Volume 7 Number 5 July/August 1996

MONTAGE

NEWS AND VIEWS FROM MONASH UNIVERSITY

Exploring the cultures of mothering

Monash University's Centre for Women's Studies has embarked on an ambitious community project which will challenge traditional stereotypes of mothering.

The project, which grew out of the centre's highly successful 'Women Changing, Changing Women' seminar series held last year, was launched by Monash vice-chancellor Professor Mal Logan in July.

Acting director for the centre and chair of the project's steering committee Dr Denise Cuthbert said women's groups were eager to become involved in the Cultures of Mothering project.

A seminar on motherhood last year was highly successful, indicating to the organisers that there was enormous demand among women to further explore the different ways they were "doing families" in the 1990s and to redefine dominant perceptions of motherhood.

The seminar also showed the great potential for interaction between academia and the wider community. "This project continues the dialogue and exchange of knowledge between academia and community," Dr Cuthbert said.

A survey of more than 500 community groups found that issues women wanted to explore included balancing the needs of mothers and children, representation of mothers in the media, changes in mothering across the generations, change in women's status after becoming mothers, and different cultures in the modern Australian family.

A one-day workshop for community workers will be held to discuss these issues and develop strategies to challenge prevailing stereotypes. An information kit will also be distributed so that workers can take the program back to their own communities.

The kit will include guidelines on setting up writing and discussion groups, lobbying governments and monitoring the media, and how to evaluate popular images of motherhood.

"The aim is to provide women with critical and analytical tools to help them understand why they feel alone or different. We want women to be able to put issues in a cultural context," Dr Cuthbert said.

She said the "tip top mum" many people believed represented the ideal way of mothering was an historical anomaly, a product of post-war affluence when some women could afford to stay at home and look after their children.

Another, even more inaccurate, image of motherhood currently promoted in the popular media was the 'supermum', typically a successful career woman, with an 'ideal' body and the perfect home.

Despite the continued portrayal of the middle-class, Anglo-Saxon, stay-at-home mother in popular and commercial discourse, Dr Cuthbert said this image represented only one of many diverse ways that families operated.

Continued on Montage 2

Spike

Faculty of Constructionology

The constructionologists of the new Sports and Recreation complex on Clayton campus are providing entertainment as well as bricks and mortar. At any given time, the on-site repartee is bound to fascinate, evidenced by the following recently overheard conversation:

Builder 1: You can take your earmuffs off now.
Builder 2: Narghh, I don't think so.
Builder 1: Why not?
Builder 2: I don't wanna hafta listen to you.

Now, who's for a tasty chop?

We all know lean times are ahead and the fat must be skimmed from the system following the dire predictions of Senator Vanstone. This became quickly apparent to the editor of *Etcetera*, who noticed that staff appointments fell in one week from an average of 10 to just one. The one new appointment to be made at Monash that week was for a vegetarian restaurant manager.

Down, down and away

Australia's new Foreign Affairs Minister Alexander Downer is proving to be very particular about Australia's international image.

While in the US for trade talks recently, he was asked to present the Georgetown University library with five volumes of Manning Clark's *A History of Australia*.

Apparently Mr Downer doesn't like Professor Clark's version of our past, which many conservatives criticise for being too left-wing. He refused to hand over the selected texts, opting instead to donate a copy of Sir John Monash's biography.

NOW & THEN

25 Years Ago

Welcome to Monash University's Fourth Open Day!

Monash is a very young university. It is just 10 years since it received its first students. Today it is, by any standard, a very big and complex institution.

It has a student population of 11,034; a staff (academic, administrative and general) of some 2500; it spreads over 250 acres of land. There are seven faculties – Arts, Economics and Politics, Education, Engineering, Law, Medicine and Science – comprising more than 50 departments.

15 Years Ago

Melbourne now has a Japanese Studies Centre, designed to provide a focus for the study of Japan and to promote understanding of that country in Victoria.

The Centre, officially launched on June 24, is based at Monash, and its founding president is Professor Jiri Neustupny, chairman of the department of Japanese.

Professor Neustupny said that at present more than 30 schools in Victoria were teaching Japanese language.

5 Years Ago

Australia's world-renowned academic community was at risk of becoming an "intellectual backwater" unless significant salary increases were approved soon by the Federal Government, the Vice-Chancellor, Professor Mal Logan, said.

He said academics in Australia were grossly underpaid and were at the end of their tether over the lack of action on salaries.

"It seems that unless you can close down the wharves, turn off the power or blockade Parliament House, then you have no political muscle."

This Month Last Year

Businesses will have difficulty surviving in the global marketplace unless their managers implement electronic commerce systems, the executive director of Monash University's new Centre for Electronic Commerce has warned.

Ms Joanne Fisher said senior management in commercial, government and educational organisations must learn how to harness the potential of technologies such as electronic messaging, electronic data interchange (EDI) and all forms of on-line business communication.

Exploring the cultures of mothering

From Montage 1

Indigenous Australians, for example, have a community approach to raising children, where extended family, neighbours and friends share parenting responsibilities.

Dr Cuthbert said that in the dominant Anglo culture, many childless women felt deprived and lonely while women with children often felt swamped and under pressure.

"Maybe we could learn from cultures where child-rearing is a shared responsibility."

Women from diverse cultures were also experiencing social changes in mothering differently. In Aboriginal communities, the increase in family breakdown meant grandparents were taking on a much larger role in bringing up children, while in Anglo-Saxon families the increase in family breakdown meant grandparents were being increasingly cut off from the parenting role.

A further major research study set to begin in 1997, 'Making Maternity', will challenge the notion that motherhood is natural or innate.

"Women around the world do mothering differently, from the birthing process to rearing," Dr Cuthbert said. "Research has shown that even the maternal 'instinct' is learned – little girls play with dolls because they are given them, not because they are expressing an innate need to mother."

The project will be launched on 22 July, along with a video and study guide based on last year's seminar series. Women featured on the video include Katie Spearritt, convenor of the Young Women and Feminism Group at the Women's Electoral Lobby; Lisa Bellear, well-known indigenous poet; Mandy Grinblat from the Women's Circus; and Lesley Podesta, former executive director of the Victorian Women's Trust.

The Cultures of Mothering project is funded by DEET's National Priority (Reserve) Fund and administered by the Australian Foundation for Culture and the Humanities.

BY GEORGIE ALLEN

MONTAGE
NEWS AND VIEWS FROM MONASH UNIVERSITY

Montage is published by the Public Affairs Unit of Monash University's Marketing and Communications Office. Views expressed by contributors in *Montage* are not necessarily endorsed by Monash University.
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Montage may also be viewed on the World Wide Web (WWW) at http://www.monash.edu.au/pubs/montage/index.html
Staff writers: Georgie Allen, Juliet Ryan, Brenda Harkness, Gary Spink.
Editor: Georgie Allen, Public Affairs Office,
phone (03) 9905 5333, fax (03) 9905 2097.
Imageset and printed by Cherry Graphics Pty Ltd.
Registered by Australia Post: PP 338685/00010.

Banking on books

Mary Poppins is known to both children and adults around the world, but how many people would know that her creator was Australian?

Pamela Travers, who brought the much-loved nanny to life, is just one of thousands of creative writers whose life details will soon be accessible via the National Centre for Australian Studies' 'Australia's Literary History: A national data bank'.

The data bank is part of an ambitious project by the Monash centre to provide up-to-date bibliographical information for many "forgotten as well as famous" Australian authors.

"As we move towards the centenary of federation, we are becoming increasingly aware of the extent and wealth of our literary heritage."

Project coordinator Ms Sally Batten said the idea had stemmed from a need for a fully comprehensive record of Australia's literary production.

"As we move towards the centenary of federation, we are becoming increasingly aware of the extent and wealth of our literary heritage," Ms Batten said.

"But it is disturbing that students and researchers in the field do not have access to a comprehensive bibliographic data bank."

