsy. The Monash researchers hope tibalosine may prove useful in preventing or treating these diseases.

Ideally, such drugs will be administered by ambulance officers to anybody who has suffered a stroke or head injury. These drugs could also have positive effects if administered up to 12 hours later.

But Professor Jarrott says testing tibalosine in humans poses formidable challenges. The brain is relatively inaccessible for study, and the consequences of stroke or head injury are so variable in nature and severity that it will be difficult to show quantitatively that tibalosine has done its job in ameliorating nerve cell death.

Dr Beart has applied for a grant from the Victorian Health Promotion Foundation to establish a tissue culture laboratory so that tibalosine's ability to protect nerve cells exposed to injury or chemical insult can be evaluated.

Professor Jarrott and Dr Beart also plan to work with the Department of Chemistry at Monash to synthesise new variants of tibalosine and structurally related compounds that may be even more potent. They have established a theoretical design project with Dr Margaret Wong of Swinburne University.

## What is the NMDA receptor?

The NMDA receptor is a specialised protein that mediates communication between nerve cells. Present in virtually every nerve cell in the brain, NMDA receptors can be thought of as a channel through the membrane of the neuron that opens or shuts in response to levels of various biochemical signals from other neurons.

Among these signalling compounds is the amino acid glutamate, a potent neurotransmitter that opens the gate, allowing a pulse of sodium ions to flow into the cell, activating the nerve. However, high concentrations of glutamate released by nerve cells can jam open the NMDA channels of a neighbouring neuron by displacing magnesium ions and allowing both sodium and calcium ions to enter and depolarise the nerve. A sustained depolarisation results in depletion of energy reserves. The neuron then dies.

Nerve cells release glutamate when they are deprived of oxygen by the blockage or rupture of a blood vessel, or when they suffer physical injury. The glutamate released by a stressed or dying cell can kill its neighbours; as these cells die, they in turn may overstimulate and kill adjacent cells, causing a wave of damage to radiate from the epicentre of the injury.

# Creatively recycling waste

*The multitude of new materials developed in the 20th century has resulted for some in what futurologist Alvin Toffler termed 'shock of the new'. But some are less shocked than others. One Monash lecturer is turning 20th-century waste into art.*

'Beautiful', 'artistic' and 'impractical' are words not commonly used to describe the plastic that goes into milk cartons. But in the hands of sculptor Mr Dan Wollmering, who has created several new works from a recycled form of this ubiquitous 20th-century substance, such a description fits.

Mr Wollmering, who lectures at Monash's School of Art on Gippsland campus, has chosen Syntal, a dark, solid material whose chief constituent is polyvinyl chloride from recycled milk containers, for his most recent works because of its sculpting qualities.

"I find Syntal quite exciting because contemporary sculpture, as a branch of fine arts, is concept-driven — the material or the objects are chosen to suit the idea. We're talking about the effective, as opposed to the objective," says Mr Wollmering. "Apart from providing a structure with a physical presence and strength, the chosen materials also provide sensations such as touch, sight and even smell. Matters that fall into the category of aesthetics led me to study the potential of recycled plastics.

*'Camouflage', a Syntal and PVC sculpture by Mr Dan Wollmering.*

"I am well aware of community perceptions of recycling, purely because of the vast quantities of plastic products that are fabricated annually – about 100 million tonnes world wide. Plastics have the advantage of being economical, versatile, durable, light, and resistant to chemical attack and decay. Aesthetically, they are also very versatile."

Public response to these plastic sculptures has been favourable. "What comes through loud and clear is surprise about what those plastic containers in the refrigerator can end up looking like. I find that Syntal creates a new attitude – it arouses people's curiosity and interest in the work generally," he says.

Mr Wollmering says that while the idea shapes the choice of material, the chosen material can sometimes shape the idea. This was particularly true for recycled plastic because it has limitations as well as exciting possibilities.

Syntal was originally developed as a wood substitute. When it is extruded in semi-molten form, different dyes are used to shape it as it emerges. It cools to a hard, dark grey or black colour with what Mr Wollmering describes as an elephant-hide surface texture.

*Assorted extrusions of Syntal.*

If the plastic is sliced, the cut surface often reveals speckles of colour embedded in the glossy dark matrix – the remnants of a piece of coloured plastic or shredded aluminium bottle cap that have escaped the sorting process.

It can be cut and shaped using woodworking tools, including radial-arm saws, bandsaws, drills, planers, lathes and finishers, and individual components can be joined with adhesives such as Liquid Nails™ or Maxibond™.

Although Syntal is very durable as a wood substitute outdoors, as a sculptor's material it is more suited to indoor environments because of its structural characteristics. In hot sunlight, it tends to flex so Syntal does not lend itself to the larger, monumental scale that characterises outdoor works.

"As a recycled material, Syntal is termed a 'post-consumer waste', distinguishing it from plastic wastes that come out of industry," he said. "Post-industrial wastes come from various factories that generate plastic scrap, usually PVC. The plastic is washed, melted down and extruded in pellet form for re-synthesis.

"We have obtained some unusual results by using Syntal in conjunction with post-industrial plastic wastes."

Mr Wollmering became interested in consumer waste plastic as a material because of low consumer awareness of what happens to recycled household plastics. But, he concedes, wider use of waste plastic by artists would have a negligible impact on the supply.

"It's not that I'm trying to convince anyone of its artistic merits, I'm just investigating interesting materials," he said. "Traditionally, sculpture studios have been employing familiar materials such as wood, steel, bronze, cement, plaster and found objects for generations. The introduction of recycled plasties will only add to the vast range of mediums available to the sculptor."

Companies in the plastics business have taken an interest in Mr Wollmering's work. The plastics recycling division of Smorgons in Footscray has donated Syntal, and the Nylex Corporation in Dandenong has given him waste industrial plastic.

# Beating the flu blues

*From Research Monash 1*

The compound's level of activity, however, was still not high enough to be used as a human anti-influenza drug. Dr von Itzstein's team had made a promising start, but now needed to refine the design of the compound so that it would bind much more tightly into the sialidase enzyme's active pocket.

"It was a milestone," Dr von Itzstein said. "The conventional wisdom, based on 20 years previous experience, was that it would not work.

"Once we knew we could do it, the field opened right up. If we could make a more potent in-vitro inhibitor, we could expect in principle that it should translate to in vivo activity."

By 1987, the CSIRO researchers had further refined the crystal coordinates, opening the way for Dr von Itzstein to alter the basic shape of the sialic acid template to improve its binding activity.

The Pharmacy College researchers were using a powerful computer program that allowed them to ask 'what if?' questions. They could hang small chemical groups, for example a hydroxy or a methyl group, off the template molecule and the computer would calculate how it affected binding.

The preliminary experiments had used a basic template molecule called 2-deoxy sialic acid. In 1988, Dr von Itzstein decided to vary the template itself, by inserting an amino group into its ring structure. The task of synthesising the 4-amino analogue based on the sialic acid template was given to group member Dr Wen-Yang Wu. The result was at least 10,000 times more active than any of its 2-deoxy sialic acid predecessors, a huge gain in binding activity.

