Burns victims with horrific injuries now have a better chance of recovery as a result of pioneering work at Monash.

Cultured skin grown to order in the Department of Surgery at the Alfred Hospital is now saving lives in cases which only a few years ago would have been fatal. Patients can be given grafts of their own skin within three weeks, reducing the risk of infection and eliminating problems with graft rejection.

Over the past five years, Mrs Joanne Paddle-Ledinek's tissue-culture laboratory at the Monash Medical School has refined and modified a technique which allows virtually unlimited quantities of skin to be grown very rapidly from an original sample, even if it is contaminated with bacteria.

The school is the only tissue culture laboratory in Australia successfully using the method, originated by Rheinwald and Green in 1975 in Boston. Mrs Paddle-Ledinek and her assistant, Mr David Cruikshank, have achieved a 100 per cent success rate in growing skin for grafts, even from older patients whose skin cells grow more slowly than those of a younger person.

In the past two years they have been able to supply life-saving grafts to hospitals in Melbourne, Perth, Brisbane and Adelaide. The service grew out of the research work of the laboratory. Hospitals are charged a fee for materials and to cover some of the labour costs.

In one recent case 100 skin cultures—each about the size of an audio cassette tape—were grown from a piece of undamaged skin the size of half a postage stamp in only 19 days. This represents about a 3500-fold increase in area (see Research Monash for more details). The patient, who had suffered burns to 85 per cent of the body, survived.

Mrs Paddle-Ledinek said, depending on the patient's age and extent of the burns, enough cultured skin for grafting could be grown in two to three weeks, while the patient was kept alive with a temporary graft.

"The life-saving benefits of the technique are enormous," she said. "With burns in excess of 60 per cent of the body you cannot use traditional methods; that is, taking skin from one part of the body and grafting it onto the wound. Until now, patients like this just didn't have a chance."

"Skin cannot be transplanted from one person to another. The human immune system soon rejects temporary grafts taken from other human donors, even close relatives."

"If the patient's immune system is suppressed by the use of drugs, the patient then becomes highly vulnerable to opportunistic infections. Victims of severe burns can also die from dehydration caused by massive fluid loss," she said.

"The sooner the patient receives a graft grown from their own skin, the better their chances of a full recovery."

Mrs Paddle-Ledinek said the laboratory may seek Federal funding for growing skin cultures if its workload increased to a point where it was affecting other research projects.
NOW & THEN

THIS MONTH LAST YEAR

The university is encouraging staff and students to share cars, and use public transport and bicycles to ease parking congestion. Ninety per cent of cars arriving at the Clayton campus are now driven by only a driver.

5 YEARS AGO

Past and present Monash students were enthroned as King and Queen of Moomba. They were second year arts/law student Ms Marita Jones and science graduate turned tennis professional Paul McNamara.

15 YEARS AGO

The effect of the architectural style of buildings and size of departments on the work habits and social interaction of academics is being studied by Monash sociologist Dr Bill Fody and La Trobe psychologist Dr Margaret Foddy. "Tertiary education buildings have been designed generally without thought to the possible impact on the people who have to work in them," they said.

25 YEARS AGO

"I am afraid we have built up such an elaborate machinery that the effort of making it work will prove a real deterrent to experiment and change," the Vice-Chancellor, Professor Louis Matheson said of the decision-making structure of the university. He was commenting on a university legal opinion that a faculty had no power to make decisions or pass resolutions that bound its faculty board.

THE SPIKE

A new faculty?

An invitation to the official launch of this year's subscription theatre season at the Alexander and George Jenkins theatres arrived in the mail marked 'From the Faculty of Entertainm entology'.

Cagey research

On the surface, the study of rust is not a subject which suggests danger and excitement. Even rust afficionado, Acting Professor Brian Cherry, said of the decision-making structure of the university. He was commenting on a university legal opinion that a faculty had no power to make decisions or pass resolutions that bound its faculty board.

MONTAGE

From the faculty of sciences of Monash University

MONTAGE is published and produced by the Monash University Department of Information Services. Published bi-monthly on the 10th of March and September. Subscriptions: 1994 $12 in Australia, $25 international. Postmaster: Send all change of address to Montage, Monash University, Clayton, Victoria 3168. Phone 5732311.

An artist's impression of two building projects on the Clayton campus.

A new look for Clayton

Four new building projects will change the face of the Clayton campus over the next few years.

The university has received two separate Department of Employment Education and Training grants - totalling more than $15 million - which will allow an extensive redevelopment of the south-eastern part of the campus.

The projects are:

• an information services building.
• an additional floor on the Law building;
• a performing arts building; and
• alterations to the Menzies building.

The $5.76 million information services building on the east side of the Main Library is intended to be the first part of a two-stage extension. The four-level building will house administration, postgraduate students, staff, technical services, rare books, the Music Library and an AV microform store.

A $9.31 million grant will fund the other projects. One third will be used to create an additional floor on the existing Law building and to rearrange space on other floors to make the faculty more self-contained. The faculty will give up space is currently occupied in the Gallery building.

A performing arts building, costing $5.81 million, will be built to the east of the information services building to accommodate staff of Music, Drama, Australian Studies and Asian Studies. It will provide a multipurpose performing space, a theatre, offices, and teaching, performance and practice areas. This will allow a reorganisation within the Menzies building.

The remainder of the grant - about $400,000 - will be used for alterations and better use of space in the Menzies to provide accommodation for the Faculty of Economics and Management. Each of the Arts, Law, and ECOM facilities will gain about 1500 square metres in building space.

The plans offer an opportunity to create an arts precinct, linking the Religious Centre, Robert Blackwood Hall, the new performing arts building, the Alexander Theatre and Monash Gallery.

An arts precinct was first suggested by Professor Margaret Kartomi of the Department of Music in a letter to Montage last year. She wrote that as the university was blessed with a combination of performing arts venues superior to any other university in Victoria, a precinct could make Monash the focus of performing arts in the south-eastern suburbs.

Professor Kartomi said that she expected a sub-committee would be set up by the university to examine the design concepts and the feasibility of the project.

"The courtyard formed between the new performing arts building and Robert Blackwood Hall could be developed as a focal entry point for university visitors," Professor Kartomi said.

"One idea is to build a partly enclosed walkway linking the main performance centres. The proposal may also require new licensed premises where light meals and suppers could be served and a lounge area for patrons. An arts precinct would focus the attention of the community on Monash, as well as make better use of our existing resources."

BUILDING PROGRAM UPDATE

<table>
<thead>
<tr>
<th>BUILDING</th>
<th>COST</th>
<th>PROGRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering building, Clayton</td>
<td>$8.2 million</td>
<td>Now being occupied</td>
</tr>
<tr>
<td>Technology building, Frankston</td>
<td>$6.5 million</td>
<td>Tender let, construction started June 1991, due for completion November 1992</td>
</tr>
<tr>
<td>General teaching building and Distance Education Centre, Gippsland</td>
<td>$7.76 million</td>
<td>Commenced September 1991, due for completion late 1992</td>
</tr>
<tr>
<td>General Teaching and Business school, Caulfield</td>
<td>$8.5 million</td>
<td>Master plan approved by Council, Discussions under way with architect. Tenders by April 1992 and construction to be completed by start of 1993</td>
</tr>
<tr>
<td>Computer science and general science building (actually two buildings, including medicine)</td>
<td>$9.1 million</td>
<td>Construction commenced, due for completion December 1992</td>
</tr>
<tr>
<td>Information services building, Clayton</td>
<td>$7.03 million</td>
<td>Planning has begun pending approval and tenders are expected by mid 1992</td>
</tr>
<tr>
<td>Law/Arts/ECOMAN (Extensions to existing buildings)</td>
<td>$9.5 million (1/4 to each faculty)</td>
<td>Planning underway, tenders expected by mid 1992 aiming for completion by the beginning of 1994</td>
</tr>
</tbody>
</table>

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Registered by Pageset, 4th year.
Registered by Pageset 30th April 1986.
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New conductor recruits outside talent

The university's new full-time conductor has taken a major step in search of major music talent. Andre de Quadros, a senior lecturer in the Department of Music, has opened up membership of the recently-established Concert Band and New Monash Orchestra to both the local and university communities.

So far he has received a positive response to his call, and both groups will play their first concert at Robert Blackwood Hall on 15 April. In fact, all concerts will be played at the hall, described by Mr de Quadros as having finer acoustics than the Melbourne Concert Hall.

The New Monash Orchestra - in effect, a small symphony orchestra - consists of 25 string players, 15 wind players, and three percussionists. Its repertoire will include classical, baroque and 20th century works.

The Concert Band comprises 14 woodwind players, six saxophonists, 10 brass players, four percussionists and a pianist. It will play a mixture of classical and light pieces.

Both orchestras face a demanding program this year. Rehearsals already have begun, and in May the Concert Band will support the Monash University Musical Theatre Company's production of Man of La Mancha.

On 3 June it will play a program of Gershwin, Vaughan Williams and Nielsen.

The orchestra will play a concert of Purcell and Mozart (including the Melbourne premiere of the new edition of Mozart's Mass in C minor) on 23 May, and a program of baroque, classical and romantic music in the combined concert on 5 June.

"These will be quality ensembles whose standard of musicianship is very high, but they are open to everyone who can play at the required level," Mr de Quadros said. "I think they will be a fantastic presence this year." Mr de Quadros was formerly director of music at the Presbyterian Ladies' College and lecturer at the Australian Catholic University.

Mr Daniel Stefanski, a first-year medical student, has been awarded the inaugural Vice-Chancellor's Orchestral Leader Scholarship.

Students in the Forum at the Clayton campus, taking a break from the Septic Orientation Week program. More pictures page 8.

Young achievers go into business

The Monash Course and Careers Centre's training program for tertiary students has initiated a world-first in vocational training for tertiary students.

Twenty-five final year arts, economics, engineering and science students have been selected to participate in a Young Achievement Program. The students, with the assistance of a sponsoring employer, will set up and run a venture company.

Previous Young Achievement companies have manufactured backpacks, car holders, reflective pet collars, mouse pads and computer games. This is the first time university students have taken part in the program, which originated in the US in the 1980s.