According to Ms Batten, the most frequently used bibliography of Australian literature was published 40 years ago and has several gaps. In addition, more literature has been produced by Australians in the past 40 years than in the 160 years covered by that book.

The recently completed first stage of the data bank involved the collection of basic biographical and bibliographical information on almost 10,000 authors. To be included, the authors must have published at least one work of fiction, poetry, drama or children's literature.

Mr Terence O'Neill, Ms Sally Batten, Ms Kerry Kilner and Mr John Arnold from the National Centre for Australian Studies.

The result was the publication of the double volume *List of Australian Writers: 1788–1992 (LAW)* in 1995, which has already sold out two print runs.

The data bank has been designed to store author-specific information (pseudonyms, gender, and birth and death dates), from which a hard copy or fully searchable on-line version of a *Bibliography of Australian Literature* can be produced.

"Over a period of 200 years, the authors listed in *LAW* have published about 40,000 literary works, and the completed bibliography will contain details of virtually every one of these," Ms Batten explained.

"Not only will the bibliography provide substantial information about Australia's literary history but users will be able to access a multitude of statistics, for example on a year-by-year, state-by-state, gender or genre basis."

And the data bank's availability on the Internet will make it widely accessible and easy to update.

Those who will benefit from the bibliography include researchers, students, booksellers, librarians, publishers and anyone interested in Australia's cultural history.

"It is disturbing that students and researchers in the field do not have access to a comprehensive bibliographic data bank."

"Previously, researchers and readers alike would have had to consult a variety of databases and reference books to piece together biographical and bibliographical information about most writers," Ms Batten said.

The centre is also working on two new publications – *Dictionary of Australian Literary Pseudonyms* and *From Stage to Page: A bibliography of Australian drama.*

By Juliet Ryan

Gender imbalance in computer studies cause for concern

The good news is that more girls are studying computing at VCE level than ever before, the bad news is that virtually none of this growth is flowing through to university.

Monash Teaching Fellow Ms Catherine Lang is surveying or interviewing up to 500 secondary and tertiary computer students this year in an attempt to find an explanation for this gender bottleneck.

"The more you look at the basic statistics, the more puzzling and concerning they seem," Ms Lang said.

"Using Monash as an example, women make up more than half of the university's undergraduate population, but they account for less than 30 per cent in computing degrees."

This is an increase of only 1.5 per cent over the past four years, compared to 4 per cent across all Monash courses. And the slight increase in female computing enrolments has not been consistent over that time, with this year's ratio slightly down on the 1995 figure.

"During the same period, young women have been taking up VCE information technology subjects to such an extent that this year they represent 46 per cent of enrolments. This trend has continued for long enough to expect a flow-on effect at the tertiary level," Ms Lang said.

Australian female school-leavers appear the most reluctant group to take up university computer studies. She suspects that the Monash computer courses that record the best gender balance have their female contingent boosted by mature-age and international students.

Ms Lang is well placed to look at this issue from both sides of the secondary/tertiary education fence. She is one of seven experienced VCE teachers spending up to a year at Monash, teaching first-year students while researching issues that affect the school-to-university transition.

Through her survey and interviews, she will explore factors which might be influencing the gender imbalance in computer degree enrolments.

Respondents will be asked about their access to and ownership of computers, subjects done at school, familiarity with computer games and programs, whether they know any computer professionals, their image of the profession and their own opinions about what may be discouraging women from pursuing computer careers.

Research is still at a preliminary stage, but Ms Lang said the initial responses indicated that the myth that computing was a male field was being perpetuated.

There was also a general impression that all computer courses required good mathematical ability (some Monash courses only require Year 11 maths), and there was mixed opinion on whether the VCE offered a good preparation for tertiary computing degrees.

Strategies suggested by undergraduates to redress the gender imbalance included more aggressive marketing, assertive encouragement through scholarships and an education campaign directed at females to correct false perceptions.

Ms Lang plans to have completed her research by the end of this year and intends to publish her findings widely in education and computer journals. She is determined her work will lead to practical strategies for reform.

She will be reporting to Monash's Faculty of Computing and Information Technology, which has already expressed its keen interest by extending Ms Lang's fellowship from six to 12 months and sending her to Singapore to investigate the relatively high participation rate among women in that country's university computer courses. She also plans to present her findings to a Victorian Board of Studies committee currently reviewing VCE information technology courses.

"The difficulty in attracting women to computer studies is not unique to Monash, or indeed to Australia," she said.

"Figures from across Australia, the US, Canada, the UK and Japan suggest that the problem is common to most developed nations."

The exception seems to be Singapore, where 40 per cent of computing degree undergraduates are female despite only 10 per cent of females studying information technology subjects at secondary school level.

Ms Lang has distributed surveys in Singapore schools and will compare the responses to the data collected in Australia.

By Gary Spink

A model for crowd control

Arthur and Liz Veno's first impression of Bathurst, New South Wales, was one of chaos.

As newcomers to the area, they set out to explore the city's nightlife but found themselves caught in the middle of violent clashes between police and revellers at the 1983 Australian Motorcycle Grand Prix.

The riots, which erupted again at the same site in 1985, left dozens of police and revellers injured and resulted in hundreds of arrests, permanently damaging the event's reputation. Even years after its relocation to Victoria, its notoriety continued in the NSW courts, where many of those arrested disputed charges laid by police.

But the Venos – who have spent more than 12 years studying the causes of the riots – believe police are still learning the lessons of Bathurst: that the use of force is an ineffective means of crowd control.

According to Dr Arthur Veno, a criminologist and senior lecturer at Monash University, the heavy-handed crowd control tactics used by police at Bathurst contributed to the tension which sparked the rioting and aggravated further violent outbreaks.

"Bathurst represents the very worst of what can happen when police match excessive force with force. In terms of a breakdown in public order, there has been nothing like it in Australia before or since," he said.

Based on data from Bathurst, the Venos' subsequent research at Monash's Centre for Police and Justice Studies has resulted in an innovative crime prevention model for policing large-scale public events.

The model, which last month earned the pair a Victorian Government Crime Prevention and Community Safety Award, turns the traditional style of law enforcement on its head.

"It is based on back-to-basics policing, which involves collaboration and cooperation between police and the public," Dr Veno said.

"From our research at Bathurst, we know that the paramilitary style of crowd control simply serves to increase public hostility and escalate violence."

The model has since proved successful in reducing violence at other motorcycle races in NSW, and at Phillip Island, where the Australian Motor Cycle Grand Prix was held in 1989 and 1990.

Aspects of the model were also applied at the 1996 Formula One Grand Prix at Albert Park, and the strategy will be used again at Phillip Island when the Australian Motor Cycle Grand Prix returns there next year.

In developing their crowd control strategy for the motorcycling events, the researchers coordinated working groups – which included police and 'bikers' – to identify conditions which could trigger violence and develop practical solutions to potential problems.

Dr Veno said the model helped reduce frustration between police and spectators with a number of simple but effective strategies. These included ensuring that spectator facilities and services at the race were adequate, implementing an effective traffic plan using a community-run marshalling system, and reducing police involvement away from the traditional 'garrison' patrol to a community support role.

"At Bathurst, we found that confrontational policing, including searching spectators en route to the race and during the event, provoked the crowds," Dr Veno said.

"Aggravated by a range of other factors – such as excessive alcohol consumption, a strong media presence and inadequate facilities at after-race entertainment sites and camping grounds – the situation got out of control," he said.

"At the 1985 event, it was chaotic. The police commander read the riot act three times before being forced to run for cover under a hail of missiles that soon became a torrent of rocks, broken bottles and Molotov cocktails. Clearly the aggression was aimed at police."

Dr Veno said that in Victoria, principles from the model were being applied in a number of community-based initiatives including domestic disputes and alcohol-related crime reduction campaigns.

And he believed there was potential to apply the community-based policing principles across all police activities. He said this was particularly important in Victoria, where police needed to regain public confidence in the wake of severe criticism of their heavy-handed tactics.

But according to Dr Veno, one of the biggest barriers to applying these principles was that current police culture did not consider community policing as 'real' law enforcement policing.