Even as the new compound was being tested in rodents in the UK, Dr von Itzstein sent the new variant synthesised by Dr Wu. This compound had a guanidino group attached to the template, in place of the amino group.

This variant proved to be a puzzle. The computer predicted that the 4-guanidino sialic acid analogue should be even more active than the 4-amino compound, but when it was tested in vitro by the team's biochemists, activity seemed to vary widely.

It was indeed an improvement, being about a million times more active than native sialic acid, but its activity seemed to vary considerably around this figure. Dr von Itzstein said that by repeating the assay, his team found that the result depended on how early, or late, the measurements were made.

It turned out that the guanidino compound was extraordinarily active in vitro. Variations in activity occurred because the molecule fits so tightly into the sialidase pocket, taking time to move into the right position. But once in place, it binds with enormous tenacity, minimising any side-effects caused by the drug binding with non-target molecules.

Some mammalian cells and bacteria have their own sialidases, so it was important that an anti-influenza therapy should ignore these sialidases and act exclusively on flu virus sialidases.

The strong binding affinity is also crucial. Dr von Itzstein says that ideally, a candidate antiflu drug should work at extremely low concentrations. The lower the dose, the lower the risk that it will be toxic, teratogenic or carcinogenic.

In animal trials the new compound has proved to be protective against the influenza virus. Glaxo and Biota may seek approval to test it in human volunteers in the US, Europe and Australia as early as next year.

Tests have yet to confirm that the drug will cure, as well as prevent, an influenza infection. It certainly prevents infection, and its mode of operation suggests that it should also halt an established infection if administered when the early symptoms of a runny nose and sore throat appear.

Dr von Itzstein says that his group plans to make other changes to the sialic acid template to see if it can further improve its binding affinity. A back-of-the-envelope calculation suggests that 1000 million times better than native sialic acid is the theoretical maximum. "We are not far from that, but we have to try to keep improving", he said.

Dr von Itzstein's group has approximately 27 members, as well as a number of postgraduate students. "One of the group's strengths is that it is multidisciplinary," Dr von Itzstein says. "Computational chemists, organic chemists, and biochemists are all working together, something rarely seen in a university environment."

Other Monash researchers involved in the project are Dr Mary Amputch, Mr Brendan Mackey, Dr Gaik Kok, Mrs Betty Jin, Ms Faith Rose, Mr Michael Campbell, Mr Basil Danylec, Dr Jeff Potter, Mrs Margot Jones, Mr Tho Van Phan, Ms Cindy Holzer and Ms Wendy Stewart.

Dr von Itzstein's research has also focused on aspects of organic synthesis, including the design and synthesis of potential anticancer drugs, antidiarrhoea agents and studies of potential enzyme targets.

# New centre declares science is golden

*Australia might be the lucky country, but 'the clever country' threatens to become just another political cliché. One Monash academic is fighting to secure our intellectual future by concentrating on where she believes it is currently being lost – in our schools.*

SCHOOL-AGED CHILDREN will rediscover their innate desire to investigate, observe, and experiment if an ambitious project being undertaken by Dr Pat Vickers-Rich of the Department of Ecology and Evolutionary Biology is successful.

With the encouragement and financial support of the university, Dr Vickers-Rich has begun work on the project, which she hopes will enhance the way science is taught in Victoria's schools. Such a transformation would also ultimately alter the way science is perceived in the community.

Dr Vickers-Rich has become one of Australia's most visible scientists through her work on dinosaurs with husband Dr Tom Rich of the Museum of Victoria. She has introduced thousands of Australians of all ages to the joy of scientific inquiry and discovery through the spectacular dinosaur fossils found at Dinosaur Cove.

Dinosaur fossils have instant appeal, and palaeontology will feature prominently in the new Monash Science Centre, now under development in the former Bushell's tea and coffee factory in Normanby Road, Clayton.

Dr Vickers-Rich, who studied palaeontology at the University of California and Columbia University, is modelling the new centre on a famous Californian prototype – the Lawrence Hall of Science, on the Berkeley Campus of the University of California.

Dr Vickers-Rich suspects that by the time most Australian children enter high school, they have lost or dulled the insatiable curiosity that drove them to learn in their first few years of life. Learning has become a chore.

Something about the way science is taught – or not taught – in the early school years results in the atrophying of such innately human traits as the desire to inquire and observe, and the urge to experiment and invent.

To blame teachers is to ignore the roots of the problem, which include a teacher training system that undervalues science and a chronic lack of resources for teaching science in primary schools. Dr Vickers-Rich wants to use the new Monash Science Centre to enhance the way science is taught – or more accurately, learned – in primary and early secondary schools.

> Many people reject science because they consider it to be a cold, joyless, dehumanising enterprise.

She believes that if schools can engender and sustain an interest in science through these critical early years of learning, more students will be encouraged to take science subjects in the Victorian Certificate of Education and pursue careers in science. For those who do not wish to pursue science as a career, a simple understanding of how it works and how it affects their lives is still important.

According to Dr Vickers-Rich, the answer does not lie in science centres that students visit once or twice a year with their teachers: "I want to go beyond the science where kids only press buttons that turn wheels, without really understanding – the sort of science that seems like magic." Such centres need to follow up to excite an enduring interest in science. But while she believes science should be fun, Dr Vickers-Rich worries that well-intentioned efforts to popularise science often end up trivialising it.

Meanwhile, television and film constantly expose children to bizarre images that will colour their attitudes towards science and scientists in adult life.

Dr Vickers-Rich has been working to develop the new Monash Science Centre with Ms Jenny Monaghan, a BA graduate from Monash who is administrator/database manager of the centre, and former secondary school teacher Ms Sanja van Huet, who is the centre's schools' liaison officer. Ms van Huet previously worked with the Science Teachers' Association of Victoria and CSIRO's Double Helix Club.

The centre will give students, teachers and parents access to flesh-and-blood scientists, not the stereotypic 'mad' scientists of television and film. Initially, it will have three permanent classrooms: one for the physical sciences, one for the biosciences, and the third for something Dr Vickers-Rich describes as a 'Wizard's Lab' for preschool and early primary school children.

In time, the centre will have its own library that will be a "showpiece of what is available in science education for primary and secondary grades," Dr Vickers-Rich said. A computer database of the different sorts of science teaching materials will also be installed.

Instead of using push-button displays to teach the principles of physics, the new centre is planning a playground in which children, as they play, will conduct their own simple experiments with fulcrums, levers and other devices.

"Monash scientists who are doing the research are already getting together regularly with the children and the general public, and we are encouraging these meetings so that scientists themselves make direct contact with the students," she said.

"We are trying to get the students involved in the research. It is not going to be a public relations exercise where we just tell people what we do."

Dr Vickers-Rich says that, contrary to the ivory tower image of scientists, many Monash researchers have volunteered to give time to the centre, and have welcomed it because it will provide a focus to a longstanding tradition of less formal contact between Monash personnel and the community.

