

MONTAGE

NEWS FROM THE CAMPUSES OF MONASH UNIVERSITY

Volume 2 Issue 2

11 March 1991

RESEARCH

M O N A S H

LIFTOUT INSIDE

Health care for disabled moved to community clinics

A specialised health unit for people with intellectual disabilities – the first of its kind in Australia – is to be set up at Monash University.

Funding for the unit, will be provided by the state government as part of a unique medical services agreement.

Under the agreement, funds now used to employ medical officers in institutions, will be redirected to the departments of community medicine at Monash and Melbourne universities to help develop expertise in medical practice for the intellectually disabled, as well as to undertake research and education.

Over three years about \$750,000 will be made available. The agreement was signed last week by the Minister for Community Services, Ms Kay Setches, the Deputy Dean of the Faculty of Medicine, Professor Dennis Lowther, and Head of the Department of Community Medicine, Professor Neil Carson.

The first step will be appointing a senior lecturer in intellectual disability at the Moorabbin branch of Monash's Department of Community Medicine. The hospital-university units will have positions for additional senior lecturers and postgraduate students.

According to Ms Setches, the agreement will ensure that those people with an intellectual disability, who live in institutions, will have access to the same medical services available to the general community.

In addition, intellectually disabled people living in the community would be able to consult doctors with expertise on their medical needs.

"If we are really serious about integration, and about people with an intellectual disability having the

same rights as other Victorians, then we have to ensure that their medical services are also of the same standard," Ms Setches said.

"The direct employment of medical officers in training centres will be phased out over three years, and residents of institutions will use general practitioners based in the community.

"There have been no doctors based in the community with special expertise in health matters for adults with intellectual disabilities. Consequently, access to quality medical services for these people has been limited."

The head of the Department of Community Medicine, Professor Neil Carson, said the new unit would provide health care for the intellectually disabled "in a very broad way".

"We propose to set up a consultancy service for general practitioners and the families of these patients, and to develop the special skills needed to care for them in the community," he said.

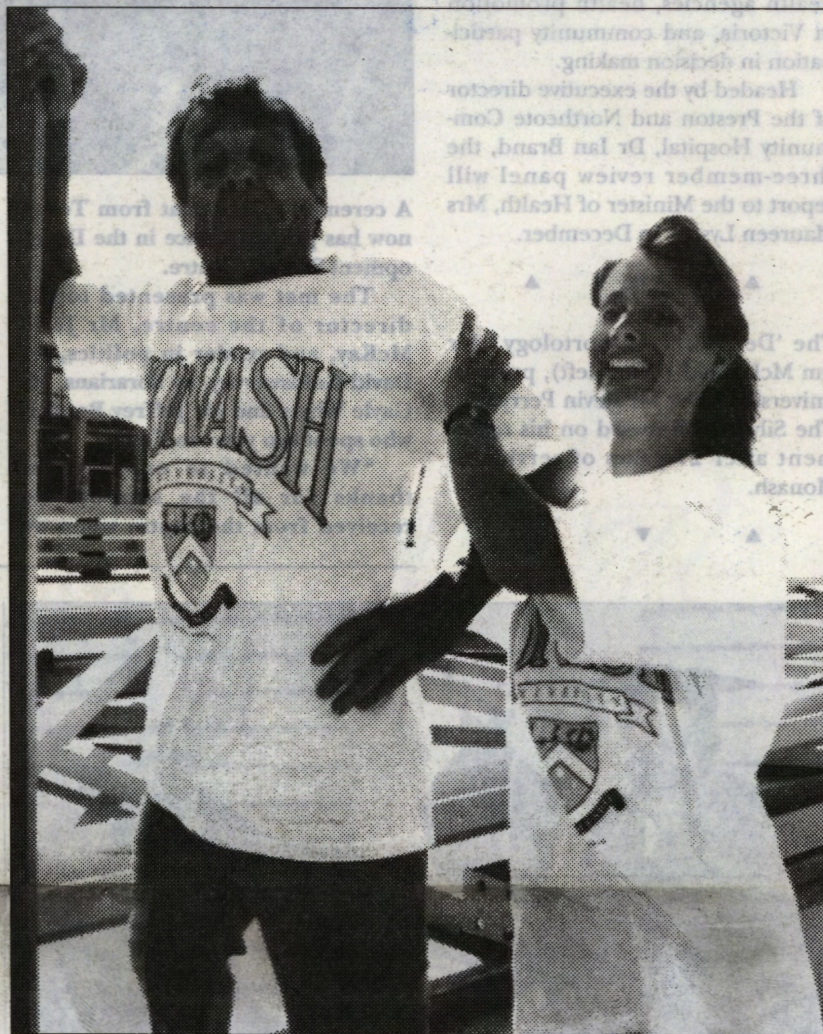
"A major problem will be dealing with health problems with psychosocial overtones, such as family difficulties."

The department's educational role would be to heighten the awareness of GPs and undergraduates about the health problems of people with intellectual disabilities, as well as to improve community awareness.

Research would identify existing inequalities and particular problems of the intellectually disabled, and perhaps look at ways in which medical education needs to be modified to take these into account.