"While there is a commitment to community policing in Victoria, it is still the weak link in the policing chain, and it continues to struggle for the ear of command and for resources," Dr Veno said.

"It isn't about catching the bad guys and high-speed chases. It's more about solving problems and preventing crime with simple solutions such as ensuring the street lamp on the corner is fixed to stop muggings".

BY BRENDA HARKNESS

Virtual training for keyhole surgery

Virtual reality could be used to provide training opportunities for doctors in the latest 'keyhole' surgical techniques, according to a Monash University obstetrics and gynaecology PhD student.

But Dr Jim Tsaltas said that while laparoscopic or 'keyhole' surgery was fast becoming an alternative to open surgery, there were still only a few surgeons trained to perform the technique.

Laparoscopic surgery, previously used only as a diagnostic tool, is now being used in some major surgery including hysterectomies, ectopic pregnancies and removal of adhesions and ovarian cysts.

But there is a lack of training opportunities for doctors wanting to learn the technique.

"Virtual reality surgery would address the problem. It would allow the surgeon to wear tactile gloves and a headset and practise keyhole surgery on a virtual body."

Virtual reality training could provide doctors with an artificial environment in which they could practise surgery as often as they liked.

"If the surgeon cuts in the wrong place or makes a mistake, the virtual body can replicate how the human body would react," Dr Tsaltas explained.

The biggest obstacle to providing more training is the $1 million cost of the computer required for the program, as well as the cost of the highly specialised computer programmers required to set it up.

Another problem is the current state of the technology. At the moment, virtual reality equipment works on a one or two-second time delay. To be effective as a training tool for laparoscopic surgery, there should be no delay between the actual incision and the body's reaction.

"If the surgeon cuts in the wrong place or makes a mistake, the virtual body can replicate how the human body would react."

Dr Tsaltas is researching the benefits of laparoscopic surgery, which involves up to four half-centimetre incisions, a long, hollow piece of equipment called a laparoscope inserted into one of the incisions, and a camera. There are no open wounds and the whole procedure is conducted with the surgeon watching a television screen.

He said that while a laparoscopy used for diagnostic purposes was not too complicated, laparoscopic surgery took at least three years to master.

"It is an unusual procedure in the sense that you are not watching your hands but rather a television screen, so it is important that you get your hand-eye coordination absolutely right," he said.

His current research has found that while the cost of a laparoscopic hysterectomy using disposable instruments is the same as an open surgery hysterectomy, the difference lay in the amount of time the patient spent in hospital following the procedure.

"Open-surgery hysterectomy patients stay in hospital for five days. A hysterectomy performed by laparoscopic surgery results in the patient spending a maximum of two days in hospital," he said.

Other benefits to the patient included less scarring, a quicker recovery rate and less potential for damage to fertility in gynaecological procedures.

"When you are dealing with procedures such as ectopic pregnancies, it may be that the woman is trying to become pregnant," Dr Tsaltas explained. "It is very important not to endanger reproductive health and reduce the chances of becoming pregnant.

"Laparoscopic surgery leaves minimum internal and external scarring, and there is less chance of post-operative infection and trauma."

By Juliet Ryan

Adapting technology for quality of life

Important medical signals can be automatically transmitted from patients to their doctors with recent technology developed at Monash University. Juliet Ryan reports.

Technology being developed by Monash's Centre for Biomedical Engineering could give thousands of Australians new-found freedom.

A research team at the centre is adapting existing communications technology to enable people with disabilities and severe illnesses to go about their lives knowing that help is available in an emergency.

Last year *Montage* reported on a system that had been developed for Monash librarian Mrs Joan Streitberg-Hodgson, who had been confined to a wheelchair since having a stroke at the age of 14.

The system enabled Mrs Streitberg-Hodgson, who was unable to use a mobile phone, to push a button and transmit a distress signal, which conveyed her exact location to a central monitoring service.

"But the problem was that the system was a prototype and it was big and bulky," project leader Associate Professor Ian Brown explained. "It could be carried on a wheelchair but not in a pocket or handbag."

Dr Brown and three undergraduates have ow developed a miniaturised version of the ystem and, in the process, have found other uses for the adapted technology.

"We have developed a piece of technology that can control a mobile telephone and transmit a wide range of medical signals from a mobile patient to a predetermined point," he said.

The technology has the potential to transmit electrocardiograph (ECG) or other parameters from a patient, who can be anywhere in the mobile telephone catchment area, to a doctor or hospital.

The original system was based on a mobile telephone, a modem equipped with auto-dial capabilities and a computer. In the case of the wheelchair tracking system, position information was obtained via a GPS satellite navigation system.

Last year the group eliminated most of the bulky elements from the system by replacing the modem, the computer and the GPS receiver – the equipment that receives the information via satellite – with three electronic chips. The total system could be carried by an ambulatory patient.

Dr Brown said the ECG was a good example of the capabilities of the technology, which he called "mobile tele-medicine".

"When a cardiac patient is sent home from the coronary care unit, the period just after release is when they are most at risk," he said.

ECG electrodes monitoring the patient's heart would feed information into a miniature mobile ECG unit, which could be operated manually or pre-set to activate in the event of a rhythmic digression. The ECG signal would be transmitted digitally via a mobile phone (controlled by a microprocessor) to a base station.

The technology could be used for a range of medical conditions, with either the patient or doctor initiating the data transmission.

"The patient could initiate the transmission of a signal if they detected a problem, or the doctor could initiate a data transfer by sending a message to the mobile phone, which could then reply with a medical data transmission," Dr Brown said.

The centre is working on several other projects to adapt existing technology not currently accessible to many people with illnesses or disabilities.

"For example, a child with cerebral palsy does not have the fine balancing skills required to ride a standard bicycle," Dr Brown said.

"If we could design a bike that could support the body, it would not only be good exercise for the child but also provide a sense of self-confidence."

According to Dr Brown, the custom-designed bike is just one of many promising project ideas that are waiting to be developed by the centre's growing number of undergraduate students.

But, he added that without sponsorship and funding for these projects, it could be some time before technology could make an impact on the lives of people with disabilities and debilitating diseases.

APRIL 1995

Technology to watch over you

While technology is moving ahead in leaps and bounds, it often leaves disabled people behind, according to the head of Monash's Centre for Biomedical Engineering, Professor Ian Brown.

But electronics and computer systems student David Gold has been adapting the most up-to-date technology with disabled people in mind.

In conjunction with the Centre for Biomedical Engineering, Mr Gold has developed a push-button system that allows wheelchair users to transmit a distress signal while also conveying the user's location.

Professor Brown said the project was initiated by Monash librarian Mrs Joan Streitberg-Hodgson, who has been confined to a wheelchair since having a stroke at the age of 14.

"Joan is a professional woman who needs to be independent," Professor Brown explained.

The technology developed by Mr Gold was designed to provide security for Mrs Streitberg-Hodgson when out shopping or in transit between home and work or university buildings.

At first Mrs Streitberg-Hodgson felt she needed an adapted house alarm with a screecher or flashing light for when she was out.

"But a major shortfall of house alarms was that they didn't work outside the home," Mr Gold said. "I suggested a more advanced system that offered additional security for Mrs Streitberg-Hodgson when she was out."

Mr Gold said the original screecher or flashing light system would be useful when there was someone within visual distance, but not when the person was alone and in trouble.

The system that Mr Gold subsequently developed allows the user to press a button that automatically transmits a message to an emergency service or nominated person.

Mr Gold's device uses a Motorola mobile telephone, a Redycard PCM modem equipped with auto-dial capabilities to transmit information to a central station and a computer.

The user's location is determined by a GPS system – a satellite navigation system. When the button is pushed, the satellite tracking system works out exactly where the user is and conveys that information through the telephone using the auto-dialler. A computer sends the details through the modem, into the telephone network, and to a receiving phone with a modem. A help message and a position and Melways reference are then printed out via computer.