Ms van Huet says the centre will also attempt to instil in students the idea that there is not always a right and a wrong answer to every problem, and that science seeks to prove or disprove ideas.

"People think there is a right and a wrong answer to everything, because this is the way we have been taught," she said. "Science challenges this idea. It gives the best available explanation of the circumstances, but it's a process of continual discovery, exploration and questioning.

"We're trying to teach people what science is about, that it's something you can do yourself by the way you observe and the way you interpret what you observe. We are trying to demystify the scientific process and give people the tools to look at the world in a more analytical way."

Dr Vickers-Rich says scientific rationalism is under siege. Many people reject science in favour of a holistic, non-analytical view of the world because they consider science to be a cold, joyless, dehumanising enterprise.

"You can appreciate the world in a holistic fashion, but there is so much more to it than that. If you can get beneath the surface of something that appeals to your aesthetic sense, you may arrive at an even greater appreciation by understanding the finely tuned mechanisms that underlie that beauty," she said.

Dr Vickers-Rich has had little difficulty in exciting students about her own mainstream interest – dinosaurs. Many children who will eventually pursue careers in science show an early interest in dinosaurs.

The new centre is developing a series of inexpensive education kits for primary and lower secondary science teaching, and will offer in-service training to teachers who wish to use them. The first is already available – a kit containing epoxy casts of some of the unique fossilised dinosaur bones from the celebrated Dinosaur Cove dig in the Otways, west of Apollo Bay in Victoria.

Dr Vickers-Rich and her husband opened a new window on Australian prehistory with their Dinosaur Cove discoveries. Their fossil finds led them to suggest that when prehistoric Victoria lay close to the South Pole 110 million years ago, dwarfed dinosaurs stayed active during the frigid, five-month near-darkness of the sub-Antarctic winter, suggesting that some were warm-blooded.

This first science activity kit, *Dinosaurs of Darkness*, contains teaching materials that explain how the fossils from Dinosaur Cove have been interpreted. The kit contains a fossilised leg bone from one chicken-sized hypsilophodontid dinosaur for comparison with one from a similarly sized modern chicken – giving kids something they know to compare with the fossils.

Eventually, the science centre will have five classrooms, including a computer room where students will be able to gain access to international scientific databases. Another room has been set aside for a now-disused planetarium, which will be transferred from the university's Caulfield campus, hopefully in July.

The science centre is also planning to stage regular exhibitions. The first of these, on animal skeletons, will open in a few months. It will be followed by an exhibition on Gondwanan dinosaurs, to coincide with the release of a new book on southern hemisphere fossil vertebrates, *The Wildlife of Gondwana* (Reed Books, Sydney) by Dr Vickers-Rich and Dr Rich. The book's release will also coincide with Stephen Spielberg's new dinosaur epic, *Jurassic Park*.

> We are trying to demystify the scientific process to let people look at the world in a more analytical way.

The centre has established a Dinosaur Club, and despite the name, it caters for a wide range of scientific interests. The club publishes regular newsletters and will be organising excursions, field trips and evening lectures for students, parents and the general public.

The science centre is drawing on the expertise and resources of the faculties of Medicine, Engineering and Science. It is hoped that in the future all faculties will become involved.

"There are many connections between science, the arts, economics and business," Dr Vickers-Rich said. "We want to show in our centre how science is addressing some of the really big problems in life, like overpopulation, which certainly involves an interplay of politics, economics, social issues and the environment. The university has expertise in all these areas."

Dr Vickers-Rich says that while the university grant covers salaries and some facilities at the new centre, she is seeking a further $70,000 in funding from sponsors to help install classroom partitions and transfer the planetarium.

The centre's telephone number is 543 4061. Dr Vickers-Rich can be contacted on extn 75 4889, or fax 75 4903.

In its early stages of development, the new Monash Science Centre has already helped rekindle students' interest in science. Ms Jenny Monaghan (left) and Dr Pat Vickers-Rich use dinosaur print casts in their schools program.

## ▼ A dual award

Dual winners of the 1992 Dodds Memorial Award are mechanical engineering students Mr Richard Arrows and Mr Ayhan Boz.

The award recognises scholastic achievement, potential as a practitioner, and insight and understanding of mechanical engineering in Australia.

Representatives of Clyde Babcock-Hitachi presented the award.

Pictured below (from left) are Clyde Babcock, Hitachi representatives Mr Ken Thompson and Mr Ray Austin; head of Mechanical Engineering; Professor Bill Melbourne; and Dodds Memorial Award winners, Mr Richard Aarons and Mr Ayhan Boz.

## ■ Accounting for demand

To cater to increasing demand for offshore postgraduate courses, the School of Accounting has extended its Singapore-based program to include a Master of Business (Accounting).

The two-year course, offered in conjunction with the Singapore Institute of Management (SIM), emphasises strategic accounting and management issues.

SIM is the leading management organisation in Singapore in terms of its membership size, range of programs and services offered, as well as the quality of its management development programs.

According to Associate Professor, Dr Claudio Romano, the school aims to be one of the most well-known education providers in Asia.

"There are plans to establish similar courses in Hong Kong and Kuala Lumpur by the end of the year," Dr Romano said.

## ▲ Aussie Greek to Chinese

Students taking Australian studies in China will probably be better able to make use of our colloquialisms than native Australians now that they have the *English–Chinese Dictionary of Australianisms* as a reference.

The dictionary, edited by Mr Neil Courtney (above), lecturer in English at Monash University, and Professor Wang Guo-fu of Suzhou University in China, is designed to make Australian studies easier for Chinese students, who often struggle with the many idioms in Australian culture and literature.

According to Mr Courtney, the dictionary flowed from the surge of interest in all things Australian over the past decade in China.

"Australian studies centres are appearing all over China," he said. "The dictionary will help those students reading such classics as Henry Lawson, Banjo Paterson and Patrick White, which are studded with words unique to the Australian language."

It was important to the editors of the dictionary that vulgar words and phrases, including those with racist overtones, were not omitted.

As such, that four-letter euphemism for excrement, which is probably used in more ways in the Australian vernacular than any other, is included in more than 20 entries in the dictionary.

"We are not condoning the use of such words in our language, but simply recognising that they exist. Our emphasis on objectivity is that currently used by most lexicographers (dictionary makers) and linguists," Mr Courtney said.

The dictionary not only focuses on vulgarisms and slang, but also includes words even Australians would find baffling. For instance, how many would know that a pissaphone is a tube-like device used in Australian army camps as a urinal?