INSIDE RESEARCH

- 1 The greening of agrochemicals
- 2 Putting friendly bugs in the system
- 3 Reaching towards a robot reality
- 4 Getting teeth into animal design



Showing off the new Monash apparel are the Dean of Engineering, Professor Peter Darvall, and Mrs Karin Yeoman, of Materials Engineering.

PICTURE: RICHARD CROMPTON

Monash shirts suit every body to a T

A new range of Monash University T-shirts is now on sale – and selling briskly. The first batch of 200 T-shirts has almost sold out but new stock is on the way.

In the style of US college clothing, the Monash T-shirt is available in grey or white, with the design in blue and pale blue, or red and yellow. Sizes are medium, large and extra large.

The T-shirts are on sale at the Union shop, ground floor, Union building for \$20.

A range of hooded T-shirts is expected to be available in April.



INSIDE

3 Computer graphics boost

Perfectionists wanted!

4 Treating PMS holistically

Mansion accommodation

5 Staff advance Australia

The balance of care

6 Notes and diary

7 Poster art makes its mark

Jazz arrives on campus

8 Savant: Brian Powell

Diogenes: Hidden agenda

Left, Australia for Sunshine and Romance, a 1936 colour lithograph by James Northfield, one of the exhibits in Trading Places, at the Monash University Gallery.

AROUND THE CAMPI

CLAYTON

Executive director of the Public Sector Management Institute, Professor Bill Russell, has been appointed to a State Government panel which is to review the efficiency of the public health system.

It will investigate the administration of the public health system with particular emphasis on duplication of services, existing networks of community care, the accountability of health agencies, health promotion in Victoria, and community participation in decision making.

Headed by the executive director of the Preston and Northcote Community Hospital, Dr Ian Brand, the three-member review panel will report to the Minister of Health, Mrs Maureen Lyster, in December.

The 'Dean of Transportology,' Mr Jim McDonald (below left), presents university driver Mr Kevin Perry with The Silver Hub Award on his retirement after 27 years of service to Monash.



A ceremonial tapa mat from Tonga now has pride of place in the Development Studies Centre.

The mat was presented to the director of the centre, Mr John McKay, and reader in politics, Dr David Goldsworthy, by librarians, Ms Gayle Whyte and Mr Jeffrey Bender, who spent two years in Tonga.

"We wanted to express our thanks for all the support we received from the centre when we

decided to join the Australian Volunteers Abroad Program," Ms Whyte said.

Tapa cloth is made from the bark of the paper mulberry. The mats are used at weddings, funerals, royal occasions and are given as ceremonial gifts.

Pictured with the mat (from left) are Mr Bender, Mr McKay, Miss Vi Finau, Miss Sela Cunningham and Ms Whyte.

Second year medical student Ms Sophie Morris (pictured below) has added the Brighton Council's Australia Day Young Citizen Award to her recent sporting achievements.

Ms Morris, 18, was nominated by Firbank Anglican School, where she was a prefect and member of the debating team, for her scholastic and sporting efforts.

She has been involved in sailing since the age of six, and has been a member of the Royal Brighton Yacht Club for eight years.

In January last year she won the Australian 420 Women's Championship.

She later competed in the international 420 competition in Japan, finishing in the middle of the field.

The Royal Brighton Yacht Club has named her its Yachtsman of the Year.

This year she hopes to sail Olympic-size 470 boats while continuing her medical studies.



CAULFIELD

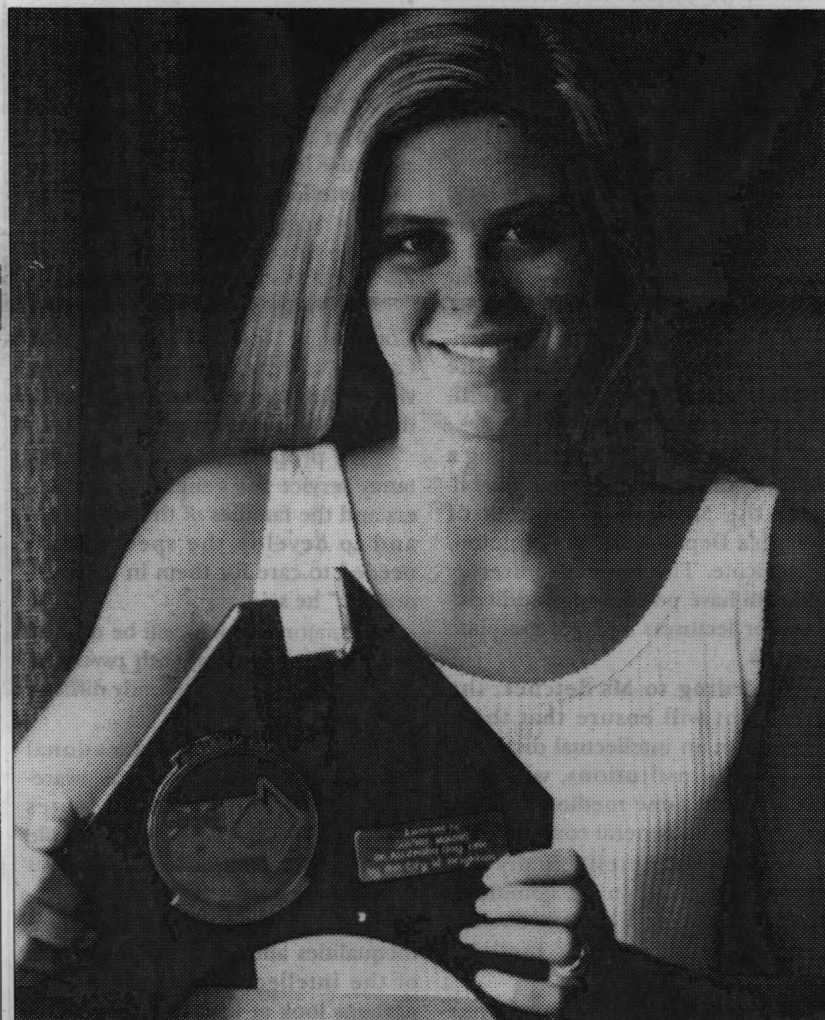
Professor Ramez Elmasri of the University of Texas, Arlington, conducted a seminar on database design at Caulfield campus last month.