Ms Sue Brown, a counsellor with the Monash Course and Career Centre, approached Young Achievement Australia late last year about extending the program to tertiary students.

"Response from the students was overwhelming. More than 200 applied for the 25 positions, so we are now looking for more corporate sponsors to join the program," she said.

"The spotlight will be on us because this will be the model for future tertiary level Young Achievement programs," said the Monash Department of Anthropology and Sociology will track the results of the program.

State Manager of Young Achievement Australia, Ms Ann Fitch, said the program gave young people business experience in a realistic and exciting learning environment.

"The program also offers participating organisations an opportunity to broaden the management perspective of their own future leaders and actively contribute to the development of tomorrow's workforce," Ms Fitch said.

She said many corporate sponsors used the program as a training project for junior and middle management or for recruitment.

Checkpoint Automotives Brake and Clutch in Mulgrave will support and sponsor the Monash Young Achievers. General Manager of Checkpoint, Mr Kelvin Alfred, said young people could not be expected to develop into committed employees if employers were not prepared to make a commitment to them.

Medical computing expands

The first sod has been turned on a $220,000 extension to the Department of Community Medicine's East Bentleigh headquarters.

The extension - housing seminar rooms, a new learning laboratory and medical informatics office - is expected to be completed by mid year. The work includes refurbishment of existing facilities.

The director of medical informatics, Dr Branko Cesnik, said both community medicine and the faculty as a whole had been involved in expanding the role of medical computing in the undergraduate curriculum.

Five years ago community medicine had six staff; now 42 medical and administrative personnel were involved in undergraduate and postgraduate teaching, and developing computer-aided learning and medical information packages.

"The learning laboratory will continue its role in undergraduate teaching programs, but we will be fostering its use as a resource for other departments and units in the faculty," Dr Cesnik said. "When not in use, it will be available for individuals to develop computer programs on their own behalf."

Powerful new computers were being installed for computer learning programs, to complement existing video and audio facilities. "We now have an optional course in medical computing for first and second year students," he said.

In the 10-week course - now in its second year - about 25 undergraduates are introduced to basic computer use including word processing and spreadsheets, telecommunications, applications in medicine, computer-generated models and on-line sets.
Enrolments rise for disadvantaged groups

Monash equity strategies have significantly improved access to higher education for disadvantaged students, according to the Equal Opportunity Unit. A report to the Department of Employment Education and Training (DEETY) on the implementation of the university's equity objectives for 1991 identified a trend of increasing enrolments among groups who have not traditionally participated in tertiary education. It predicted a similar rise in re-enrolments for the 1992-94 triennium.

Institutions have developed their own equity plans, based on a 1988 DEETY discussion paper. A "fair chance for all", giving priority to groups who are under-represented and those the institution is best equipped to assist.

Equal opportunity project and public relations officers, Ms Sally Addison, reported that at Monash special emphasis had been placed on support programs for such groups, Aboriginal and Torres Strait Islanders, people from remote areas and those who had disabilities.

Student data collected by the Higher Education Advisory Research Unit predicted an increasing number of students entering university from socioeconomically disadvantaged backgrounds. Admissions under the Schools Link program, which now covers 96 schools, rose from 145 to 250 in 1991, a 75 per cent increase.

"The program has been successfully extended to all campuses, providing information, counselling, encouragement and special entry procedures," Ms Addison reported. "A proposed new strategy is to promote access for socioeconomically disadvantaged students, focusing on the Faculty of Medicine."

Direct entry schemes provided 152 mature age admissions in 1991, compared with 114 in 1990. Alternative Year 12 admisions rose from five to 12 in the same period.

While the external enrolments of rural and isolated students had increased, expansion of the activitiy of the National Distance Education Centre would further assist this target group.

"New courses are to be developed and implemented and the awareness and aspirations of these people will be raised by the promotion of the value of tertiary education," the report said.

The introduction of the TV Open Learning project will also target rural and isolated students, providing them with a new avenue to higher education. Thirty-seven per cent of written inquiries have been from such students.

Last year the Monash Orientation Scheme for Aboriginal (MOSA) was extended to the Caulfield and Frankston campuses, and MOSA and MUGO programs were integrated and coordinated. "By improving access to all faculties through enabling courses, the MOSA strategy has been very successful," Ms Addison reported.

It was now intended to increase student numbers in business- and science-based courses. Initiatives included recruiting Koorie teaching staff, offering bridging programs by extended campus, attracting more part-time students, and offering distance education units. The Monash equity objectives propose to increase MOSA enrolments by about 50 students by 1998 while maintaining the scheme's high retention and progress rate.

Achievement of the targets for students with disabilities included the appointment in February 1991 of a full-time Disability Liaison Officer. The position will support existing services and manage new initiatives, such as providing part-time personal assistants for disabled students.

A university sub-committee was formed to set capital works priorities for improving disabled access to buildings and the Equal Opportunity Unit published a 84-page booklet for prospective students with disabilities. The booklet will be updated for staff members.

People from non-English speaking backgrounds remain well represented at Monash, comprising 24 per cent of 1991 total enrolments. New strategies assisting these groups include promoting the value of tertiary education for males and females by targeting parents as well as potential students and increasing the participation of under-represented national groups.

While there has been a slight drop in the female proportion of Bachelor of Engineering enrolments, two strategies have been successful in advancing female participation in engineering careers.

"Firstly, the provision of bridging courses in 'missing subjects' at upper school level has quadrupled the number of eligible females," Ms Addison reported. Secondly, combined arts and engineering degrees had introduced a humanising element, attractive to female students who now represent 50 percent of arts-engineering enrolments.

Ms Addison said in several faculties there were disparities between female participation in undergraduate and postgraduate studies.

"By 1995 it is intended to increase the participation rates of women in PhD and master's courses to approximate closely those of women in related undergraduate courses," she said.

"This is to be partly achieved through the Child Care Strategy, which identifies the particular needs of women in postgraduate studies. Improvement in this area of child care has been started."

The Equity Pilot is the responsibility of the Registrar, Mr Tony Pritchard.

VICTORIAN HIGHER EDUCATION SYSTEM

How the institutions compare

<table>
<thead>
<tr>
<th>College/University</th>
<th>TOTAL</th>
<th>MALE</th>
<th>FEMALE</th>
<th>ACADEMIC</th>
<th>NON-ACADEMIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballarat University College</td>
<td>4069</td>
<td>1917</td>
<td>2152</td>
<td>272</td>
<td>230</td>
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<tr>
<td>Deakin University</td>
<td>13,432</td>
<td>5759</td>
<td>7673</td>
<td>471</td>
<td>717</td>
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<tr>
<td>La Trobe University</td>
<td>20,755</td>
<td>7822</td>
<td>12,933</td>
<td>1,127</td>
<td>1,431</td>
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<td>Monash University</td>
<td>32,796</td>
<td>16,401</td>
<td>16,395</td>
<td>2,163</td>
<td>2,515</td>
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<td>Phillip Institute</td>
<td>7,564</td>
<td>2,717</td>
<td>4,847</td>
<td>373</td>
<td>301</td>
</tr>
<tr>
<td>RMIT</td>
<td>14,644</td>
<td>6,665</td>
<td>5,999</td>
<td>824</td>
<td>899</td>
</tr>
<tr>
<td>Swinburne Institute</td>
<td>7,934</td>
<td>4,975</td>
<td>2,959</td>
<td>407</td>
<td>538</td>
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<tr>
<td>University of Melbourne</td>
<td>26,944</td>
<td>11,689</td>
<td>14,855</td>
<td>2,252</td>
<td>2,555</td>
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<tr>
<td>Victoria College</td>
<td>9,562</td>
<td>3,313</td>
<td>6,233</td>
<td>564</td>
<td>564</td>
</tr>
<tr>
<td>Deakin</td>
<td>1,056</td>
<td>632</td>
<td>424</td>
<td>246</td>
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<tr>
<td>Victorian College of the Arts</td>
<td>680</td>
<td>316</td>
<td>364</td>
<td>85</td>
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<tr>
<td>Victorian College of Pharmacy</td>
<td>443</td>
<td>162</td>
<td>281</td>
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<td>45</td>
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<tr>
<td>Victoria University of Technology</td>
<td>10,261</td>
<td>5283</td>
<td>4978</td>
<td>589</td>
<td>557</td>
</tr>
</tbody>
</table>

Note: Deakin University and Victoria College have merged.

The Victorian College of Agriculture and Horticulture will become part of the University of Melbourne and the VCA is now associated with Melbourne. The Pharmacy College is to become a faculty of Monash.

Source: Department of Employment, Education and Training.
Jewish studies finds a home

An Australian Centre for Jewish Civilisation is to be established at Monash.

The centre, through an undergraduate studies program managed by the Faculty of Arts, will provide an overview of Jewish history and heritage from the origins of the Jewish people in Biblical times to contemporary Jewish experiences in Australia. One of the centre's aims will be to emphasise the interaction between the Jewish culture and those societies where it has flourished.

Professor Louis Waller, convener of the centre's liaison committee, said it was appropriate that the university should initiate the development of a centre for Jewish studies because of its links with Sir John Monash.

"The decision to establish the Australian Centre for Jewish Civilisation reflects our association with the Monash family," Professor Waller said. "It also acknowledges in a unique fashion the contribution of Melbourne's Jewish community to our country."

Professor Moshe Davis, of the International Centre for University Teaching of Jewish Civilisation at the Hebrew University of Jerusalem, is consulting on the development of the centre's study program.

Open learning goes to air

University education has entered the television age. The first broadcasts in the TV Open Learning project were made on ABC-TV in March, and since then others have been overweighted by public interest.

The project received more than 1000 telephone enquiries and 300 letters after the airing of the first program in the series on 3 March. About 50,000 people have now contacted TV Open Learning for information about the Commonwealth-backed project, developed to broaden access to tertiary education.

Seven first year university subjects will be broadcast at 7.30 am each weekday and repeated on Saturday days. There are no prerequisites and formal assessment is optional. However, passes will enable students to apply for credit towards university degrees.

Monash is the leader of a consortium of five universities, and has also supplied material for the marketing program. Other subjects are French, Australian Studies, Statistics, Religion Studies, Anthropology and Australian Environmental Studies.