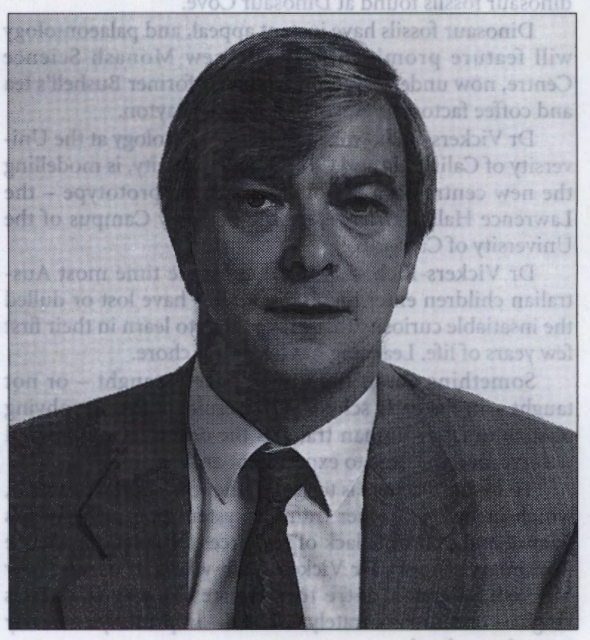
## ▼ Evaluating healthy

Options appraisal was the topic of discussion at the National Centre for Health Program Evaluation's recent two-day intensive workshop.

Director of the York Health Economic Consortium from the University of York in England, Mr Ron Akehurst, was the keynote speaker at the workshop, which was attended by senior Commonwealth and State health executives, hospital administrators, clinicians and economists.

Options appraisal, a technique for applying economic and financial appraisal principles, has been widely adopted by managers and clinicians to guide major strategic developments in health and other services.

The National Centre for Health Program Evaluation, which was established in mid-1990 by a grant from the National Health and Medical Research Council's Public Health Research and Development Committee, is based in the Faculty of Economics Commerce and Management at Monash University.



## ■ WHO grants $400,000

The World Health Organisation (WHO) Special Program in Human Reproduction has given the department of Obstetrics and Gynaecology $400,000 to investigate the causes of abnormal menstrual bleeding in patients using injectable contraceptives.

The principal investigator in the project is Monash senior lecturer Dr Peter Rogers. The three-year project will be conducted in collaboration with the Prince Henry's Institute of Medical Research.

## ▼ Greenhouse under scrutiny

The effects of global warming on the energy producing regions of the Latrobe and Hunter valleys were discussed at a conference held at Gippsland recently. The conference attracted speakers from around Victoria, including business leaders, conservation groups, union representatives, the media, academics and energy industry experts.

Conference organiser Dr Sharron Pfueller, of the Monash Centre for Environmental Science at Gippsland, said the conference was a great success. "It discussed the greenhouse effect from the socioeconomic perspective, and the policies dealing with potential global warming will have on regions like the Latrobe and Hunter valleys," Dr Pfueller said.

"Energy production forms the backbone of the Latrobe and Hunter valley communities' economic livelihood. Global warming and how this is combated will have serious implications on those regions."

Dr Pfueller said the conference explored the possibilities and limitations of reducing greenhouse gas emissions and proposed strategies for community response to change.

"By providing the forum for interdisciplinary discussion, the conference will help in the development of solutions," Dr Pfueller said.

A feature of the conference was a 20-minute presentation that headed each major session and concluded with a workshop discussion. Tapes of the workshop will be used to prepare a report of the major conclusions reached during the conference.

The conference, *Greenhouse and the Energy Regions*, was co-hosted by the Centre for Environmental Science at Gippsland and the Australian Institute for Energy.

## ▲ Lecturing up a constitutional storm

The topic may not have been examinable, but law students packed the new Monash South 1 lecture theatre to hear Professor George Winterton of the University of New South Wales introduce the Lucinda lecture series.

The series, named after the SS Lucinda, the steamship on which the Australian constitution was drafted in 1891, has been developed by Associate Professor H. P. Lee of the Faculty of Law. The series is designed to highlight the changing role of the Australian constitution, which will celebrate its centenary on 1 January 2001.

Professor Winterton's timely address, given the current debate, explored the issue of the Australian crown, its creation and demise.

Special guest at the lecture was former governor-general, Sir Zelman Cowen.

The Law Book Company is providing financial assistance for the lecture program, and will also publish a special centenary volume of lectures from the series.

# Music of the spheres

"An ambitious and fundamental study of organology" is how one critic described the latest book by head of the Department of Music, Professor Margaret Kartomi.

*On concepts and classifications of musical instruments* explores how scholars in China, India, Sri Lanka, Tibet, Java, Ancient Greece, the Arab world and Europe classify musical instruments and instrumental ensembles.

Professor Kartomi looks beyond the perfect classification system and focuses on the process of classifying used in various historical periods and cultural contexts.

The Australian Journal of Music Education described Professor Kartomi's work as "a delightful study of the sociology of culture. In her analysis of the relationship between cultures and classification, she links the status of musical instruments and their hierarchy in classificatory systems with social facts including religion, military power, priestly groups, and ethnicity."

# Learning the language of life

Traditionally the domain of school teachers, linguistics has become an integral part of the world of quicksilver telecommunications and speedy transportation.

Australia's multinational population and global business interests have meant that many career paths now are linked to its study. To help us come to terms with the rapid change, linguists at Monash are moving beyond the lecture theatre to schools and even the factory floor.

For those learning a second language, senior lecturer Dr Peter Paul has just published *Linguistics for language learning*, a text designed to provide the missing information linking the *why* of a language and the *how*.

Language awareness, says Dr Paul, is vital, especially given that the formal study of the structure of language has been largely absent from the school curriculum for the past 10 years.

"Foreign language classes generally present only the *how* of the language facts, not the insights that would allow students to understand the *why* of its characteristics," Dr Paul says.

"Yet it is these aspects of a language that determine some of the restrictions in its use and structure or which point to generalisations leading to a more efficient acquisition of the language."

The book, which also touches on body language, would be a handy addition to any school library, says Dr Paul.

In other parts of the Monash department, researchers are examining communication in English between non-native English speakers in Melbourne's workplaces.

With non-native English speakers making up 40 per cent of the workforce in the manufacturing sector, communication between different non-English-speaking groups (notably between people from European and South-East Asian backgrounds) is becoming the norm in many workplaces.

Most of the problems the research team has encountered are not due to vocabulary, pronunciation or grammar, but rather to the differing expectations of how particular acts such as promises, apologies, complaints or requests are expressed and conversations organised.

Data for the research have been compiled from audio recordings of spontaneous communication in four factories, two offices and the catering department of a large institution by way of a lapel microphone worn by a volunteer. Videos of meetings and employee participation groups have also been recorded – in total, about 184 hours of data.

So far, the research has shown that people of central European, southern Asian and some southern European origin are likely to hold the floor for longer periods and more often than those of South-East Asian descent.

This is largely due to cultural values. For instance, in some cultures it is more polite to water down something unpleasant by giving detailed explanations.

In others, a person will keep apologising until they receive an appropriate response. Some ethnic groups have more tolerance for silence and small-talk than others.

Linguistics is not taught in Australian schools, but some of the issues it is concerned with are not new to people entering university.

Linguistics is the systematic study of language. It is concerned with how and why languages change, the relation between language and society, how children acquire other languages, how people acquire a new language, and why communication may be successful or not.