Although the device would be used in wheelchairs initially, Mr Gold said it could eventually be made small enough to fit in a pocket or purse.

Professor Brown said the system could also be used to transmit different messages. "There could be five buttons to push, each might transmit the message that there is an emergency and the user needs to be picked up immediately, and another could transmit the message that the user needs to be picked up after work."

Although the concept was only at the prototype stage, Professor Brown said there were a number of possible applications for this kind of technology.

"The device was designed specifically for a stroke patient, but it could also be used as a tracking device for Alzheimer's sufferers and the elderly," he said.

"There are also several possible commercial applications. The device could be placed into automobiles, industrial machinery and equipment to keep track of it."

The centre is currently looking for commercial partners to market and produce the device.

By Juliet Ryan

Mrs Joan Streitberg-Hodgson and Mr David Gold display the prototype of the device, which is temporarily assembled in a backgammon case.

In April 1995, Montage *reported on technology that allowed a stroke victim to transmit a distress signal from her wheelchair.*

The solar cycle research race is on

Monash engineers are building a sleek, speedy and environmentally friendly tricycle to compete in the inaugural world solar cycle race this year. Tim Thwaites reports.

Question: What vehicle costs almost nothing to run, can cruise quietly at speeds of more than 50 kilometres an hour, can be comfortable, is waterproof and even has space for luggage? Answer: a solar cycle.

This is not a silly riddle; it's a serious proposition. In late October and early November, in conjunction with the World Solar Challenge – the Darwin to Adelaide solar car race – the world's first transcontinental race for solar-powered cycles will be held. And a team from the Monash Department of Mechanical Engineering at Caulfield plans to compete.

Organiser Mr Hans Tholstrup has mapped out a series of stages of between 200 and 400 kilometres a day so that the solar cycles will reach Adelaide within nine days. It's a testing project which will bring together skills from many diverse disciplines.

"The whole thing will be a phenomenal learning experience," said senior lecturer in mechanical engineering Mr Paul Wellington, who, together with colleagues Mr John Burt and Mr Don Sheridan, will coordinate the engineering side of things.

Building the solar cycle will be a final-year design project for several students from Mechanical Engineering and the Bachelor of Technology program. And selecting and developing the riders and race tactics will involve staff from the Department of Physiology at Clayton.

Four classes of cycles will compete in the race, ranging from ordinary two-wheeled production bikes with add-on solar panels to much more sophisticated three or four-wheeled enclosed vehicles. Monash has entered Class C for purpose-built, aerodynamic, pedalled vehicles with at least three wheels.

"This should be the fastest, most competitive, most experimental class," Mr Wellington said. "The vehicles in this class should average close to 70 kilometres an hour. A Japanese team had an initial crack at the trip last January and averaged about 54 kilometres an hour."

About half a dozen engineering students have been working on the project since the beginning of the year. For aerodynamic reasons, the group has decided on a recumbent cycle, where the rider reclines in a hammock with the pedals in front of him. The students have already located such a commercially-made cycle and have found an aerodynamic shell to fit around it.

The team is now looking for sponsorship of at least $50,000 to buy the solar cells needed to power the cycle and to help them test and solve design problems involved in putting together a competitive machine.

"We are still at the stage of debating the relative power a cyclist can produce on an upright as opposed to a recumbent bike," Mr Wellington said. "But it is likely the cyclist develops less power from the recumbent position." The payoff comes at higher speeds, when wind drag becomes the critical factor, as the lower frontal profile of the recumbent position reduces drag considerably.

"Our biggest concern is how to keep the rider cool. Inside an aerodynamic shell you don't get the normal level of wind cooling." The obvious answer is to incorporate ducts into the shell to let air flow across the rider. But that increases wind drag, which the designers want to minimise.

But these will be far from the only trade-offs. A flat, 1.2 square metre panel of solar cells, set close to the horizontal to capture the most sunlight, is hardly aerodynamically efficient. It needs to be designed to be as aerodynamic as possible, with a certain amount of power be gained to offset any aerodynamic loss.

The solar cycle uses both muscle and solar power. But how do you link the two and use them most efficiently? "The simplest system is to use the cyclist for initial acceleration and solar power to maintain the vehicle at a constant cruising speed," Mr Wellington said.

The two sources put out about the same amount of power – somewhere between 50 and 250 watts. But while the cyclist pedals at about 100 revolutions a minute, the electric motor can spin at about 3000. The drive system will somehow have to link the two.

Then there are questions of the construction materials (probably a lightweight carbon-fibre body with carbon-fibre discs for wheels), steering, and the braking systems. (According to the rules, there must be two independent braking systems each capable of bringing the vehicle to a complete stop from 30 kilometres an hour within 22 metres.)

While the cyclist pedals at about 100 revolutions a minute, the electric motor can spin at about 3000. The drive system will somehow have to link the two.

But these are just the engineering issues. What of the riders and the part they play? Providing expertise in human performance is where Dr Glenn McConnell and Associate Professor Tony Luff from the Department of Physiology come in.

Several candidate cyclists have already begun work, and the group is looking for more potential team members. Riders are being tested and selected using a sophisticated exercise bike set up on a dynamometer in a hot room.

"Little is known about cycling efficiency in the recumbent position," Mr Wellington said. "We will need to look at the changes in the muscles used and probably develop a new approach to cycling because of the difference between pulling on the handlebars (in the upright position) and pushing against the back of the seat."

In fact, the seat is so important in recumbent cycling that the team is considering using seats custom-built to suit the needs of individual riders, which can be snapped in and out of the vehicle.

The vehicle itself will probably weigh little more than 20 kilograms, which means the rider will make up the bulk of the weight. So it may be good strategy to use lighter cyclists to climb hills and heavier ones on downhill sections. Each rider will probably be expected to do a stint of between one and two hours, and would ride once a day. The changeovers provide another engineering challenge – how to design the aerodynamic shell so it can be removed and replaced most efficiently.

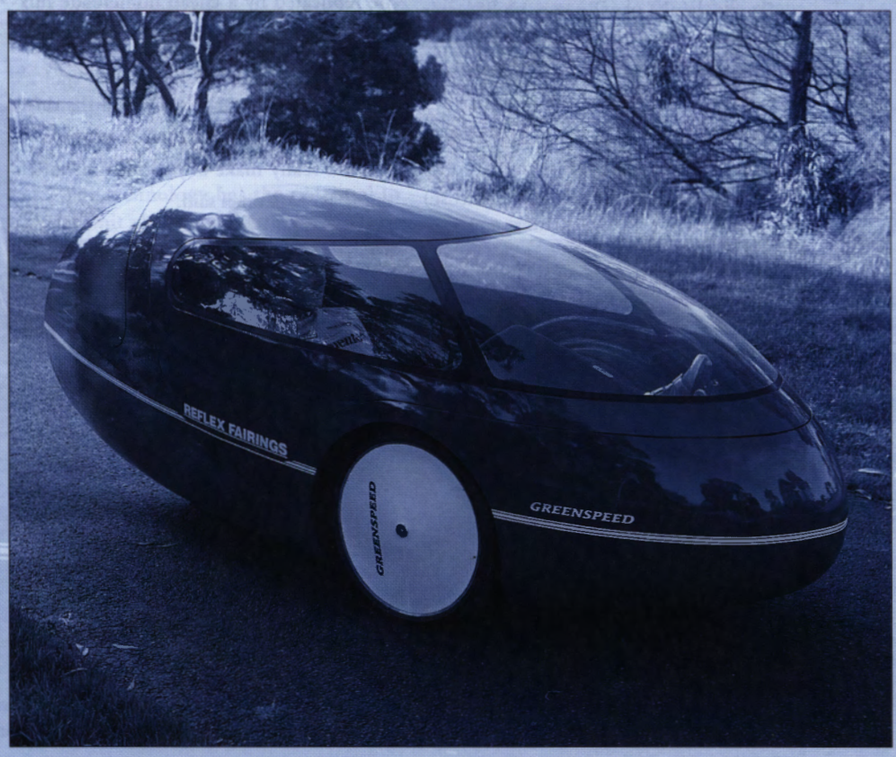
And, as well as determining how to keep the riders cool, the researchers need to determine how much they should drink and whether it should be plain water or include sugar and/or mineral salts.