Head of the School of Marketing in the Faculty of Business, Professor Garry Harris, said the increasing popularity of marketing courses made them an obvious choice for the program.

"Those who applied for a marketing course and were not accepted now have a chance to get a foot in the door," he said. "The aim of the subject is to provide small business people, community groups, and those in remote areas with the opportunity to study.

"Buy executives will also find the program useful, as it will be screened outside working hours."

The 13-program marketing series features executives from Australian Airlines, David Jones, Myer, Grace Brothers and Daimaru in panel discussions.

TV Open Learning Director, Mr Tony Prichard, said cooperation between the five universities, the ABC and the Commonwealth was "a wonderful example of what can be achieved when expertise is pooled and a high level of commitment is translated into a relentless dedication to make this work."

"It was only last May when the Government gave the go-ahead," he said. "Since then many academics, production staff and organiser have contributed time and expertise to the project."

The other universities involved in the program are the University of New England, Griffith University, Deskin University and the University of South Australia.

Stage set for open day entertainment

The focus of Open Day program on the Clayton campus this year will be an entertainment stage in the Forum, between the Menzies and Union buildings.

Each faculty will be invited to provide an item or activity for the stage's program, which is being coordinated by Mr John Clark in the Public Affairs Office.

The Philosophy department is considering presenting an Ancient Roman comedy about a public auction of Greek philosophers. The Music department is expected to present a program of ethnic and pop music.

A recent survey of more than 2000 students released by Melbourne advertising agency, Austin Knight, found that open days were often young people's first introduction to university.

Almost 35 per cent of the Year 12 students surveyed nominated open day as being their first point of contact, and more than 40 per cent of undergraduates said they had found out about the university they now attended through an open day.

Austen Knight's National Operations Director, Mr Robert Robinson, said open days and university visits presented a key marketing opportunity to tertiary institutions. "We may have underestimated just how important open days are when students are making their selection decisions," he said.

"The survey results show that open days are second only to career advisers as a source of information when it comes to making decisions about courses and universities."

According to the Public Affairs Office, which fielded most of the public's telephone enquiries, many people visited the campuses because they were interested in the university's role in the community.

Year 11 and 12 students attended to discuss higher education options with career advisors and academics.

More than 50,000 people visited Monash campuses on Open Day in August last year.

The new Chairman of Open Day, head of the Philosophy Department, Professor John Bigelow, said open day was essential, both to the university and the larger community.

"Open Day has a positive effect on perceptions of the university. It reinforces our collective identity and reminds us of the many things in which we all involve," he said. "One of my tasks as chairman will be to speak to each faculty representative and offer encouragement, support and suggestions."

The Open Day Committee is now considering ideas for Open Day 1992, which will be held on Sunday 2 August. Send suggestions to Ms Suzanne Hatherley, Public Affairs Office, Gallery building, Clayton campus, phone extn 75 8087. Contact Mr John Clark about entertainment stage events on extn 75 8057.

March—April 1992

New chancellor presides

The university's new chancellor, Mr Bill Rogers, presided over his first Council meeting last month. Mr Rogers (above), who replaces Sir George Lush, is chairman of Woodside Petroleum, a director of BHP, and senior partner in the law firm Arthur Robinson and Hedderwick.

He will be officially installed as chancellor at a graduation ceremony at Robert Blackwood Hall on 10 April.
A small red car and a large media contingent waited anxiously in the engineering labs for the results of a Supreme Court hearing.

At the last minute, a mobile phone call direct from the court gave the all clear to run the Mazda 121 at eight kilometres per hour into a 12 tonne block of concrete, and then rearwards into a steel post. The demonstration crashes were a follow-up to a Civil Engineering department study into the effects of low-speed front and rear impacts on popular cars.

"It was high drama," said Professor Noel Murray, who was commissioned by insurance company AAMI to conduct tests on six late-model popular cars. "We obviously couldn't test the Mazda while an injunction was still being considered."

Mazda's action delayed the crash test for about 30 minutes. The go-ahead spared a substitute Corolla commandeered on the day from a AAMI employee. Technicians already had the car in the test track and had begun connecting electronic monitors when the call came through.

The survey found that the average repair cost of a low-speed collision was just under $2000, based on four separate quotes for each car from panel beaters. Five cars - a Holden Barina, Toyota Corolla sedan, Nissan Pulsar hatch, Ford Laser hatch and a Honda Civic sedan - were tested by the department in December.

AAMI says that bumper designs are costing Australian motorists $283 million per year for damage that need not occur. The company has called for a new Australian design rule requiring cars sold in Australia to be fitted with impact-resisting bumpers. The company says car bumpers are decorative, but ineffective.

Professor Noel Murray, a world expert in thin-walled structures, stressed that the scientific tests had been carried out using state-of-the-art computer monitoring equipment to standards established by the US Insurance Institute for Highway Safety. The cars were bought privately by AAMI through Melbourne dealerships and transported to Monash University.

"The results were appalling," Professor Murray said. "None of the cars we crashed withstood the tests without substantial levels of damage."

"It was clear from the tests that the price of the car had no effect on its ability to withstand impacts. The cheapest car tested, the Holden Barina, and the most expensive, the Honda Civic, shared the doubtful distinction of being the most expensive to repair."

"We know from experience in the US and from current technology in use in Europe that fitting bumpers to withstand eight km/h impacts with no damage at all is quite feasible. But the design of car bumpers used in Australia leads to an irresponsible waste of labour and materials."

He said the trend in car styling over the past 15 years had been towards thinner steel for car bodies, expensive lighting units placed in vulnerable places, and the use of lightweight cosmetic bumper bars.

"The bumper bars on some of the test cars were made from a very thin piece of plastic which was held on by lightweight brackets," he said. "From a structural point of view they had no strength at all."

On the day, an Austin 7 also underwent a low-speed impact test. "It just bounced back," Professor Murray said.
Growing skin, saving lives

Only a few years ago, victims of severe burns had little chance of survival; much less making a full recovery. But now a life-saving technique first developed in Boston and refined at Monash is giving them new hope.

In February this year a four-year-old boy was brought into a Perth hospital with horrific burns from the explosive combustion of a foam mattress that had caught fire as he played with matches in his bed. He had lost most of his skin because of third-degree burns to 85 per cent of his body.

A few years ago the boy would have had little chance of survival. This time, surgeons removed a two square centimetre patch of undamaged skin from near his groin, and flew it to the tissue culture laboratory in the Department of Surgery at the Monash Medical School, adjacent to the Alfred Hospital.

An Australian first, the surgeons then grafted matches of skin donated by the boy's father onto his body to minimize the massive loss of body fluids and to provide a base for the cultured skin. Just 19 days later the boy was grafted with enough patches of cultured skin, grown in Melbourne from his original sample, to cover all the burned areas of his body - about 0.6 square metres.

Mrs Paddle-Ledinek went to Harvard Medical School in Massachusetts three years ago to discuss the latest developments of the method with one of its originators, Professor Howard Green, and to work in his laboratory.

During the past two years she and her assistant have grown 1000 grafts - seven square metres in all - for 21 patients. She has even been able to supply skin grafts for two patients, aged 82 and 84, suffering from leg ulcers. One of the refinements that Mrs Paddle-Ledinek has introduced to the technique is the judicious use of antibiotics to eliminate bacterial infection without compromising the overall growth rate.

The laboratory is the only one successfully using the technique in Australia. The beauty of the technique is that it allows burns victims to be given grafts of their own epidermis within less than three weeks. The immune system soon rejects temporary grafts taken from other human donors, even close relatives.

The skin is one of the most vital human organs; it is a permeable, two-way membrane that keeps essential fluids in, and keeps out parasites and pathogens like bacteria, fungi and viruses. Today, because there is a small but real risk that virus infections can be transmitted in skin grafts, there has been a move away from temporary allografts (the term applied to grafts from persons other than the victim).

Skin allografts require the immune system to be suppressed with cyclosporin to prevent rejection. The preferred xenograft - a graft from another species - is a temporary dressing. The preferred xenograft is pigskin; after it is removed it leaves the exposed tissues ready to accept autografts of the epithelium, regenerated in large quantities by tissue culture.

Before the advent of the Green tissue-culture technique, human skin resisted all efforts to grow for any length of time in tissue culture. After just a few divisions, the keratinocytes - derived from the basal layer of the skin biopsy - would undergo terminal differentiation. In other words, they would stop dividing.

The technique revolves around the use of special "nurse" cells called fibroblasts, which provide the right biochemical environment and a substrate on which keratinocytes are able to grow and divide. Mrs Paddle-Ledinek says the nurse cells are a special line, called mouse 3T3 fibroblasts. The 3T3 fibroblasts are grown on a human dermis (the tissue immediately beneath the epidermis) so that they spread out in a sheet.

The medium in which the skin is grown contains a complex of nutrients, including fetal calf serum, Epidermal Growth Factor (EGF) and also tiny quantities of cholera toxin. The EGF increases the culture lifetime from 50 to 150 generations, whilst the cholera toxin increases the growth rate.

Depending on the age of the patient, the cells will double in area in about 24 hours. The growing keratinocytes can then be subcultured many times.

Ultimately, the cultures are allowed to form layers of cells, but it is only the bottom layer which continues to divide. This layered culture is similar to the original epidermis, except that it lacks hair follicles, sweat glands and sebaceous glands (these glands are formed in the skin not long after conception, and cannot be regenerated from keratinocytes).

When the cultured skin is grafted back on to the patient, specialised white cells from the immune system - called Langerhans' cells and T-cells - migrate from the wound bed and re-colonise the graft, re-establishing the new skin as the front line of the immune system.

Another specialised cell type, the melanocytes (which secrete the anti-sunburn pigment melanin) survive the culturing process and regenerate with the new epidermis so that the cultured skin retains its original pigmentation.

This was demonstrated in 1988 when a badly burnt young Aboriginal child received cultured grafts.

In the case of the Perth boy treated recently, five of the 100 flasks of cultured epithelium have been kept at the Monash Medical School laboratory, frozen in liquid nitrogen, to provide a basis for further skin culture growth. Over the next few years, the boy will require more skin grafts and perhaps cosmetic surgery. In this way, the culture process can supply unlimited amounts of skin to complete the patient's recovery.