Other research projects conducted by the department or within the associated National Language and Literacy Institute of Australia's Language and Society Centre include studies on euphemisms, the grammar of the Aboriginal language Pitjantjatjara, the differences between how men and women use language, varieties of English used in South-East Asia, and why some ethnic groups maintain their language longer than others in Australia.

# *Arts & Minds*

## ■ Robert Blackwood Hall

**The Monash and Melbourne university choral societies** will present 'Music from the New World and Beyond' on Saturday 22 May at 8 pm. The societies will perform Bernstein's *Chichester Psalms*, and works by Copland, Barber and Dvorak.

Admission: Adults $16; Concession $10; Family $40. For further information and tickets, contact Mr Andrew Wailes on 568 7374. Tickets are also available from MONUCS and the Robert Blackwood Hall Box Office on extn 75 3091.

Vocalist Arvind Apte with accompaniment from Niranjam Depdhar will perform classical vocal music from India in a **lunchtime concert** on Monday 24 May at 1.15 pm.

The **Monash University Concert Band** and **Big Band** will perform a selection of contemporary, symphonic and swing highlights at the **Music department Exam Concert**. Ensembles from Box Hill College of TAFE will also feature at the concert on Saturday 29 May. Admission: Adults $10; Concession $7; Monash and Box Hill students $5.

The **Paul Grabowski Trio** will perform original compositions by Paul Grabowski in the contemporary jazz style at a **lunchtime concert** on Monday 31 May at 1.15 pm.

## ■ Alexander and George Jenkins theatres

***The Garden of Granddaughters***, by Stephen Sewell, is the newest production to be held at the Alexander and George Jenkins theatres.

This deeply emotional and whimsical play centres on a family with optimism and humour.

Max, a world-renowned Australian conductor, and his wife Morily swoop back into Melbourne unannounced to tend to their three daughters and young granddaughters.

They find their daughters' lives overgrown with disorder, hope choked by disappointment, romance rotted by reality. Thankfully, their granddaughters seem to be budding with promise. Before they leave again, Max and Morily gently nurture their family with love and understanding, uprooting a few family secrets in the process.

*The Garden of Granddaughters* will run from 18 to 22 May at the Alexander Theatre on Clayton campus, and from 27 to 29 May at the George Jenkins Theatre on Frankston campus. For bookings, contact extn 75 3992.

## ■ Australian Centre for Contemporary Art

The Australian Centre for Contemporary Art's (ACCA) most recent exhibition, ***Esensual Fragments***, will appear throughout 1993.

The exhibition, which will be presented in stages and feature the work of a variety of artists, will explore different interpretations of sexuality and sensuality through visual and written media.

The current exhibit in the series, ***Inhabit Me (Like a Memory)***, is a selection of works by Neil Emmerson, and will be displayed from Wednesday 26 May to Sunday 27 June.

A series of public lectures about sexual politics in art is to be held at the Australian Centre for Contemporary Art in May and June. The first: '**The rape – facialized body: Black hole, reading the phallic machine**' will be presented by Ms Anne Marsh of the university's Visual Arts department on Thursday 27 May at 7 pm.

Ted Gott will present a lecture titled '**Anything but gay: Surrealism and homophobia**' on Tuesday 15 June at 7 pm.

'**Sticky labels: New contexts for lesbian and gay art practice**' will examine issues raised through various components of ACCA's 1993 exhibition program that have dealt with notions of lesbian and gay sexuality. It will question the notions of a gay, lesbian or queer aesthetic and address the relationships between visual arts practice, representation within popular culture and social activism. It will be presented on Tuesday 22 June at 7 pm. Tickets $5 (concession $3).

The lectures coincide with an exhibition of works by prominent gay artist Mathew Jones. ***Poof! The Last Word in Queer Art*** questions whether the sudden explosion of interest in gay and lesbian artists' work heralds the emergence of a new realm of politicised queer expression. It also explores whether queers will find a voice in the 'general community' with anything other than the novelty value of the marginalised victim.

Exhibition dates are from Wednesday 26 May to Sunday 27 June.

For further information about the lectures or exhibitions, contact 650 3438.

## ■ Gallery

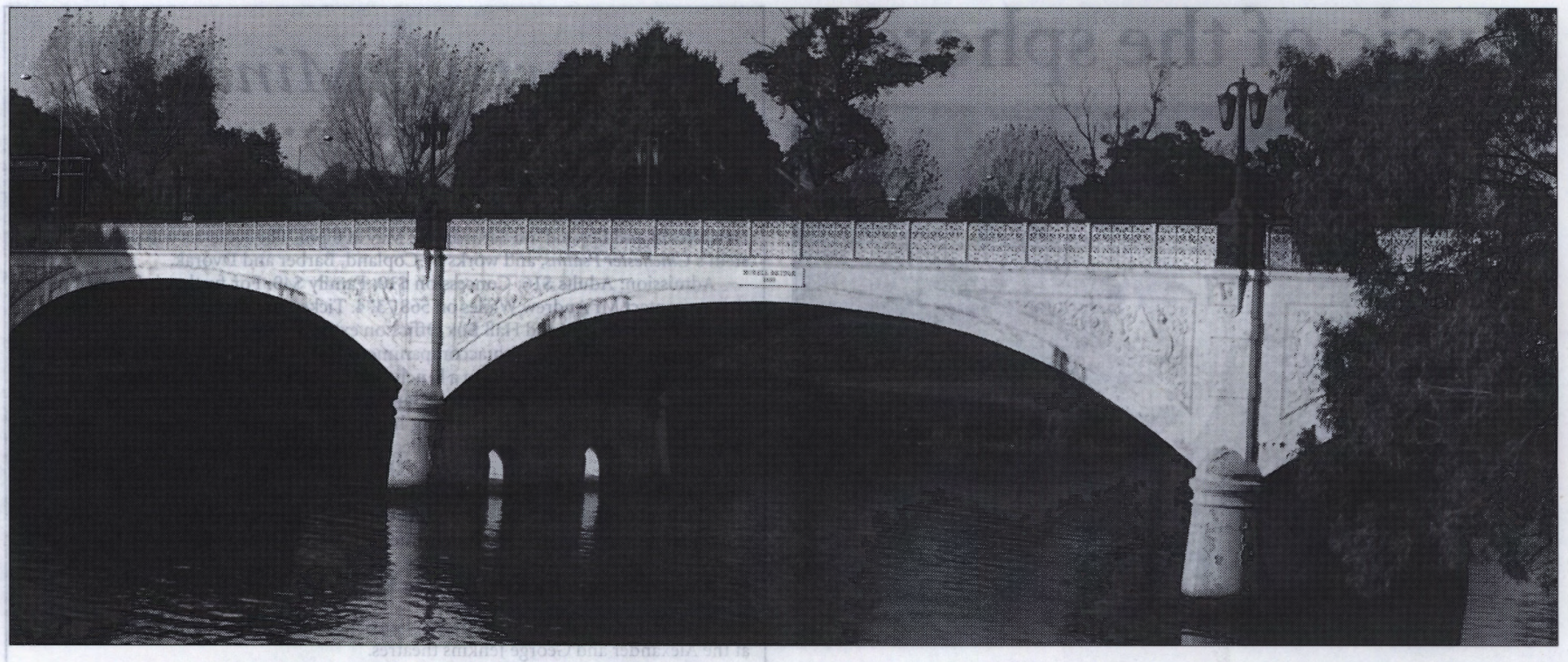
***Towards Identity*** is the result of a five-year project by Melbourne artist Victor Majzner to be exhibited at the Monash Gallery during May.