Clearly, students and staff have a huge amount of work ahead of them before fronting up at the starting line on 27 October. But the work will not stop there, Mr Wellington said: "After the race, we are thinking of building prototypes for people to ride on a daily basis. There's no reason why we can't build a two-seater, which would make a modest shopping buggy. It would combine the economy and flexibility of a bicycle with the safety of a small car."

And, unlike an electric or solar car, a relatively inexpensive solar cycle could be put on the market very quickly. "The amount of muscle power required to operate it would be substantially less than an ordinary bicycle – and even an average cyclist could travel more than 200 kilometres a day in it," Mr Wellington said.

"There's no reason why we can't build a two-seater, which would make a modest shopping buggy. It would combine the economy and flexibility of a bicycle with the safety of a small car."

Anyone who like to become involved in the solar cycle race – as either a sponsor or a rider – should contact Mr Paul Wellington on (03) 9903 2156 or by fax on (03) 9903 2766.



Sports drinks fail the fitness test

Research by a Monash physiologist casts doubt over the benefits of highly marketed and widely popular sports drinks. Gary Spink reports.

Sports drinks have almost become standard equipment in gymnasiums and on playing fields, but Monash research shows most competitors would gain as much benefit from drinking water.

Exercise physiology lecturer Dr Glenn McConell has been investigating links between body carbohydrate availability, carbohydrate intake, exercise metabolism and performance for seven years, and most recently has concentrated on the impact of sports drinks.

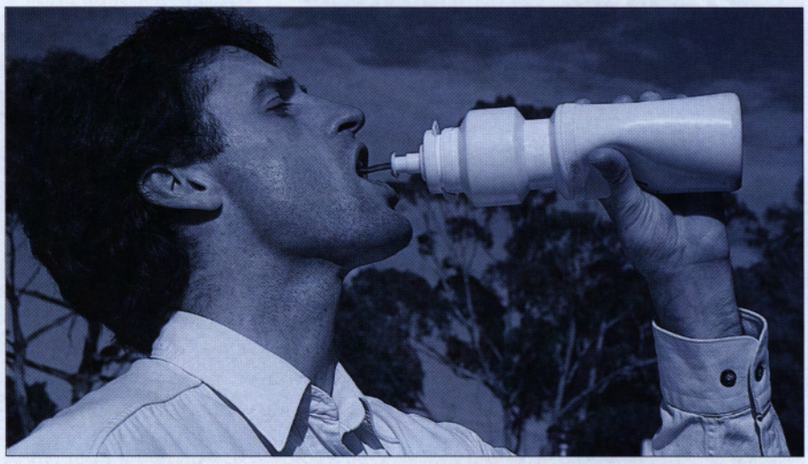
Sports drinks usually consist of water with a 6 per cent concentration of carbohydrates and electrolytes (salts, particularly sodium).

The rationale is that the drinks will improve performance because the carbohydrates will maintain blood sugar (glucose) levels during exercise when muscle glycogen (stored glucose) levels start to run critically low. The electrolytes are supposed to allow the carbohydrates, and water, to be absorbed into the body faster.

But trials conducted by Dr McConell suggest that ingesting carbohydrates has no effect on performance during constant exercise of less than 90 minutes.

And he said the benefits gained from sports drinks during longer events could be replicated by a cheap homemade mixture of sugar and water, or even diluting a soft drink.

"The type of carbohydrate in the drink – glucose, sucrose or glucose polymers – doesn't really make any significant difference," Dr McConell said.



Dr Glenn McConell found that sports drinks did not provide enough carbohydrates to be beneficial.

"Anybody could mix up a drink with 6 g of sugar for every 100 ml of water (a 6 per cent solution), add a bit of cordial for taste, and it would do the same thing as sports drinks and be a lot cheaper."

For his latest research, Dr McConell asked well-trained amateur athletes to ride an exercise bike at an intensive pace for about an hour, while they drank a placebo or a 6 per cent carbohydrate solution.

During this time he monitored muscle glycogen use, the rate of glucose delivery to the blood (from the drink and from the liver) and the amount of this blood glucose used by the muscles.

He found that the subjects became exhausted before their muscle glycogen levels became critically low. This meant that although the carbohydrate drink increased blood glucose levels, it did not contribute greatly to energy needs and therefore did not improve performance.

"For the exercise most people do, they need extra fluid more than they need extra glucose. So they might as well drink plain water."

"The carbohydrate boost provided by the sports drink was simply not used enough to have had a beneficial impact," Dr McConell said.

"For the first time, we have demonstrated that performance during an hour's intense exercise isn't limited by carbohydrate availability. If you have to stop during this time, it's for some other reason."

Claims of the benefits of sports drinks have been based on previous studies using

less intense exercise over two or three hours. These showed improved performance due to a large increase in blood glucose uptake as reserves of muscle glycogen ran down.

But Dr McConell said generally it took a minimum of about 90 minutes of low-to-moderate exercise before muscle glycogen levels became critically low.

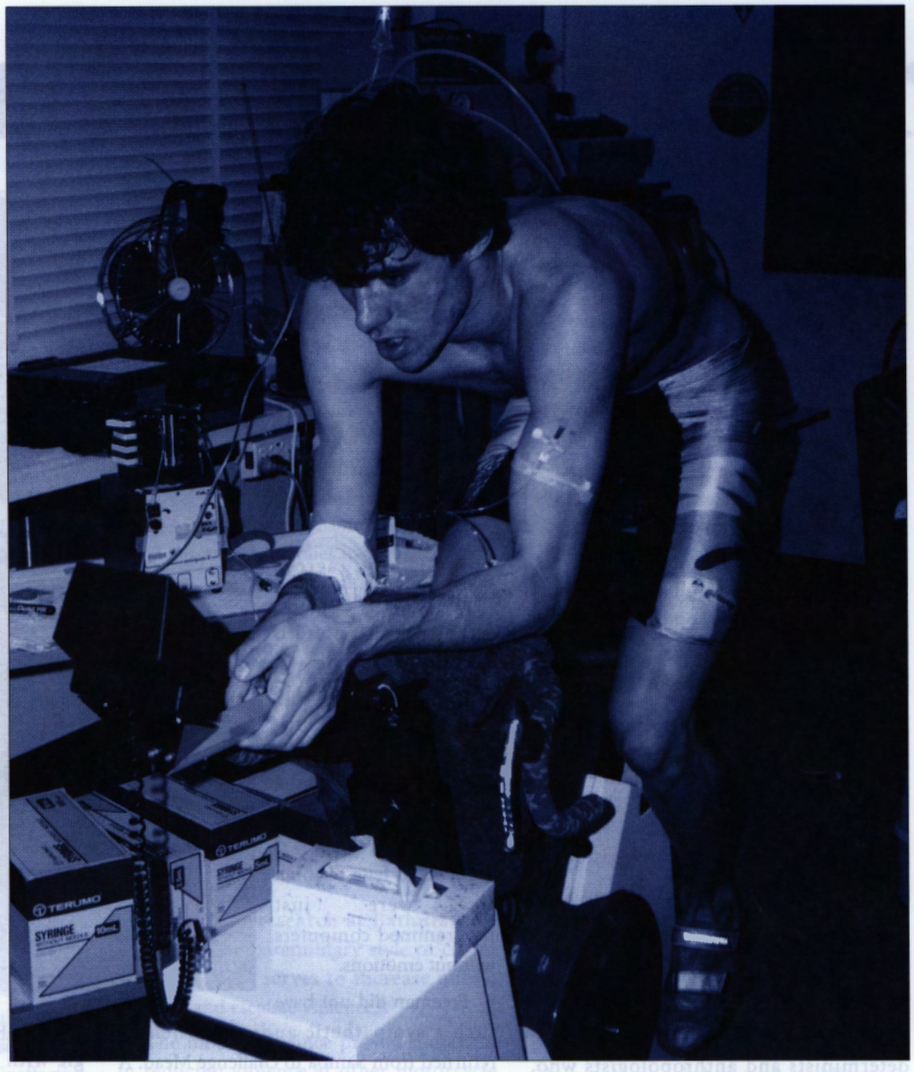
"Most people don't exercise or compete for more than an hour so sports drinks aren't going to do them any good," he said.