Mrs Paddle-Ledinek pointed out that cultured skin grafts had also been used successfully in other situations, such as after the excision of a giant birthmark that covered 15 per cent of the body of a five-month-old child.
The information revolution will link every home to a global network carrying video, data and voice via optical fibres. Work at Monash is well on the way towards establishing a world standard to handle the torrent of information and make it accessible to all.

Fifteen years after the computer revolution, users are still confronted and confronted by the chaos of incompatible data formats. Different operating systems, network protocols and file formats all conspire against the smooth flow of information.

With the world of telecommunications poised to enter a digital era, scientists are already developing systems to help avoid the pitfalls of the past and present. And there is a great chance that contributions to the international standards will come out of Australia.

Two years ago Professor Fred Symons and Dr Khee Pang, of the Department of Electrical and Computer Systems Engineering, assembled a team of highly innovative researchers whose ideas on a Universal Video Coding (UVC) system are now attracting worldwide attention.

The team, headed by Dr Pang, has been developing data-encoding and data-compression techniques, using a multi-layered approach that it conceived only two years ago. In essence, the multi-layered approach segregates data so users can select the level of detail appropriate to their needs.

Dr Pang says people do not require high-definition colour images for a videoconference, but when downloading the latest wide-screen video from a centralised video library they will want the best images available, plus full surround sound. Images of intermediate density will suffice for video shopping on the household computer.

Devices at the user's end must be able to filter the data, taking only the level of detail appropriate to each application. The information must be encoded in a way that allows the filters to discriminate between necessary and unnecessary detail.

Dr Pang says the digital information will travel along the optical fibres in bursts, called packets. Each packet will need a piece of code that identifies it uniquely, and indicates where it fits into the layered hierarchy of the image.

Instead of having a house full of video screens and computer terminals, people will probably have a main video screen and one or two terminals that will serve a variety of purposes. For a video telephone conversation, the terminal will take only the packages from the lowest layer: the framework of the image.

An international video conference would need the detail from the next layer, because the participants need to observe changes in facial expressions and the nuances of body language. Television will demand the next level of detail, while high-definition colour television requires extremely fine detail.

Dr Pang says the layering system must be open-ended because super-high-definition video images are already in experimental use. Super-high-density TV images are already being generated, for example, by the latest tomographic imaging devices in modern hospitals. Moving images will demand data transmission rates several orders of magnitude higher.

Each successive layer will consume larger bandwidths, eating into the capacity of the optical fibre. High-definition television images will even exceed the astonishing capacity of modern optical fibres, requiring the data to be compressed at its source, and expanded at its destination.

Dr Pang says the narrow-band Integrated Services Digital Network (ISDN) used in Australia during the past few years would be completely inadequate. Here, the copper components of yesterday's communications technology limit transmission rates to a relatively glacial 64,000 bits per second (bps). Broadband ISDN, which can still be developed and standardised, will provide a very high speed telecommunications network, giving users access to transmission rates up to 600 megabits per second.

The department's UVC project seeks to develop ways of encoding data that will link customers to a variety of video-sourced images, while allowing maximum flexibility.

"Each household will have an optical fibre connection to the distribution, providing a telephone connection and access to services like pay television," Dr Pang said. "The idea is that television no longer needs to be transmitted on the airwaves, which will free up the radio spectrum for other uses, particularly mobile telecommunications."

Professor Symons says each frame of a high-definition television image, transmitted at 50 frames per second to create a moving image, would require data transmission rates of up to 2 gigabits per second (a gigabit is 1,000 million bits). This would place impossible demands on optical fibre cables without compressing the data to a manageable rate of about 50 megabits per second.

Data compression involves selecting those parts of a video image that do not change from one frame to the next, and distilling them down to a compact package that can be reconstructed at the user's end.

"A news reader may talk in rapid bursts interspersed with moments of silence. His eyes and lips may move, but the rest of his body and the studio set remain unchanged," Professor Symons said. "This information is quite easy to compress. In contrast, a telecast of a Grand Prix motor race contains a huge amount of rapidly changing visual information."

Existing systems use fixed bandwidths that can swing between being overloaded and under-used as the information content of the signal varies, resulting in variable quality of the video images. Tomorrow's broadband systems will use variable bandwidths that adapt dynamically to the volume of information so that images will be of consistent quality.

The Monash group's multi-layered system of representing different densities of information will combine maximum flexibility with maximum quality, close to its theoretical limit, Dr Pang said. Data compression can be a tricky business: the shorthand method of transmitting information must not short-change the human eye and brain.

The human eye, for example, sees an image flickering when it is refreshed at less than 50 times per second. The eye is also sensitive to jerky motion, while the ear and voice are very sensitive to imperfections in complex images - a consequence of the brain's limited capacity to assimilate complex visual information.

Dr Pang and his colleagues recently purchased a $200,000 Sony D1 high-definition video recorder - one of only two used for research in Australia - to see how much their data-compression techniques can compress and reconstruct image sequences without impairing the quality of the final image. Any recorder of lower quality would make it impossible to distinguish between distortions introduced by the recorder itself, and those due to the image-processing techniques being tested.

Professor Symons describes Dr Pang's group's progress - in cooperation with Telecom Research Laboratories, Siemens and the Australian Defence Force Academy under a UVC grant - since 1989 as "phenomenal."

"Our problem was to get the world to accept that layering was the way to go," he said. "The total team has been able to convince experts in the field to take it seriously. When people have compared coding techniques and efficiencies from various international research groups, ours comes with the best."

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Divining the real fakes

Telling a synthetic gemstone from the real thing involves more than just a good eye and a steady hand.

Two Monash physicists are helping to alleviate the nervousness of dealers and insurance companies as high standard synthetic stones become commonplace in the world's precious gemstone market.

Gemologists, says Gordon Troup, are ultimate proof of the quickness of the dedicated collector, and of human value systems.

Offered a large, near-flawless emerald, hard-won from the earth in some remote Third World country, a gemologist with even a small eye will attach little value to an even larger emerald, he says, that might have been specially developed for the occasion. He will be amazed, however, by its sheer perfection and more brilliant lustre.

Mr Troup and Dr Hutton, experts in identifying synthetic gemstones upon the fact that real and emeralds have become widely available in the international marketplace during the past decade. The word 'fake' does not apply because in their composition and structure, the synthetics are real rubies and real emeralds.

When sums of tens of thousands of dollars can pivot on whether a gemstone is natural or synthetic, nervous buyers and their insurance companies need to know. Dr Troup and Dr Hutton are experts in a powerful analytical technique called electron spin resonance (ESR) spectroscopy.

ESR spectroscopy can identify natural gemstones by the irregularities in their crystal structure, or by detecting the 'fingerprints' of traces of other elements in the crystal that is not only confirming that a stone is natural, but which may even indicate its provenance.

Several years ago the Physics department's ESR group, together with the Electrical Engineering department and KMT, developed a compact ESR spectrometer a quarter of the cost of the large commercial spectrometers then available, but offering the same performance. Among other things, it could be used to identify vanadium, a top is disturbed by a magnetic field and excited by microwaves at a fixed frequency. As the electrons precess in a strong magnetic field, they absorb the microwave energy and re-emit it as heat infra-red radiation.

Varying the strength of the magnetic field causes the excited ions to absorb and re-emit energy at several different values of the field; again dependent on the specific elements present. By changing the orientation of the sample within the magnetic field, the ESR spectrometer can also obtain different perspectives on the regular arrays of atoms in the crystal lattice.

Any defects caused by paramagnetic ions in natural gemstones cause the signal to spread out, instead of being tightly focused around particular peaks. The data appears as a pattern of lines on a graph, whose height, position and spacing identifies the paramagnetic element and its concentration.

The ratio of iron to chromium in rubies, for example, varies between stones from mines in different parts of the world. The ESR signatures of gemstones from different mines can be determined and used as reference standards to identify stones from different provenances - a further test of authenticity.

ESR spectroscopy on gemstones only works on magnetic elements like iron and nickel, and on paramagnetic elements - those that are not naturally magnetic, but which acquire magnetic properties within a magnetic field.

Ruby is a form of corundum, or aluminium oxide, closely related to sapphire. Both are crystal variants on the same elemental theme, and are sometimes found together. Emerald is beryllium-aluminium silicate, a form of the semi-precious gemstone beryl.

Natural rubies contain chromium ions (Cr⁷⁺), while emeralds contain iron (Fe²⁺) and vanadium (V⁵⁺). V⁵⁺ is not normally observed by ESR, but Dr Troup and Dr Hutton found a clever way to make vanadium ions 'visible' to their ESR spectrometer.

Crumbling an emerald converts some of its natural V⁵⁺ ions to paramagnetic V⁷⁺ and V⁶⁺ states. It does not change the emerald's properties, but adds diagnostic detail to the ESR signature.

Dr Troup says a Perth-based company, Biron International, has perfected a technique which dissolves beryl and turns it into a highly magnetic state. The stone is then excited by microwaves and the result is measured. By comparing the radiation with that from natural stones, the stone's authenticity can be confirmed.

Back in 1975 Dr Hutton showed that ESR spectroscopy could distinguish between natural golden sapphires from Australia and synthetic golden sapphire. Dr Hutton and Dr Troup subsequently extended the technique to distinguish between synthetic and natural blue sapphire.

At an international symposium organised by the Gemological Institute of America in Los Angeles last year, Dr Troup was asked whether ESR would distinguish between synthetic and natural 'paparadscha' sapphires.

The colour of these sapphires lies somewhere between apricot and pink, with a slight brownish tinge. Most come from mines in Sri Lanka, but a new mine has recently been opened in Tanzania.

Synthetic paparadscha sapphires are being passed off as natural gemstones, so Dr Troup and Dr Hutton decided to determine the ESR signatures of both. Surprisingly, they had no difficulty buying the genuine article, but could not obtain certain synthetic stones.

Eventually, Ms Belinda Turner, a jeweller and student with the Gemological Institute of America, tracked some down in the US and sent them to the Monash researchers. "Without her participation the project would have been incomplete," the researchers said.