The 12 large-format paintings present a series of unrelated narratives and include images of flying figures, a hand imprint, the spiral of a mine shaft, sexual poses, excerpts from landscape paintings and traditional Aboriginal icons.

Majzner articulates and confronts his ongoing interest in sociocultural and environmental themes in these works. The influence of his trips to Riversleigh, an outback cattle station in north-west Queensland, is most obvious in the paintings selected for this exhibition.

The exhibition runs from 20 May to 3 July. For further information, contact extn 75 4355.

*In the Grottos*, a 1991 acrylic on canvas, is one of 12 Victor Majzner works to be exhibited at the Monash Gallery until July.



# Rapid repair means no rusting on one's oars

Monash engineers are helping to extend the lifespan of one of Melbourne's most historic landmarks, the Morell Bridge across the Yarra River.

Concrete slabs measuring up to three metres have fallen off the bridge at Anderson Street, metal rods are protruding from its underside, and several sections have rusted. The most damaged section is under the arch closest to the South Eastern Arterial, where part of the reinforcing steel has rusted right through.

The Engineering faculty's associate dean of research and development, Associate Professor Brian Cherry, says that if the bridge's condition had been ignored, authorities would have been forced to limit its use.

Engineers have emphasised that despite the obvious corrosion problems, the bridge does not yet pose any safety threats to motorists or to boats using the Yarra.

When construction of the Anderson Street bridge was completed in 1899, its life expectancy was 50 years. Now, nearly 100 years later, Monash engineers are playing a major role in developing techniques to arrest the degradation.

Professor Cherry says the problems have occurred because salt and air have penetrated the concrete and have rusted the reinforcement.

"In modern reinforced concrete construction it is possible to protect the reinforcing steel from corrosion by using impermeable concretes of sufficient thicknesses. Of course in 1899 this sort of technology was not available," he said.

Professor Cherry says the rusted reinforcing bars have expanded and exerted so much pressure that the concrete has cracked. With the use of an electrolysis process called cathodic protection, the firm contracted by Melbourne City Council to restore the bridge is confident that the degradation can be stopped.

A Monash team, which has been investigating the application of cathodic protection to reinforced structures for some years, will be working with Remedial Engineering Group to look at what actually happens in the heart of the concrete structure when an electric current is passed through the steel.

The cathodic protection process involves inserting electrodes through the pedestrian walkway into the land-fill section under the road. The electrodes will direct a low-voltage electric current through the soil and concrete into the reinforcement. The flow of current will suppress the dissolution of the metal reinforcement and at the same time restore the alkalinity of the concrete that protected the reinforcement during the earlier years of its life.

Such is the simplicity of the process that installation of the system will close the bridge for no more than about 10 hours at night.

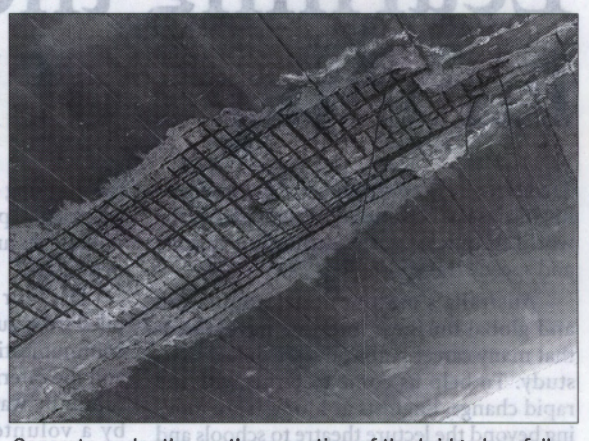
Monash has also been developing monitoring techniques that quickly determine whether the cathodic protection process is working properly. Without the technique, engineers would need to wait about 20 years before the structure's condition could be reassessed.

Professor Cherry says that the principles of cathodic protection were established more than 200 years ago. It is believed that the first cathodic protection system seen in Australia involved protecting iron nails in the hulls of Royal Navy ships at the end of the 18th century.

Despite the age of the technology, it has never been used in the form proposed for the bridge.

As a result of preliminary studies, Professor Cherry is confident the crossing will survive another 100 years. He also believes the restoration will provide a technique that will play a major role in maintaining Melbourne's heritage.

The Anderson Street crossing was the first reinforced concrete bridge in Victoria. It was built by the firm Monash and Anderson, whose principal was Sir John Monash.



Concrete under the northern section of the bridge has fallen away, revealing rusted steel reinforcement sections.

# AFL draft to go under the spotlight

With the 1993 AFL season now in full swing, there is plenty of conjecture regarding the premiership chances of each of the top contenders. One fact leaving little room for debate, however, is that AFL football in the 1990s is big business.

At the centre of the clubs' wheeling and dealing is the player draft system, a baffling set of rules that controls the merry-go-round of player allocation and trading between the clubs.

Mr Ross Booth, a Monash University economist and ABC TV football commentator, is about to dissect the draft system in economic terms and examine how the system influences the big business of Australian Rules.

As well as a full appraisal, Mr Booth will also draw some conclusions on whether the draft is good for football and how it is likely to affect the game in the medium and long terms.

Mr Booth is in the early stages of his PhD and believes he will take up to four years to complete the study.

Already, several AFL clubs have expressed an interest in Mr Booth's research. He stresses that the study will be totally impartial.

The AFL's rationale behind introducing the draft system was to even up the competition and prevent a continued domination of the five clubs that won the flag between 1967 and 1986.

There seems little doubt that having only five premiership clubs in 20 years was reflected in reduced gate attendance figures during that period.

Basically, the AFL national draft system works with all uncontracted players and recruits going into a selection pool. The club that gets the first choice of all available players is the team that finished at the bottom of the ladder at the end of the previous season. The second last club gets the second choice, and so on.

Clubs are also permitted to trade senior list players for draft choices, but the AFL outlaws draft positions being sold for cash.

Mr Booth agrees that the number of potential premiership winning clubs appears to have risen since the introduction of the draft system, although he is not yet prepared to attribute this to the success of the draft.

'Indications are that the various draft systems in the US have not achieved the goal of evening up the competition, but it must be pointed out that the AFL system is slightly different," Mr Booth said.

"In particular, the AFL does not allow players to be sold for cash."

One of the important issues Mr Booth will look at is the clubs' ability to trade players for draft choices.