"Evidence shows that for the exercise most people do, they need extra fluid more than they need extra glucose. So they might as well drink plain water."

Water reduces dehydration and helps maintain blood volume, which improves performance because it lowers the heart rate and body temperature.

"Some people are afraid that drinking plain water during exercise will dilute the blood and cause a drop in electrolyte levels. But this only happens in events that last longer than four or five hours, and only then if you aren't exercising fast enough to raise much of a sweat," he said.

"Even though sweat tastes salty, there is actually less salt in sweat than in blood. So when we sweat, the sodium concentration in our blood increases."



Carbohydrate drinks did not improve the performance of amateur athletes exercising at an intensive pace.

"If you increased the electrolyte concentration to a level where it might make a difference, the drink would be too salty to be palatable."

In a previous study, Dr McConell had subjects drink more than two litres of water while exercising for two hours at a relatively cool 22°C. There was no significant drop in the subjects' electrolyte levels, and they performed best when they drank the two litres of water compared with one litre and, in a third trial, no water.

He said that electrolytes might allow a minute increase in the absorption rate of water and carbohydrates, but explained that the body naturally adds sodium when plain water is ingested.

This was supported by another of Dr McConell's research projects, where he gave subjects a drink containing a 10 per cent carbohydrate solution, but varying levels of electrolytes, during exercise. All subjects ended up with the same blood glucose levels.

"In any case, the concentration of electrolytes in sports drinks is too low to make any difference to blood sodium levels.

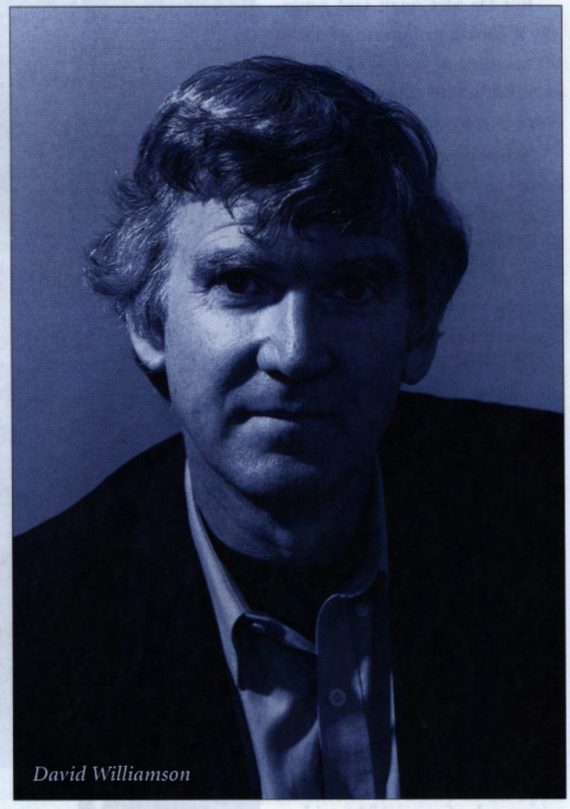
"If you increased the electrolyte concentration to a level where it might make a difference, the drink would be too salty to be palatable."

He acknowledged that sports drinks were a good recovery aid after exercise, allowing rapid rates of muscle glycogen resynthesis, but said it was just as logical to simply drink water and eat carbohydrate-rich food.

"Studies have shown that the rate of muscle glycogen resynthesis after consuming carbohydrate drinks is virtually the same as when subjects take the same amount of carbohydrate in a solid form by eating foods such as pasta, bread and fruits.

"There may be a case for using sports drinks if you were having a couple of hard training sessions or races in the one day and it wasn't practical to be competing on a full stomach. But, again, sugar and water would do the same thing," Dr McConell said.

The coming of age in academia


David Williamson

David Williamson doesn't care if his plays offend. Well, he might care, but that doesn't stop him from lashing out.

His latest targets are academics, or, to be more precise, anthropologists.

With a career spanning 30 years and stretching around the globe, the prolific writer can afford to make a few enemies.

"I don't resile from it ... people want to engage in ideas, not just emotions, when they go to the theatre."

His latest play, *Heretic*, to be performed at Monash University's Alexander Theatre in August, explores the conflict between the mother of cultural determinism, Margaret Mead, and Australian anthropologist Derek Freeman.

Mead wrote *The Coming of Age in Samoa* in 1928. She had lived in Samoa for eight months and found it an idyllic society – free from guilt, anger, stress or violence.

The book became the bible of cultural determinists and anthropologists who, Williamson said, "believe that we are totally shaped by our culture and that whatever ideology is pumped into us will entirely shape us".

In 1983, Mead's legacy was challenged by a pugnacious Australian anthropologist, Derek Freeman, whose own travels and three years of living in Samoa had left him with an entirely different perspective.

He found elements of Samoan society that were consistent with other cultures, including jealousy, anger and guilt, and concluded that there was an essential human nature that existed regardless of culture.

Williamson agreed with Freeman.

"I think that Mead is wrong. I mean, the evidence is overwhelming coming in from neurophysiology and biology that there is an essential humaness. And from my point of view, thank god there is. I'd hate to think we were just programmed computers without emotions."

Freeman did not have such a sympathetic audience when he returned from Samoa to challenge Mead. A great controversy raged in newspapers around the world and Freeman, Williamson said, was blackballed by the academic community.

He believes it is ironic that while anthropologists argued there was no biological essence to human nature, or links with our animal ancestors, "their treatment of Derek was identical to the treatment a chimpanzee troupe gives to one its outcasts".

The title *Heretic* refers to Freeman, who challenged the major premises of his own discipline.

Williamson said that telling an anthropologist that humans were not totally created by culture was like telling the Pope there was no god. "And suddenly here was this bishop from Ballarat going up to the Pope, ie Margaret Mead, and saying, 'Sorry, but we can't just ignore biology'."

It is of little surprise that Williamson sympathises with Freeman's predicament.

"It's about what happens when you tangle with an ideology and say you don't believe in all its tenets."

It can be compared with the response Williamson got to his recent play, *Dead White Males*, when he tangled with some of the tenets of post-structuralism.

"I got very personal and nasty criticism from those of the post-structuralist persuasion."

"Our world view is terribly important to us because we tend to define who we are and gain a lot of our self worth from the particular ideology we attach ourselves to. And if that ideology is questioned, or threatened, as in Derek's case, people get extraordinarily angry."

He believes post-structuralism gives academics an excuse to be lazy.

"Although there may not be any absolute truths, there are pretty close truths, but the problem is that even approximate truths take a lot of hard empirical work and research. In academia it's easier to say, 'Ah, there's no truth so we don't have to do any work'."

Continued on Montage 13

Shaping the different sounds of music

People with differently shaped vocal tracts produce detectably different sounds on single-reed and brass instruments, according to Monash research.

The average length of the vocal tract in women, for instance, is about 13 per cent less than in men (women tend to have higher pitched voices). As such, women saxophone and clarinet players produce different sounds to men.

Even speakers of different languages – who often make use of different parts of the vocal tract – are detectably different when they play the clarinet. For instance, French speakers are more nasal than English speakers.

A video showing an X-ray of the movements and positioning of the vocal tract of renowned classical saxophonist the late Dr Peter Clinch has been central to the Monash research, which demonstrates the importance of changing the shape of the mouth chamber to produce sounds of different pitch and timbre in certain wind instruments. The findings are of significance to music teachers and students.