Natural paparadscha sapphires contain iron and chromium, with the amount of chromium increasing steadily from the palest apricot to the pinkiest stones. The Tanzanian stones have a broader spectrum and contain less chromium but ESR has no difficulty telling them apart from synthetic sapphires or the Sri Lankan stones.

Dr Troup and Dr Hutton say they would now dearly love to test some of the diamonds coming out of CRA's Argyle diamond in the Kimberley region of Western Australia to see what influence different paramagnetic elements have on their colours.

The Argyle mine is now the largest producer of diamonds in the world, and the stones come in a range of exotic colours.
Designing in deep water

With the Bass Strait oilfields nearing the end of their economic life, oil companies are looking for ways to exploit untapped reserves. Meeting engineering challenges in new fields is the task of the newly-established Australian Maritime Engineering Cooperative Research Centre.

The oceans are a hostile environment for human-built structures, placing even these structures gain respite in the relative calm of summer. In contrast, oil rigs in Bass Strait are subjected to a relentless assault from huge storm-driven waves at almost any time of year, and from the strong ocean and tidal currents that sweep between the mainland and Tasmania.

Associate Professor John Hinwood, of the Department of Mechanical Engineering, who heads the Melbourne node of the new tri-state Australian Maritime Engineering Cooperative Research Centre, says that today's Bass Strait oil rigs stand in water depths of 50 to 80 metres. These fields are nearing the end of their economic lifetime, but new engineering techniques could make it feasible to exploit smaller oilfields that have previously been considered uneconomic, by linking them at low cost to the existing rigs.

BHP's recently discovered Otway Basin project of the western Victorian coast will also present new engineering challenges. While it has yet to be evaluated, it is unlikely to hold the large, concentrated reserves of Gippsland's offshore fields. Hydrocarbons have also been found in much deeper water.

"We can imagine that five to 10 years hence, we may be looking at oil prospects off the continental shelf, at depths between 200 and 450 metres, which will present a whole new set of problems," Dr Hinwood said.

The new Australian Maritime Engineering CRC will conduct research into a class of problems relating both to floating and fixed offshore structures. These include both ships and moored oil rigs, of the type that BHP operates in the Timor Sea. Dr Hinwood says moored facilities may well be used in marginal oilfields around the Victorian coast, including the Otway Basin.

The centre's research will emphasise both fixed and compliant structures. The latter structures have a measure of inbuilt elasticity that allows them to roll with nature's punches. These include moored platform structures and the tall, slender steel towers secured by steel guy cables anchored in the seabed, which are being used to tap deepwater oilfields off the US coast.

Exciting is exploring the possibility of reducing seabed pipeline costs, by using special flexible pipelines as part of the system to connect smaller peripheral fields to a central platform. The oilwater mix from these wells would be pumped to the platform for separation and then to storage and transportation facilities on shore.

"The idea would be to drag a conventional steel pipeline out from shore onto the seabed, then connect it with a new or existing platform with a large flexible pipe like a rubber hose," Dr Hinwood said.

"Conventionally, these pipelines have been made of steel, and have had to be installed by divers, with cost penalties of the order of $10 million per pipeline. Flexible risers could be installed at a cost of about $2.2 million for 200 metres of pipeline, so the cost savings could be considerable.

He says Bass Strait has the typical problems of a corrosive saltwater environment, and biofouling (colonisation by marine life), which can increase drag and magnify the forces on the legs of platforms. But Bass Strait's chief challenge to engineers comes from its strong and sustained wave action, which leads to difficult operating conditions and to structural fatigue from repeated loading.

Even biofouling tends to be more pronounced because in remote areas of Bass Strait where there are few suitable substrates to which marine life can attach, oil platforms provide prime pieces of real estate. Biofouling of oil rigs in the Rankin field on Australia's tropical North-West Shelf is also severe.

Oysters weighing over a kilogram with their thick shells have been scraped off with a device that clings to the steel legs, and carves off marine life with an array of seven tungsten carbide-tipped circular saw blades and carbonsteel wire brushes. The ability of a prototype to cling to the platform legs was proven by model testing in the department's wave tank.

A third area of difficulty is the remoteness of Bass Strait and other Australian fields from any engineering support infrastructure, which means that structures must be made robust and reliable. For installation of a platform or processing equipment, it would take 30 days at a cost to $400,000 a day to hire one of the huge crane vessels and other boats that service and retap oil rigs in the Northern Hemisphere.

Dr Hinwood's Monash group has a major project to investigate the stability of seabed pipelines, which can be damaged by strong currents or accidentally damaged by fishing nets or ships' anchors.

Pipelines are shielded by a layer of sand that is in turn covered by a mound of rock fragments which neutralises their buoyancy (oil containing air bubbles is lighter than the surrounding water) and stabilises them against forces imposed by deep wave action and strong currents.

The design of the rocky shield must be optimised against its cost; the rock can cost as much as $30 per cubic metre to deposit, and one seabed pipeline like those laid in the Rankin oilfield can require hundreds of thousands of cubic metres of rock to protect it. Moderate economies of 15 to 20 per cent in rock volume can save millions of dollars.

In another project, the group is studying pipeline vibration. In uneven terrain, a pipeline may sag a gap between two outcrops or seabed dunes, and local currents can set up low-frequency vibrations that damage the concrete coating used to slick the line.

In a rigid pipeline the amplitude of vibration may be up to twice the pipeline's diameter, and it, a flexible riser, as much as 10 metres. Dr Hinwood's group is seeking to determine how these vibrations are generated and how much oscillation can be tolerated, by doing experiments in the wave tank and another test facility called a U-tube.

The researchers have found that the vibration period is related to the frequency with which the pipeline shed vortexes under wave action. A 10-second wave interval may cause vortexes to be shed at two second intervals, and the combined forces of the waves and the vortices can set up destructive vibrations.

Waves are relatively predictable but vortex action is not because it is influenced by other factors. The group has been attempting to develop a mathematical model to predict pipeline behaviour and has made the interesting discovery that, at least in some cases, it can be chaotic. Small changes in local conditions can cause it to move suddenly from one mode of vibration to another, very different vibrational state.

But Dr Hinwood says that even chaotic motion leads to a finite number of vibrational states, and it is thus predictable within certain bounds. It can be described statistically, so that pipeline designs can accommodate the forces they generate; the trick is to predict when these changes are likely to occur. In January this year fourth year student Richard Aarons, building on cumulative efforts of several PhD students in the department, made an important conceptual leap that has led to a new theory of vortex-forced motions that is far more successful at predicting real-life phenomena than anything previously described in the research literature.

The offshore engineering program, which involves the departments of Mechanical and Civil Engineering, was the vehicle for the university's involvement in the Australian Maritime Engineering CRC.

The other nodes of the centre are at the Australian Maritime College at Launceston, the Department of Mechanical Engineering at the University of New South Wales, and the Curtin University Centre for Maritime Studies in Perth. The industrial partners are the engineering companies John Holland, Kinhill Consultants and Macmillan Pty Ltd, as well as a wide group of shipbuilders and designers.
You're naked and the temperature is hovering around zero on a frigid winter's night in the bush. What do you do to keep warm? The answer, if you're a baby brush-tailed phascogale, is: nothing. You let your own body temperature dip towards the freezing point of water, and allow your heartbeat to slow almost to nothing as you wait with your littermates until mother phascogale returns from the hunt to warm you and provide a feed of milk.

Todd Soderquist, of the Department of Ecology and Evolutionary Biology, made the astonishing discovery about the baby phascogale's remarkable energy-conserving strategy during his PhD study of the species, which he is attempting to reintroduce into areas of Victoria where it has become locally extinct this century.

Warm-bloodedness is one of the most basic mammalian characteristics; most mammals, including adult phascogales, maintain a body temperature of around 37 to 38 degrees Celsius. All animals obey a simple law of physics: the smaller one's volume, the larger the surface area through which body heat can escape, so the smaller a mammal the more energy it must devote just to staying warm.

Mr Soderquist, who has been studying phascogales in the Chiltern Reserve near Bendigo, has observed mother phascogales leaving their babies in a tree hollow to hunt at night to satisfy their own energy requirements. The babies, thumb-sized, hairless and weighing only 3 grams seven weeks after birth, put nearly all their food energy into building body tissues, and grow rapidly to independence at around 150 days.

The brush-tailed phascogale, Phascogale tapoatafa is a dasyurid, a member of the family of carnivorous and insectivorous marsupials that includes the Tasmanian devil and antechinus. Some-what resembling a squirrel with its steel-grey fur and black bottle brush tail, it is mainly arboreal with a diet consisting mainly of spiders and insects, but it also eats lizards and birds.

It was once quite common in open dry sclerophyll forest throughout Aus- tralia, with an extensive clearing of Aus- tralia's box and ironbark forests has fragmented its habitat and it is in gen- eral decline across its range; and is thought to be extinct in South Aus- tralia. It is found in islands of forests across central Victoria, but is locally ex- tinct in Gippsland.

Todd Soderquist, in a project sup- ported by the Melbourne Zoo and the Healesville Sanctuary, has been trying to reintroduce phascogales from a suc- cessful breeding colony at Healesville back into the wild in forest north of Moe in the Latrobe Valley.

Because it is now confined to dis- continuous patches of forest that impede gene flow in the species, Mr Soderquist is collaborating with Dr Peter Temple-Smith in a study which is attempting to determine the species' genetic diversity by the latest DNA-finger-printing techniques.

There are two subspecies of the brush-tailed phascogale, a small tropical subspecies, and the larger subspecies of the temperate south. The largest num- bers of the southern subspecies, found in the Whipstick State Forest north of Bendigo, are almost twice the size of the tropical animals.

Todd has concentrated his field studies on the Chiltern State Forest, which has a fairly static population of about 35 breeding females thinly dis- persed through its 510 hectares - a population that he says could be lost very rapidly in a drought year.

Males live less than a year and die soon after mating. Todd says the phascogale is of great interest because it is the largest dasyurid to employ the 'disposable male' strategy, which may reduce competition for food when the female is lactating, and after her young become independent and disperse.