While this gives the clubs some chance to alter the types of players on their list, it may offset the original intention of the draft system, which is to change the distribution of player talent.

Mr Booth will also examine whether the draft system must continue to include a salary cap establishing a predetermined maximum figure that each club must adhere to when paying contracted players.

Mr Booth regards the short-term effects of the draft as another area needing scrutiny.

Some people argue that the draft system takes too long to bridge the gap between the bottom and top clubs because the bottom team effectively has only one more 'premium' draft selection than the previous season's premiers.

Added to this, the system relies implicitly on clubs being able to identify talent, and frequently this proves to be the draft's stumbling block.

Many instances can be cited where top draft choices have failed to live up to expectations, and low priority players have excelled.

Mr Booth wants to look at the draft's impact on club financial viability.

"It could be that both the draft and the salary cap are unwittingly maintaining an uneven competition by keeping the weaker clubs going," he said.

"Some of the information from the US shows that a salary cap limits club costs and the draft gives them a few good players, but this does not necessarily make them into a top club."

The study will also include an assessment of the draft's effect on player payments, that is whether or not AFL players are being underpaid as a result of the draft/salary cap system.

He will also compare the performance of the system with an unregulated market of player-trading and comment on what a 'free' market may do to the AFL's future.

"Unlike most businesses, you don't want your competitors to fail," Mr Booth said. "You must have somebody to play against, so there is an inherent interest in having a balanced competition.

"The closer the competition, the higher the public interest, the greater the attendance, the better the TV rights, and so on."

# *Taking a worldly look at the globe*

by Paul James

Do you know the Nescafé advertisement, the one where Nestlé – a transnational corporation that once advanced the benefits of infant formula over breast milk in India – promotes its coffee as a source of friendship and community? The contradictions are replete with meaning. As Nestlé contributes to the globalising process, trading commodities across a world it reduces to market sectors, its latest advertising draws on current nostalgia with a theme of 'old-style' community. Accompanied by images of rural idyll, the narrator speaks wistfully:

*"My name is Gillian Stone. I feel like this valley has chosen me. There's a closeness, a realness here, that many I know have lost or put away like a winter coat in spring, there but forgotten … I envied them. Even the simple act of sharing coffee is an opportunity to talk, to get to know you better. It was as if the warmth of a cup of coffee somehow melted the barriers I was so used to putting up."*

Ironically, the very processes of globalisation, which are emptying our community, or at least changing the ways in which we connect ourselves to others, are now being represented as the new means of connection, the ways in which we will buy meaningful relationships with others. Coffee and Nescafé, teleconferencing and Telecom, become presented as the mediators between the village and the globe.

The globalisation of culture holds many promises … and many problems. With globalisation comes the question of cultural integrity, the crisis of community, and the issue of how we might develop global relationships without becoming overwhelmed by the processes of globalisation: the break-up of boundaries, the deregulation of economies, and the constant movement of people.

This is not to suggest that the only way of surviving in this globalised setting is to re-establish and thoroughly harden the boundaries and subjectivities of the nation-state. This single act will not hold us together, nor will it ameliorate (except as a temporary tactic of shutting out) the global problems we face.

The national boundary is better conceived as a contingent partition in a complex intersection of the various levels of integration between people – levels that range from associations within the local community to those held across the globe. In this understanding, the kinds of relationships not dominated by those most abstract processes of mediation, such as television, satellite communication and commodity exchange, need necessarily to be reasserted.

> Perhaps more than 70 per cent of commodities sold in our supermarkets come from outside Australia.

Globalisation refers to the way in which over the last century the globe has been linked on new levels across the realms of production, exchange, communication and organisation. Now more than ever we find that every aspect of our social lives has become connected by these globalisation processes.

These processes cover many aspects. They include the way in which the mode of production is organised with transnational corporations moving around the globe, exploiting zones of cheap labour or other comparative advantage. Nissan sets up its plant in Clayton and then, because of a rationalisation decision, closes down the factory and 2000 workers lose their jobs. As the process has been working across the car industry, so too has it resulted in the general decimation of manufacturing in Australia.

Communication, news broadcasting, film-making and sports telecasting have also become global in their span and profit-fixated in their orientation. Despite the fact that Rupert Murdoch says "I am Australian, I still love Australia", he has, for commercial reasons, made himself an American citizen and become a thoroughly globalised person.

Similarly, the exchange of commodities and capital has become ever increasingly a global process. It has been estimated that more than 70 per cent of commodities sold in our supermarkets come from outside Australia. With a virtual '24-hour' trading market, capital moves across the globe at increasing speed. Shadows of influence from Wall Street and Tokyo's Nikkei Index fall directly on to the volatile Australian stock exchange. Even if you disagree with the politics of Robert Reich, adviser to American President Bill Clinton, we have to take seriously his argument that in the coming century "there will no longer be national economies, at least as we have come to understand that concept".

These processes of globalisation are now affecting every area of our lives, from the ways we interact with people, buy food and function in everyday life to the form of the nation-state and the way we create our identity in that setting.

Paul Keating argues that Australia must turn away from its traditional allies in England and the US in order to assert the country's independence. Contradictorily however, he asserts the need for Australia to integrate with the latest superpower – Asia. What we are doing is simply subordinating ourselves to another "great and powerful friend", Japan.

The dominant idea permeating the rhetoric of globalisation is that we have to connect ourselves to the powerful economies of the world, otherwise we will not survive. Economic rationalists are pushing an idea of a single-layered connection, one that occurs mostly through business people and state delegations. They emphasise monetary return, efficiency and progress at the cost of most other things, including quality of life.

Nevertheless, globalisation does have a number of positive features. First, it has tended to penetrate the kinds of insularities and parochialisms that led to all sorts of narrow conceptions about how the globe or individual communities should be organised. Second, it has connected us, even if only in an abstract way, to the people of the world who face hardship, injustice and exploitation. Third, in being forced to think globally, we are impelled to organise globally. As environmental, political, trade and economic questions become increasingly global, it becomes crucial that we develop extensive global connections. At a grass-roots level, non-state, non-corporate examples of such organisations include Community Aid Abroad, Greenpeace, Friends of the Earth and the World Council of Churches.

However, we still need to address globalisation's darker side. It is these problems that current debates are either omitting or attributing (perversely) to those processes that are holding back the flows of the global marketplace. For example, in order to solve the problem of unemployment, some argue that we need to become internationally competitive. But this necessitates either sacking 'excess' labour or degrading pay and conditions, or both. Hence, 'solving' the problem of unemployment means either accepting higher levels of unemployment or setting up a dual economy of well-paid and badly paid workers – presumably both.

Global capitalism has meant that it has become increasingly difficult for countries like Australia to manage their economies either independently or effectively. While the more powerful countries such as the US and Japan have tended to benefit from the liberalisation of the trade and capital movement, Australia has seen international competition undermine its historically fragile industrial base.

Also, global capitalism has confirmed rather than bridged the divide between the First and the Third worlds – and this is not withstanding the remarkable growth of some of the Asian economies. At the same time, a parallel gulf has opened up within the economies of the late-capitalist countries in both the West and Asia.