The video makes it clear that sound in the clarinet and saxophone depends on two coupled resonators – the bore of the instrument and the vocal tract. Parallel studies by English researchers uncovered much the same phenomenon in the playing of brass instruments. In contrast, the shape of the vocal tract barely changes when playing the flute, recorder and double-reed instruments such as the oboe.

In the lower register of single-reed instruments, Dr Clinch found that the larynx (Adam's apple) rises as the player goes up the scale. But at high pitches, the tongue is placed forward in the mouth and the larynx is lowered. In fact, the vocal tract is shaped to match the resonant frequency required.

This system of double resonance has been incorporated into a numerical model formulated for a masters in science thesis by Mr Rob Johnston, now of the Department of Business Systems. Simulations using the model indicate that control of the shape of the vocal tract plays an important part in changing pitch, and that the lips have a relatively minor role.

The video, which was recorded and analysed for a Monash study of sound production in reed instruments, could become an important teaching tool, according to honorary senior research fellow in physics Dr Gordon Troup.

"But researchers in musical acoustics generally publish their findings in highly technical journals, which teachers of musical instruments do not regularly consult," Dr Troup says. "So it is highly probable that these discoveries, which are very useful to instrument teachers, have been, in a sense, buried."

He believes the Clinch video could be used to help players of single-reed instruments overcome problems with the production of sound.

BY TIM THWAITES

The coming of age in academia

From Montage *12*

Williamson said he himself was not "trapped" by an ideology but, if pressed, would align himself most closely with liberal humanism. "It's the ideology that says you've got to take as much evidence on board as you possibly can and then make up your mind about something."

It's a position he developed during his student days.

"My engineering degree taught me that you should find empirical evidence for whatever you're shooting your mouth off about. Scientific methods do sharpen up your thinking, and that's something that has stayed with me."

The playwright does much research before he shoots his mouth off. Before writing *Dead White Males*, he spent "many months" reading "nothing but literary theory" and more recently he has been consuming anthropology.

He also interviewed Freeman and his wife, Monica, extensively, and in the play he explores the changing shape of marriage in his portrayal of their relationship.

While Williamson has always been interested in the relationship between men and women, his recent plays have more directly focused on the specific concerns of women and feminism.

He said women's issues were "the central intellectual issue of our times, so if you don't address them you are missing one of the strongest ideologies and thought strands of our times".

However, he did not believe "excessive ideologies" such as radical feminism and multiculturalism were beyond "a mild satirical dig".

"The ritual denigration of the Anglo-Celtic has become a bit wearisome. If we really do mean that we are all equal, we don't keep kicking any Anglo-Celtic head that appears, as seems fashionable at the moment."

While Williamson was fascinated with the ideologies of the moment, he rejected the view that his plays only address contemporary issues, those that are topical only in the time they were written.

"My work has been satirical, but it has also touched on those human frailties, the egocentricity, jealousy and anger, but also the love and the warmth. Any writer who taps into those timeless, emotional responses to life, if they've done it well and perceptively, will last. I hope my work lasts too."

BY GEORGIE ALLEN

Gender inequality: the saga continues

Women today have access to a wider range of occupations than a decade ago, but men remain ahead in salaries and continue to dominate the full-time, higher status and more powerful jobs, according to a new book on women in the workforce.

The co-editor of *Women in a Restructuring Australia: Work and Welfare*, Professor Anne Edwards, said the formal barriers facing women entering all sectors of the workforce had been removed, partly through the introduction of antidiscrimination legislation.

Professor Edwards worked on the project while professor of sociology at Monash University, in collaboration with Associate Professor Susan Magarey, director of the Centre for Women's Studies at the University of Adelaide.

"In the 1990s, all jobs are available to women and there has been an increase in the number of women entering traditionally male occupations," she said.

"However, in terms of comparing the 'rewards for work', such as wages and salaries, women remain over-represented in the jobs with lower incomes.

"And in fact, under the shift to enterprise bargaining, the gap in wages and salaries has increased."

The book, which contains reports by Australia's leading feminist researchers, studies the relationship between women, the workforce and welfare over the past 20 years. In particular, it looks at the impact of economic and labour market restructuring on the position of women since the 1970s, when increasing numbers of women began moving into the workforce.

During this period, a whole new range of jobs within the part-time and service sectors opened up more opportunities for women to work.

Professor Edwards, who is now deputy vice-chancellor of South Australia's Flinders University, believed that restructuring had produced both positive and negative changes for women in the labour market.

Professor Anne Edwards believes women continue to be disadvantaged in the workplace.

On the positive side, not only were there more women in the workforce, but they had also gained greater choice in their employment options.

"But one of the most discouraging findings is that in the last five years, even though the number of women in paid work is higher, the division of domestic labour remains unchanged," she said.

"In the home, women are still performing much the same level of work as in the past. In a sense they are carrying a double workload and they are not getting adequate compensation in terms of assistance from their male partners to share domestic responsibilities."

The book argues that despite the removal of the 'formal' barriers to work, gender, to a large extent, still determines occupation – women's employment prospects and career advancement are still restricted by cultural, economic and social barriers including those such as language, resources and access to transport.

Professor Edwards said the numbers of women in the part-time workforce had remained high, partly because part-time work had enabled many women to fulfil the dual roles of primary caregivers and workers, but partly because of changes in the composition of the workforce and other economic factors.

The research shows that women move in and out of part-time work at different stages in their lives. As well, women with dependent children have remained reliant on welfare and pensions over the past two decades – many women made a conscious decision to remain at home, rather than work in low-paying jobs which barely covered childcare costs – while only a small minority of men are in this situation.

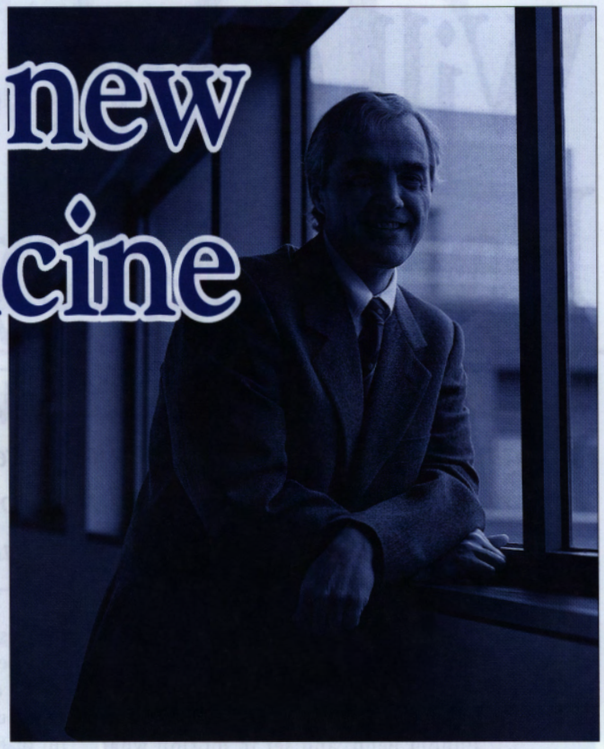
Professor Edwards said that because of the complexity of the restructured workplace, simple comparisons along gender lines could no longer be made: "In the 1970s there were some gross differences and dominant patterns, but the whole picture has now become far more complicated."

According to Professor Edwards, the 1990s have seen differentiation and some polarisation of particular categories of women within particular occupational sectors along the lines of race and ethnicity, educational background, family circumstances and geographical location. "We now need to identify which groups of women are experiencing disadvantage."

BY BRENDA HARKNESS

Women in a Restructuring Australia: Work and Welfare *was produced as a result of a 1992 conference on women in the labour market. Aimed at both academics and public policy makers, the book provides a research basis on which to assess the position of women since the 1970s. It is published by Allen and Unwin, in association with the Academy of Social Sciences in Australia. RRP $29.95*

Delivering a new style of medicine



International expert in maternal and foetal medicine Professor Robert Burrows has been appointed head of Monash University's Department of Obstetrics and Gynaecology.