Phascogales have very large home ranges - the female typically hunts in about 50 hectares of forest, while males in the pre-breeding season may occupy an area twice this size. The males make long forays to find females - using tiny radios- transmitter attached to the ani- mals, Todd has recorded one male moving up to four kilometres in one night - a considerable feat of en- ergy expenditure and distance.

Todd says that knowledge of the species' behaviour and ecology is essen- tial if it is to be reintroduced success- fully into the wild. The females, for example, are territorial but will some- times let a daughter stay in the home range after weaning, by splitting her home range and hunting in only one part of it. Male territories overlap ex- tensively with those of other males, as well as females.

Males seem to avoid fighting over females, while females take multiple mates - the reason is unclear, but Todd and Dr Temple-Smith hope to determine whether there is a sperm competition in the female reproductive tract, which would maximise genetic di- versity while ensuring that superior males would sire at least some members of a litter.

From a more practical viewpoint, Todd suspects that the female may ben- efit from an energy viewpoint; mating may last several hours, and the female submits because she would waste good hunting time trying to dodge ardent males pursuing her for her favours.

Females give birth to about eight young, and Todd says it is not uncom- mon for two or three to die between birth and winning. She has eight teats, and carries the young in a pouch until they are about seven weeks old. They are then deposited in a nest while she goes hunting.

Within an hour of the mother leav- ing the babies, the temperature has dropped to near zero, and they are co- matosed and almost devoid of any sign of life. She goes out and returns about three times a night, warming the litter by suckling them each time.

"I've put my hand into a nest and picked them up on a very cold night," Todd said. "Even though my hands were cold, they still felt like little ice cubes. There's no point in them keeping warm while the mother is absent. She feeds them, they digest the milk, then go back to being little icecubes; so they're not expending energy stay- ing warm.

"They grow and poke their noses out of the nest at around 100 days. The mother continues to feed them, but stays out of the nest entirely, presum- ably as a hygiene measure.

"At 149 days, the juveniles are capa- ble of hunting for themselves, and dis- perse soon after. The mother leaves the nest without looking back."

Todd says that phascogales learn virtually nothing from the mother, or from each other - unlike most baby mammals; they do not play except for the occasional brief chase.

He says the phascogale's behaviour, even in adulthood, appears to be "hard -wired" - they hunt by instinct, rather than by learning from others of their species. Phascogales lack what he calls "creative intelligence" and seem not to waste time on tasks involving fine dis- crimination, as he has learned to his discomfort when hand-feeding them.

"They're not very good at telling the difference between food and fing- ers," he said. "They have very sharp teeth; and they can penetrate right through a fingernail."

This lack of creative intelligence, however, makes the reintroduction pro- gram potentially easier because this in- built programming means phascogales are ready to do what phascogales so as soon as they are released into the bush.

Todd reintroduced eight females bred at Healesville into the bush at Moondarra State Park north of Moe on January 28. Three were quickly killed by cats, and another was eaten by a goanna. There was another casualty when two sisters nesting together quar- relled over a piece of chicken he gave them, and one bit the other on the leg - requiring the injured animal to go back to Healesville for recuperation.

More releases were planned this month; Todd planned to reintroduce the males only after the females had had a chance to spread their perfume around the area, because the males otherwise probably would wander off into the bush without finding a mate.

Last year he introduced a similar number of animals into the bush north of Traralgon, but all were killed by foxes or cats. The survival of the latest batch of females in Moondarra State Forest is similarly uncertain, and Todd says the releases have highlighted the problem of predation by feral animals.

But in principle, the phascogales are capable of surviving and thriving if predators can be controlled - several orphaned animals released last year into the forests of central Victoria, where predators are fewer, are still doing well.
Photographer Rhonda Joyce captured these snapshots of Orientation Day at the Clayton campus. Almost 4000 new students are attending Monash campuses this year.

Press cuttings
A selection of recent Monash print media coverage

FEBRUARY
13-19 The Australian Campus Review Weekly – Professor Alan Trounson, Centre for Early Human Development: Science's little breeders aim for clone-led recovery.
16 The Sunday Age – Assoc. Prof. Maurice Baltin, Faculty of Education: What has 44 legs and an IQ of 5000?
17 The Herald Sun – Assoc. Prof. Jeff Northfield, Graduate Studies: Unanswered questions.
17 The Age – Assoc. Prof. Chris Maher, Geography and Environmental Science: Housing stays sluggish.
18 The West Australian – Professor Peter Spearritt, National Centre for Australian Studies: Student survey response 'abysmal'.
19 The Sydney Morning Herald – Professor Peter Chandler, Faculty of Business: Economic policy takes a pounding from academics.
19 The Age – Mr Neville Turner, Faculty of Law: Suffering abuse of little children.
19 The Age – Professor Noel Murray, Civil Engineering: Car industry angered by bumper criticism.
24 The Herald Sun – Dr Brian Fildes, Accident Research Centre: Perth looks at home for elderly.
25 The Australian – Mr David Trigg, Graduate School of Management: Students need to equip students with what it is to learn: don.
25 The Herald-Sun – Dr Peter Rogers, Department of Obstetrics and Gynaecology: Health hazards of menopause.
27 The Herald-Sun – Professor Bill Ramsell, Public Sector Management Institute: 'Shove freeway' call.
27 The Australian – Professor John Fensham, Faculty of Policy Studies: GST 'lifts inflation but has been stult'.
28 The Sydney Morning Herald – Professor Peter Fensham, Faculty of Education: Unisa needs to equip students with what it is to learn: don.
28 The Business Review Weekly – Mr Hans Eisen, Management: Forget America, Asia is our leading light.

MARCH
The Australian Business Monthly – Professor Peter Singer, Centre for Human Bioethics: Greed is stupid.
1 The Canberra Times – Professor Peter Spearritt, National Centre for Australian Studies: TV education rises from the chaos.
1 The Sunday Age – Mr Tony Pollock, Centre for international studies: Universities strike fee for foreigners.
2 The Age – Dr Helga Kuhse and Professor Peter Singer, Centre for Human Bioethics: Nurses back euthanasia, survey finds.
2 The Herald-Sun – Mr Andrew Mathews, Earth Sciences Department: Bushfires on computer.
2 The Sydney Morning Herald – Mr John Evans, Distance Education Resource Centre: Let telly be the teacher.
3 The Herald-Sun – Associate Professor Neil Cameron, Mathematics: New push on maths.
4 The Age – Associate Professor Kevin O'Connor, Department of Geography and Environmental Science.
Press cuttings may be perused at the Public Affairs Office, first floor, Gallery building, Clayton campus.
Opera, tragedy, comedy in theatre season

The 1992 Monash University theatre subscription season has been launched officially by the Vice-Chancellor, Professor Mal Logan.

The Alexander Theatre's fourth annual season of professional theatre includes five plays and one opera. Following the success of its first subscription season last year, The George Jenkins Theatre, Frankston campus, will also present four of the productions in the program.

In 1991 subscriptions to the Monash University theatre season tripled.

Subscription levels are again expected to rise again this year with the involvement of the Playbox Theatre Centre of Monash University, the Victorian State Opera, the Victorian Arts Council and producer Malcolm Cooke.

"With over 17,500 people attending the Monash Theatre Season last year, the university really believes it is developing a much-wanted facility for theatre lovers outside the city region," Professor Logan said.

"Each year more and more producers are becoming aware of the vast audience potential that exists in Monash catchment areas."


This will be followed by Verdi's La Traviata on 30 April and 2 May at the Alex. Entertainer Reg Livermore will make his opera directing debut in this production with the Victoria State Opera.

The remaining productions have seasons at both theatres. The Australian premiere season of Don Giovanni, written and directed by Jerome Kilty and starring Lorraine Bayly and Lewis Fiander, will be presented in May.

It will be followed by Frank Hardy's Mary Lsoon, in which Maryanne Fahy plays entertainer Mary Hardy. The final production of the season is Shrek the Musical, played by Amanda Muggleton. To subscribe, contact the Monash Box Office on extn 75 9992 for a booking form.

Women in art history

The current exhibition at the Monash University Gallery, until 3 April, features recent acquisitions and a selection of works from the university collection.

Transpositions 1988-89, a recent and major work by Australian artist Julie Brown-Rrap, is a work of considerable historic and theoretical importance. It depicts, on 100 photo-emulsion etched plywood squares, a catalogue of portraits of women in the history of art. Klimt, Matisse, Manet, Fragonard, Ingres, Goya, Gauguin and many other "masters" are obscured from sight for one moment as the authors of these faces.

The material and process of medium which heightens the impression of faded memory creates the need for a searching of these feminine identities. Brown-Rrap presents these women as evidence, the art history mug shots implicate the memories creates the need for a searching of these feminine identities. Brown-Rrap, is a work of considerable historic and theoretical importance. It depicts, on 100 photo-emulsion etched plywood squares, a catalogue of portraits of women in the history of art. Klimt, Matisse, Manet, Fragonard, Ingres, Goya, Gauguin and many other "masters" are obscured from sight for one moment as the authors of these faces.

The material and process of medium which heightens the impression of faded memory creates the need for a searching of these feminine identities. Brown-Rrap presents these women as evidence, the art history mug shots implicate the perpetuator of the art - the 'masters' - in an act of theft.

Juxtaposed with Transpositions is Maria Zetze's Bond this (doilies) 1990. Susan Rankin's Oh! Motherland 1985, Jan Nelson's Mai di Luna 1989, Elizabeth Newman's Untitled 1987 and Rosalynd Pigott's Upside-down landscape 1989. They are all women artists who represent in various ways the presence of women within their own cultural space. Like Brown-Rrap, they quote variously from art history and its sources, yet do so with an inventiveness which positions their work at the crucial point of feminist interventions in art practice of the recent past.

The important collaboration sculpture, The schizophrenic arm 1989, by Mike Parr and John Nixon, provides a sustained example of the artists' long-term artistic sympathy for each other's projects. In this work, reductionist and expressionist strategies are played off one against the other in a match of strength.

The schizophrenic arm is given a context in numerous ways by the inclusion of a constellation of works that investigate minimalism, geometry, as well as works which toy deliberately with themes of expressionism, gesture and quotation by artists in this exhibition, including Imants Tillers, Robert Hunter, Bernhard Sachs, Dick Wakane, Gunter Christmann, Aleks Dasko.