> In being forced to think globally, we are impelled to organise globally.

In Australia, the divide is becoming obvious. While senior executives have in real terms received a 49 per cent rise in pay over the past eight years, average earnings across the board have fallen. Worse still, in 1992, more than 300,000 people were classified as long-term unemployed. The retrenching of 547,000 Australian during 1992 was not just a product of the recession, and the recession was not just a local phenomenon. They join what is becoming an internal under-class of socially redundant persons.

Increasingly, the most powerful corporations, groups and individuals in our community are those who are best able to operate at the interregional and global level. It is these individuals and corporations who are best able to move, communicate and influence networks of power beyond the immediate locale; it is they who are afforded the most prestige and cultural capital, even in the local context.

Economic and political manipulation for global power has meant that it has become progressively harder to sustain the rich complexity of local or regional cultures.

Although not all culture is being reduced to a completely homogenous and globalised realm of T-shirt-wearing Coca-Cola drinkers, local cultures are being instrumentalised; they are being sustained at the cost of turning them into a commodity. As contact and information flows with other cultures increase, our knowledge of the meaning of cultural difference is being thinned.

As an indication of this, we are now taking the superficial trappings of cultural diversity as a manifestation of a richness of cultural difference. The proliferation of restaurants and the availability of pasta, noodles and rice does not indicate a multicultural richness in Australia. This taking of the artifacts of a culture for the culture itself is unfortunately a sign of the times.

In addition, it has become almost impossible for social life to sustain itself without reference to the global. While relations grounded in face-to-face association continue, such social life is increasingly overlaid and dominated by more abstract processes. These processes are having the effect of fragmenting the face-to-face liaisons.

It is Nestlé's all-Australian country town that seems to be dying from these global realities. They suffer from as much as triple the national average unemployment rate, high youth suicide rates and increasing alienation and poverty. The countryside is now facing the pressures of the global market. In 1992, almost 10 per cent of farmers walked away from 'non-competitive' family holdings. Overall, 10 per cent of the entire Australian continent is now estimated to be foreign-owned.

> It has become progressively harder to sustain the rich complexity of local or regional cultures.

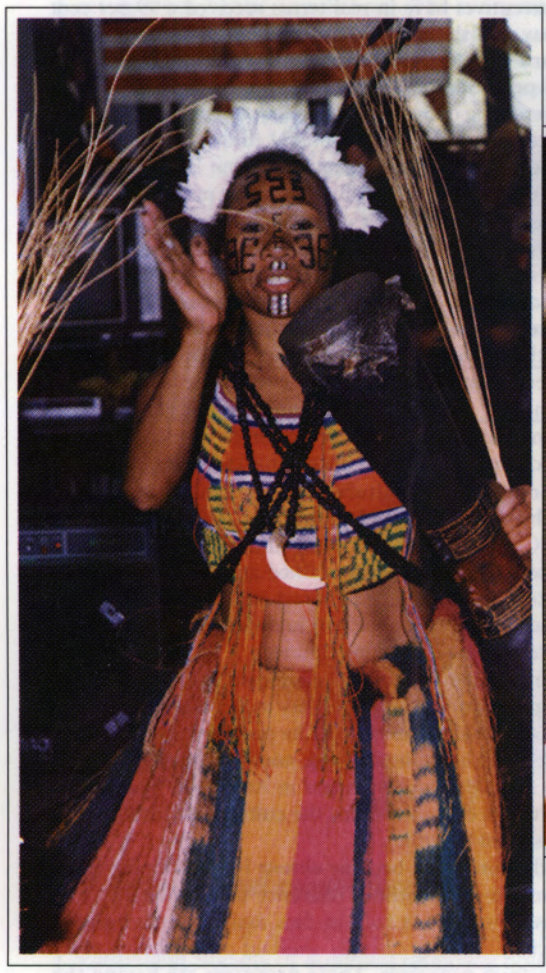
What are we getting in return? Well, there is the pleasure of drinking coffee. And as localised social life is fragmented there is always the chance of winning the Nescafé competition:

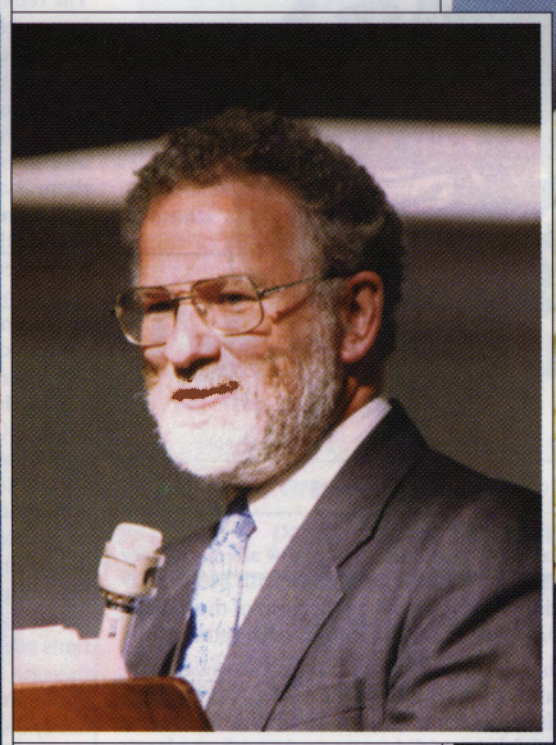
*If you have friends overseas or interstate, you know what it is like to be apart, and maybe not see them for years. Certainly, you can phone but it is not the same as seeing them, seeing how they've changed, how the kids have grown, or seeing the smiles on their faces again. Nescafé Blend 43 would like you to have that opportunity. Nescafé has got together with Telecom Australia and Channel Ten to bring you together using the latest technology – reunions live via satellite with teleconferencing.*

If that promise seems superficial and unsustaining, the other choice we have is to rethink and politicise the nature of community, drawing substantial and ongoing connections across the various levels of social integration. It would mean working things out with the people with whom we have immediate contact, setting up local and regional economic cooperatives, and stepping out of the imperative to consume from and produce for the global market. At the same time, it would mean reaching out across national borders to the people of the rest of the globe, reaching out in ways other than those dominated by the practices of economic rationalism. In doing so, relations with our closest neighbours in Asia and the Pacific should obviously assume a special focus, but not in the way we are currently going about it.

*Dr Paul James is a lecturer in the Department of Politics and is an editor of* Arena.

# Celebrating Australia's many faces





**The Union foyer on Clayton campus came alive with music and costumes when Monash celebrated Multicultural Week last month.**

**Students danced, sang, and paraded their national costumes at the colourful opening.**

**The Pro Vice-Chancellor of International Programs and Development, Professor Leo West, was guest of honour at the ceremony, which set the pattern for a week of international exhibitions, movies, seminars, and demonstrations.**

**'Faces of Australia' was the theme for the activities, organised by the Monash University International Students' Service.**