Professor Burrows plans to develop a new area of medicine within the department, which has been at the forefront of reproductive technology since it was established by IVF pioneer Carl Wood more than 30 years ago.

Evidence-based medicine, not widely practised in Australia, challenges traditional medical practice and encourages doctors to re-evaluate scientific evidence when developing patient management programs.

Professor Burrows became involved in evidence-based medicine while at McMaster University, in his native Canada.

One of his most notable studies found that caesarean deliveries were an unnecessarily aggressive procedure for women affected by the common medical condition maternal thrombocytopenia, in which their blood platelet counts were deficient.

"In the early 1990s, it was considered too risky for these women to have natural births, based on the assumption that they or the foetus would haemorrhage," Professor Burrows said.

"And while it had been widely accepted that there was a high foetus mortality rate in women with the deficiency, our research found that the risk associated with natural delivery was lower, and in fact so low that these women should have given birth naturally."

As a healthcare model, evidence-based medicine emphasises prevention through patient management programs that are scientifically based and supported by evidence.

Professor Burrows plans to develop the principles of evidence-based medicine at Monash by initiating reviews of current clinical practice in obstetrics and gynaecology. He expects the projects will be led by Monash but will also include collaborative research partnerships with other healthcare and medical teaching facilities.

"Evidence-based medicine involves reviewing existing practices and treatments and matching programs with patients' needs," he said. "It is about exploring all possibilities rather than merely relying on convention.

"The model recognises that the traditional treatment-based approach can sometimes result in wrong conclusions, lead to duplication and possible detrimental treatment and cause excessive expenditure."

Professor Burrows' obstetrics research has been guided by the belief "that a child has a better chance of a healthy start in life when the mother is reasonably well cared for during pregnancy".

His appreciation of the benefits of preventive medicine emerged early in his 26-year medical career.

After graduating from the University of West Ontario in London, Ontario, in 1970, he practised family medicine for six years before travelling under a university volunteer service scheme to Tanzania, Africa.

"At the time, Tanzania was in the depths of poverty, undergoing major political, social and economic upheaval," Professor Burrows said.

The official infant mortality rate was then estimated to be 125 deaths per 1000 births. A range of mostly preventable medical conditions, such as malnutrition and infectious disease, were responsible for a large proportion of the deaths.

Professor Burrows said that from his own experience, he felt that the death toll was probably much greater than the official data indicated.

On his return to Canada two years later, he left paediatrics to specialise in obstetrics, completing a four-year fellowship in obstetrics at Dalhousie University, Halifax, Nova Scotia.

Over the next 10 years, Professor Burrows held several senior positions in research, education and administration at McMaster University, Hamilton, Ontario.

He also served for two years as a volunteer medical practitioner specialising in obstetrics, on the Pacific Island of Vanuatu.

Professor Burrows believed that one of the major challenges facing obstetricians in the 1990s was the tendency for women to delay the birth of their first child until their mid-to-late 30s.

He said the trend had increased the need for preventive clinical care to reduce health risks before and during pregnancy.

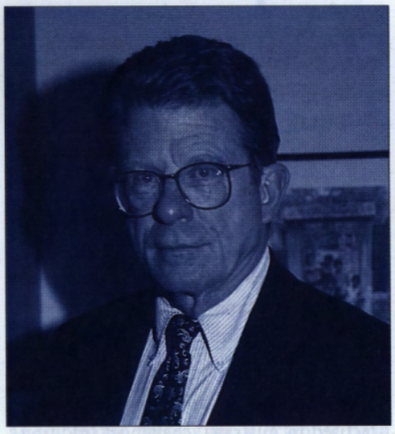
Professor Burrows said that as women aged, they were at greater risk of being affected by degenerative conditions such as hypertension (blood pressure), diabetes, kidney disease and lupus.

"With the trend towards delaying childbirth, women are now mixing and matching a combination of health risks, which will make the role of maternal and foetal medicine increasingly important in patient care and management."

BY BRENDA HARKNESS

Will Cambodia put Pol Pot's legacy to rest?

Monash University's Professor David Chandler is an international expert on Pol Pot and his brutal regime in Cambodia. As rumours circulate about Pol Pot's long-awaited death, Professor Chandler reviews the infamous dictator's life.



In April 1975, a soft-spoken, smooth-faced teacher using the name 'Pol Pot' surprised the world when his ragged troops marched into Cambodia's capital, Phnom Penh, and set in motion what became the most radical revolution in the 20th century.

Pol Pot believed that Cambodia's empowered peasants could make their country mighty and prosperous. Imitating China, he called what he was doing a 'Great Leap Forward'.

By 1979, when his regime was overthrown, nearly two million people had died of exhaustion, malnutrition or by execution. As his Utopian schemes collapsed, Pol Pot blamed his followers. Between 1976 and 1979, thousands of party members were put to death.

Pol Pot also launched a series of military offences against the Vietnamese, whom he suspected of seeking to take over Cambodia. In December 1978, a Vietnamese invasion drove Pol Pot and the Khmer Rouge from power.

Who is Pol Pot? He was born 68 (or perhaps 71) years ago as Saloth Sar, into a prosperous Cambodian peasant family. He was educated in French-language schools. A friendly, out-going adolescent, he struck his companions as intellectually mediocre.

In 1949, Pol Pot went to Paris to study radio technology. He did little work, never gained a degree, and in 1952 joined the French Communist Party, following the lead of several Cambodian friends.

Returning to Phnom Penh, he taught history and French in a private school. He was a popular, inspiring teacher, and led a second life as a member of Cambodia's clandestine Communist Party. Saloth Sar became its general secretary in 1962 and soon afterwards, fearful of Prince Sihanouk's police, took refuge with a handful of followers in the forests of eastern Cambodia. For the next seven years, against overwhelming odds, he moved from camp to camp, and dreamed of seizing power.

His chances improved in 1970 when Sihanouk was overthrown in a pro-American coup. Allied now with the Vietnamese Communists, who armed and trained them, the Khmer Rouge fought and won a ruinous civil war. As their commander, Pol Pot mounted a series of offences against Phnom Penh. The third of these, in 1975, was a success.

Soon afterwards, he ordered all towns emptied of their populations. His objective was to replace the corrupt society of the cities with a supposedly purer rural culture. Almost two million people were driven into the countryside to take up agricultural work. Thousands of them died en route.

The rest of his program was just as drastic. Money, markets, private property and religions were banned. The hidden Communist Party called itself the 'organisation' and demanded unquestioning obedience. Pol Pot himself remained hidden from view in a fortified villa behind the abandoned royal palace.

Driven from power by the Vietnamese, Pol Pot and thousands of his followers found shelter along the Thai-Cambodian border in camps constructed for them by the Thai authorities, who, like him, were fearful of Vietnam. As the monstrous reality of the Khmer Rouge era became clear, Pol Pot enjoyed the protection of his Bangkok allies and his patrons in Beijing, eluding punishment for his crimes against humanity.

Throughout the 1980s, Khmer Rouge guerillas posed a threat to the Vietnamese-installed regime in Phnom Penh. After the Vietnamese withdrawl, Pol Pot's followers seeped into the inhospitable fringes of Cambodia and established fiefdoms there. After the UNTAC period (1992–1993), however, the movement faltered, and thousands of its members defected to the coalition government.

Almost nothing is known about Pol Pot's day-to-day existence during these years. His first wife was a fellow Communist who taught with him in the 1950s. She underwent psychiatric treatment in China in the Khmer Rouge era, and in the early 1980s Pol Pot married again and became a father for the first time. He lived in a series of heavily guarded camps, granted no interviews and was seldom seen in public.

It was reported that he suffered frequent bouts of malaria and received medical attention in Bangkok and Beijing. In May 1996, he was said to be seriously ill and in early July it was rumoured that he was dead. The unconfirmed reports were greeted by survivors of his regime with feelings of relief. For hundreds and thousands of Cambodians whose lives had been scarred by Pol Pot's years in power, his departure from the scene, if it has occurred, was overdue.