Whitlam conference probes opposition

It is only now that we can understand the impact of the events of 1972 and begin to write the history books, says Mr Race Mathews, convenor of the Whitlam Revisited conference, to be held at the World Congress 1992 on 30 March and 31 April.

According to Mr Mathews, one of the aims of the conference, organised by the Public Sector Management Institute in the Graduate School of Management, is to compile a definitive collection of papers with particular emphasis on analysing how political parties develop policies when they are in Opposition.

"The development of policies by Oppositions - and reaction to them by government - has not been adequately analysed or understood," he said.

Mr Whitlam agrees. "Academic interests have so far been directed disproportionately at how Government and the public service develop policies," he said.

"The announcement of new policy proposals around a Goods and Services Tax by the Opposition parties in Canberra reminds us that it is vitally important that this oversight should now be corrected.

"The conference's scrutiny of the sustained and sophisticated processes through which the policies of my government were developed is a major step forward, and will provide significant material for future study."

According to Mr Mathews, all the participants who are delivering conference papers are people who helped with the development of key policies for the Labour Government prior to the 1972 elections or studied the development of the Government's policies in subsequent years.

Speakers will include Dr 'Nugget' Coombs, Professor Hugh Em, Victorian Premier Joan Kirner, Professor Dick Ston of and Mr Gough Whitlam.

March-April 1992
\section*{Medical centre opens}

Stage two of the Monash Medical Centre development has been opened officially by the Premier Mrs Joan Kirner (below).

The opening represents the end of the largest hospital building and relocation program ever undertaken in Australia. Three separate institutions - the Queen Victoria Medical Centre, Moorabbin Hospital and Prince Henry's Hospital - have been amalgamated in the $250 million program.

Monash's departments of Surgery, Medicine and Psychological Medicine, and the affiliated Prince Henry's Institute for Medical Research are now located at the centre. With campuses in Moorabbin and Clayton, the centre will serve as a hospital for more than one million Victorians in the south-eastern suburbs, as well as supporting teaching and research activities.

\section*{Hope's two hats}

Leading archaeologist Dr Colin Hope has been appointed to a joint position in the Department of Classical Studies and the Museum of Victoria.

Dr Hope will become curator of antiquities at the Museum of Victoria, where he already has a position, and bringing the treasures of Egypt to the attention of Victorians in his role as curator of the highly successful 'Gold of Pharaohs' exhibition. He was also Australian liaison curator for 'Ancient Macedonia' and adviser on 'Civilisation: Ancient treasures from the British Museum'.

At the museum, he will help develop educational programs related to the ancient world and organise exhibitions of antiquities drawn from Australian collections. At Monash, he will be senior lecturer in Egyptology in the Department of Classical Studies.

The director of the Museum of Victoria, Mr Graham Morris, said one of Dr Hope's tasks in his new position would be to organise further exhibitions, building on the public's fascination with ancient cultures.

\section*{Engineers meet}

A new body to oversee funding of engineering research in Australia has been established by the Federal Government to establish an Engineering Research and Development Council. Such a council would replace the ARC in allocating funding for engineering research in Australia, administering the proposed Advanced Engineering Centres, and consideration of Australian universities' engineering school resources. The council will consider applications for the completion of an eight-week elicos course at the university's English Language Teaching Centre. It is the second time that Monash has run a special program for the college.

\section*{Finance appointment}

The Comptroller, Mr Peter Wade (above), has been appointed to chair a committee to review the performance, operation and management of the South Australian Government Financing Authority.

Mr Wade is a former deputy head of the Treasury of Victoria. The review is part of a Government program to improve the effectiveness and efficiency of the public sector.

The SA Premier, Mr Bannon, said Mr Wade's strong financial background would be supplemented by the depth of expertise and experience of the other committee members. The committee includes banking, investment and accounting representatives.

\section*{China conference}

The first international conference to focus on economic and political relations between China, Hong Kong, Taiwan and Australia was held at Monash last month.

Trade, investment and economic prospects in China's three economies brought together well-known economists from the region and North America to discuss China's economic reforms and their implications for Sino-Australian economic relations.

About 160 delegates attended the conference, organised by the Faculty of Economics, Commerce and Management and the Chinese Scholar Society for Economic Studies, Australia.

Speakers included professor of economics at the University of Washington, Professor Nicholas Lardy; the director of the Institute of Economic Research, Chinese Academy of Social Sciences, Professor He Jian-jiang; and the president of the China Investment Bank, President Li Xian-lin.

Director of Taiwan's Chung Hua Institution for Economic Research, Professor Yu Teong-Shian (below), makes a point to delegates.

\section*{Memorial stones}

Two granite stones, donated by the Department of Earth Sciences, are to be incorporated into a memorial for Australian and other Commonwealth airmen who died in operations from Dalmachry, north east Scotland, in World War II.

A former senior technical officer in the Department of Physics, Mr Bob Billard, who served there with 435 Squadron RAAF, approached the department late last year when he heard of the local community's plan to erect a cairn to honour the dead.

The cairn is to consist of stones from every country that represented the Commonwealth from Dalmachry on strike against enemy shipping along the Norwegian coast. At Mr Billard's request, the section laboratory manager from the Department of Earth Sciences, Mr Robert Douglass, made the stones available for the memorial, which is to be unveiled on 30 July.

\section*{A legal match}

During a cricket match held in Germany in 1988, the idea for a twin university agreement between the law faculties of Passau and Monash universities was born.

Four years later the umpire of that match and idea's initiator, Mr J. Neville Turner, a senior lecturer in the Faculty of Law, has witnessed the signing of the faculty's first exchange agreement involving both students and staff. Although instigated and arranged by the two universities' law faculties, the agreement is not limited to any one discipline.

Pictured are (below, from left) Professor Ray Jarvis, the Minister for Science and Technology, Ross Free, and Deputy Vice-Chancellor Geoff Vaughan.
NOTES & DIARY

MARCH

25 Genetics and Developmental Biology seminar ‘Role of the heat shock proteins in response to stress’, by Dr Robin Anderson, Peter MacCallum Cancer Institute. Colloquium room, Biology Building. 4.15 pm.

26 University Gallery lecture ‘Women in the collection’ by Ms Juliana Engberg. Gallery Theatrette, Gallery Building. 1.15 pm.

Monash Liberal Club Speech by the Victorian Opposition Leader, Mr Jeff Kennett. Room 1. 1 pm.

Ecology and Evolutionary Biology seminar ‘Genetic drift in plants’, by Dr Edith Dempster, University of Natal, South Africa. Lecture theatre 58, Biology Building. 1 pm.

Southeast Asian Studies seminar ‘Philippines: Who, and does it matter?’ by Dr Ron May, Southeast Asian Studies seminar. 2 pm.

Accounting and finance seminar ‘The pricing of audit services in Australia’, by Professor John Barton, University of Sydney. Colloquium room, Biology Building. 4.15 pm.

27 Psychology colloquium ‘The role of the professional secretary’, by Dr Myung Seok Chang, Research Associate. Biology Building, room 906. 1 pm.

Accounting and finance seminar ‘Informational value of segment disclosure: Australian Evidence’, by Associate Professor Michael Aitken, University of Sydney. Lecture theatre 58, Biology Building. 1 pm.

Southeast Asian Studies seminar ‘The Philippines: Who, and does it matter?’, by Dr Ron May, Southeast Asian Studies seminar. 2 pm.

DIARY

International consulting skills workshop

An East-West Centre Association Program for individuals interested in learning the skills required to become successful international consultants. To be held in Hawaii. Dates: 2–9 June. Inquiries: Ms Akbar Hassani, extn 75 8558.

Making it happen: Managing with initiative

A course designed to improve understanding of the significant forces influencing the strategies of higher education institutions, increase awareness of personal management styles, improve performance as professional managers and enhance prospects for career advancement. Dates: 3 to 8 May. Venue: Erskine House, Lorne. Cost: $500 Monash staff, $300 full-time students, $900 non-AITA members (includes accommodation and meals). Inquiries: Mr John Swinton, extn 75 6052, or Ms Di Barker, extn 75 6049.

The professional secretary workshop

The role of the professional secretary, team-work, visibility and image, interpersonal skills, time management and office management. Procedures are to be covered in the staff training and development workshop. Date: 30 April. Cost: $90. Inquiries: Ms Di Barker, extn 75 6049.

Creative problem solving

A workshop to teach and develop the ability to solve problems efficiently and effectively. Dates: 26 March and 2 April. Cost: $30 Monash staff. Notes: Ms Di Barker, extn 75 6049.

Meetings committee workshop

The role of the professional secretary, team-work, visibility and image, interpersonal skills and office management procedures are to be covered in the staff training and development workshop. Date: 30 April. Cost: $90. Inquiries: Ms Di Barker, extn 75 6049.

Australian certificate of civil aviation medicine

A course designed for training medical practitioners in civil aviation medicine. It will cover all the principles involved in assessing fitness of aircrew and air traffic controllers to perform their duties. Dates: 29 June – 10 July. Inquiries: Ms Merrill Staples, telephone 776 1166.

Integrative medicine

The course will provide students with a background of subjects taught in the Centre for Continuing Education schools and equip them with a knowledge of health issues, their effects on the community. To be held 7–9 pm Wednesdays for two 13-week sessions, beginning 6 May. Inquiries: Faculty of Education, extn 74 4905.

Quality management

A two-day course designed for middle and senior level managers from manufacturing and service organisations. Dates: 26 to 27 March. Cost: $850. Inquiries: Ms Margaret Butterley, extn 73 2502 or 73 2581.

Tools and techniques of quality management

A two-day course aimed at developing an understanding of the tools and techniques of quality management for practising managers and supervisors for use in the enhancement of product and service quality. Cost: $850. Inquiries: Ms Margaret Butterley, extn 73 2502 or 73 2581.

Australian literature

The Monash in the city free public lecture program presents the Department of English’s series on ‘The Balinese: Performing Arts’. A report of fieldwork’, by Mr Brett Hough, PhD candidate. Room 515, Menzies Building. 11.15 am.

Psychology Colloquium ‘A detailed analysis of behaviour of autistic children’, by Mr Cheryl Dianarcy, Biology Building, room 906. 1 pm.

Accounting and finance seminar ‘Auditor switching and the pricing of audit services in Australia’, by Professor Keith Houghton, University of Melbourne. Menzies Building, room 954. 1 pm.

Public Sector Management Institute ‘Whitlam Revisited’, dinner speech by Mr Gough Whitlam, World Congress Centre.

4–13

APRIL

European Studies lecture ‘Britain: The reluctant European’ by Mr Geoff Spenceley, Senior Commerce, City Office. 6 pm.

31 University Gallery lecture ‘Artist who are not Women in the collection’ by Professor Margaret Plant, Gallery Theatrette, Gallery Building. 11.15 pm.

Genetics and Developmental Biology seminar ‘Molecular genetics of flower development in Arabidop­sis’, by Dr John Bowman, Colloquium room, Biology Building. 4.15 pm.

Ecology and Evolutionary Biology seminar ‘Ecology of a non-breeding seabird: When boxies don’t honk’, by Dr Nick Klimp, Charles Sturt University, Albury. Lecture theatre 58, Biology Building. 1 pm.

Southeast Asian Studies seminar ‘The Balkans Perform­ing Arts: A report of fieldwork’, by Mr Breen Hough, PhD candidate. Room 515, Menzies Building. 11.15 am.

Psychology Colloquium ‘Diverse learning styles, different learning environments’, by Professor Michael Aitken, University of Sydney. Lecture theatre 58, Biology Building. 1 pm.

Southeast Asian Studies seminar ‘The Balinese Performing Arts: A report of fieldwork’, by Mr Breen Hough, PhD candidate. Room 515, Menzies Building. 11.15 am.

Southeast Asian Studies seminar ‘Australian Impressions of Asia’, by Ms Alison Brousseau, The Yellow Lady, Room 515, Menzies Building. 11.15 am.

Southeast Asian Studies seminar ‘Islam in Indon­esia: Becoming more liberal’, by Mr Greg Burton, PhD candidate. Room 515, Menzies Building. 11.15 am.

Accounting and finance seminar ‘GARCH-M esti­mation: A variable risk premium for 180 day Aus­tralian bank bills’, by Dr Jon Kendall, University of Tasmania. Menzies Building, room 954. 2.15 pm.

NOTES

Uni Club AGM

The University Club Annual General Meeting is to be held on 26 March at 5.30 pm on the premises. It is open to all members. For further information, contact the club President, Mr Keith Allen on extn 73 2213.

Child and family resource guide

Monash university information on child care. A child and family resource guide, provides comprehensive in­formation about services available across all campuses as well as child care, family assistance and support throughout the community. The guide costs $2.

For a copy of the guide, contact Ms Bernadette Brown on extn 75 1156 or 75 4119, Ms Ann Garden on extn 74 4223 or Ms Catherine Wattmough on extn 73 5050.

Gallery lectures

Two lecture-museums will be held in the Gallery Theatrette to coincide with the exhibition ‘Black women novelists and the reconstruction of African identity’ by Associate Professor Elaine Barker. Two lectures will be held in the Gallery Theatrette on Tuesday 26 March at 1.15 pm. Professor Margaret Plant, head of the Visual Arts Department at Monash, will lecture on ‘Aristas who are not women in the collection’ on Tuesday 31 March at 1.15 pm.

Mothers’ and children’s health

The Centre for the Study of Mothers’ and Children’s Health is holding a one-day conference on 14 April focusing on research in progress, future research priority and the impact of research on services and health policy.

The conference includes sessions on infant care practices and the incidences of sudden infant death syndrome; women’s emotional wellbeing after childbirth; and ultrasound and the detection of congenital malformations.

There is no charge for attending the conference, at the Isabel Younger Ross Hall, cnr Swanston and Keppel Streets, Carlton, but registration is required by 7 April. For more information, contact Ms Anne Unger on 546 1231.

March–April 1992

Montage — 11
allowing when people's lives are drawing to a close, this involvement in decisions made about their care. Yet as so central to the meaning and value of our lives.

But there are signs in Australia that this situation is now beginning to change. Two days after the survey into nurses attitudes towards euthanasia was published, my students—many of whom are nurses—began talking in class. They were discussing just how often they had witnessed doctors, afraid of being convicted of murder, ignore the wishes of patients who wanted to be allowed to die.

A change to the Victorian Medical Treatment Act to provide clearer guidelines on when active means of ending life should be made available to patients, seems to be one measure supported by many in the definitions.

However, some believe that allowing doctors to provide patients with the means of ending their lives would be the very least, undermine the general commitment of doctors to preserving life, and at worst, lead to nightmare scenarios of burdensome patients shadowed by opponents of euthanasia do not appear openly available to patients (if that is their sincere request), and yet the repugnant consequences fore­seen by opponents of euthanasia do not appear to have eventuated.

But underlying the question of whether the law should be changed to allow voluntary euthanasia is a deeper ethical issue. That is, how very seriously we take the meaning and moral significance of death might be for us. Indeed, some might find the very notion of euthanasia as a good or easy death repugnant.

But there are at least three very sound reasons why people fear their own death, and the third is perhaps in utter despair at being unable to commun­icate with their loved ones. What is important to emphasise here, however, is that the question of whether a person's death is a good or a bad thing for them must be separated from the question of whether it is right or wrong for anyone to kill them. None of the ethicists who support legalising voluntary euthanasia argue that in cases where a patient views their death as is some­how a good to them, it therefore automatically follows that it is right for a doctor to kill them.

But this difficulty is no reason to deprive patients the chance to decide for themselves the manner in which they want to die. For it is only by respecting a person's wishes at the end of their life that we uphold a com­mitment to a central feature of what makes any human life valuable.

Justin Oakley is a lecturer at the Centre for Human Bioethics, and teacher a range of health care professional courses for the Master of Bioethics degree.

Another aspect of death which it seems perfectly reasonable to fear is the unpredictability with which it strikes. In particular, as Tom Nussbaum has argued, a death which occurs prematurely, before one has had the chance to experience the comple­tion of one's important endeavors, would seem to be a deep misfortune.

Yet whatever we make of the unpredictability of death and the loss that it represents, the fear of a painful death or a death full of suffering and indignity is particularly powerful for most of us. And it is as a means of averting such a distressing end to one's life that many patients have requested measures to accelerate their dying. It is in this sense, then, that death might be viewed by a person as a 'good' to them; that is, as providing their only relief from intolerable suffering and distress.

Now, some critics of the movement to allow volun­tary euthanasia argue that recent advances in analge­sia make it totally unnecessary for patients to suffer a painful death.

However, this criticism misses the point of the argument for euthanasia. For a dying patient who is relieved of physical pain marrow nevertheless have other good reasons for wanting to hasten their own death. They may quite properly feel that they would rather not spend their last days nauseous, incontinent, com­pletely dependent on artificial life-support, and perhaps in utter despair at being unable to communi­cate with their loved ones.

Some of us seem unwilling to accept death as a natural consequence of life, taking extraordinary measures to prolong our lives without regard for their quality. There seems to be a kind of longing for immortality in this, but in doing so we overlook how mortality, were it possible, would undermine the very notion of human life as make much sense were we not mortal creatures. What would be the point of courage, for example, if we were invulnerable to danger? In what ways would we value loyalty and trust, if "our lives never depended in any way on others? And what kind of love would we have for others, where there is no possibility of change or loss?"

Nevertheless, to acknowledge the inevitability of death is not to deny its tragedy, nor does it make the fear of our own death irrational. A patient who fears death should be given the opportunity to be incapable of deter­mining what is best for them. Yet a patient who requests euthanasia is also regarded by some as neces­sarily less than fully rational.

Some of us seem unwilling to accept death as a natural consequence of life, taking extraordinary measures to prolong our lives without regard for their

Dr Heiga Kuhse and Professor Peter Singer, of the Centre for Human Bioethics, recently published the results of a survey which showed that

M T RAVELLERS small businesses, big businesses, shady businesses, interviewed back­
deckers, frontiersday and dreamers, gathering material that would—the mini­ister hoped—somehow translate into indices of improvement.

DEKO had left armed with a series of questions and having a head full of answers that, in their prediet-turn­ing-stuff-into-jargon-even-a-public-ser­vant with-a-quantifiable-attention-span—would-have-trouble-understanding form, provided a window on the country's economic state of health. Here are some of its more interesting findings:

- Why do working trade drivers in luxury cars insist on wearing baseball caps back-to­face? Can't they afford the little-round numbers?
- Close, but no cigar. Creditors suc­cessively tainting these braus been fooled into thinking that their targets are, in fact, keeping an even more mi­nute on them.
- Have sales of alcohol increased because people have more money to spend?

A little more difficult. Despite ex­tensive and concentrated field work, DEKO has been unable to ascertain whether people are drinking to stupefy or drinking to forget. (On a more positive note, we've come up with a super cure for hangover that, properly produced and marketed, should tide us over when this little gravy train jumps the tracks.)

- Have attendance at restaurants de­clined in recent months?
- Certainly a lot of people are staying home and preparing meals on their own hobs. (One of the most popular books at present is This Is How To Stuff A Prepare Dinner Left Alone Flush With Enough Funds to Afford the Proper Ingredi­ents Cookbook, which apparently tells you how to whip up a gourmet meal in five minutes flat using nothing more than the contents of your filing cabinet.)

Paradoxically, the number of restaur­ants has increased over great months, to the point where several inner subur­ban councils have been forced to de­clare Cutlery Exclusion Zones. It seems local residents are getting tired of the noise of scraping chairs, hissing cap­pucino machines, portable phones and—odd this because we didn't think such a thing made a discernible sound—baseball caps being reversed.

- How was the weather during peak hour, adjusting the figure delivered in recent months?
- Understandably busy crossing their eyes and dotting the

But this difficulty is no reason to deprive patients the chance to decide for themselves the manner in which they want to die. For it is only by respecting a person's wishes at the end of their life that we uphold a com­mitment to a central feature of what makes any human life valuable.

Justin Oakley is a lecturer at the Centre for Human Bioethics, and teacher a range of health care professional courses for the Master of Bioethics degree.