Professor Elmasri is involved in research into temporal databases and improving database design. He is the author of a database textbook used by more than 130 universities in the US.

The seminar was organised by the database special interest group,

through the Department of Computer Technology, and the Pearcey Centre for Computing.

Pictured (below, from left) are head of the Department of Computer Technology, Professor Phillip Steele, Executive Director of the Pearcey Centre for Computing, Mrs Pearl Levin, Professor Elmasri, and lecturer in computer technology, Mr Noel Craske.



Research fellow, Ms Ann Capling, of the Public Sector Management Institute, is a joint winner of the Canadian Airlines International Canadian Studies Award for 1990.

Ms Capling, who is also attached to the Federalism Research Centre at the Australian National University in Canberra, will undertake two research projects: 'Beyond the protective state: National policy-making in Canada and Australia' and 'The organisation and financing of the progressive conservative party of Canada between 1920 and 1960'.

The Canadian Airlines International Awards promote links between Australian and Canadian academics.

MONTAGE

Montage is published by the Public Affairs Office, first floor, Gallery Building, Monash University, Wellington Road, Clayton 3168.

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Phone: (03) 565 2085 Fax: (03) 565 2097

Produced on Macintosh desktop publishing equipment by Monash University Publishing and Advertising, room A1.26D, Caulfield campus. Text is set in New Baskerville 9pt. Imagesetting by Pageset, 4 Palmer Court, Mount Waverley.

Printed by Syme Media (inc. in Victoria) 142-144 Frankston-Dandenong Road, Dandenong 3175.

Registered by Australia Post: Publication no. VBGO435.



Computer graphics research, teaching boosted

Monash's international reputation in state-of-the-art computer imaging techniques has been recognised by the formation of a new centre for teaching, research and industry consultation.

A grant of almost \$1 million from the Victorian Education Foundation this year launched the Victorian Centre for Image Processing and Graphics (CIPAG).

The centre, staffed by six academics from the Department of Computer Science, will provide educational, consultative and research opportunities for Victorian industry in all areas of computer imaging.

It aims to improve the quality and extent of liaison between tertiary education and industry in Victoria on several fronts including providing advice on specific problems, evaluation of equipment and products, and a referral service.

A teaching laboratory with 15 Silicon Graphics work stations has been set up and a second laboratory will

be commissioned by next year. The existing computer imaging research laboratory, established by the department in 1986, will be used for research projects.

This year CIPAG will provide short courses for industry in computer-aided design and digital image processing. This is in addition to the undergraduate degree curriculum.

Postgraduate research degrees will be supervised by the centre in conjunction with industry, and postgraduate coursework qualifications will be introduced soon.

Research projects already under way include fast shading techniques for three-dimensional objects, fast animation algorithms, automated analysis of shape and texture and parallel image processing algorithms.

Results from this research already have been used in remote sensing, biomedical imaging and scientific visualisation.

A successful joint research project has been investigating an innovative way to reduce the amount memory space needed for storing digital computer images.

Storage space is an important issue in computer imaging because of the widespread use of large amounts of data such as high-definition pictures, complex technical drawings, multi-dimensional images and video sequences.

The new technique, known as context coding, is able to compress typical images to occupy less than two-thirds of the space that previous techniques achieved.

The leader of the four-person research team, Dr Peter Tischer, said user expectations and the demand

for improved picture quality were increasing.

In many imaging applications, such as technical drawings and document preparation, very little image degradation could be tolerated, he said.

Dr Tischer said plans were under way to refine the technique to suit other applications such as the storage of three-dimensional satellite, medical and seismic images and to cater for the compression of TV transmissions.

"It is also seen as a good prospect for compact disk read only memory (CD-ROM) image storage, for which effective standards are not very well developed," he said.

"Our algorithm is very simple but involves massive amounts of computational work. As little as five years ago it would have been considered impractical."



Introducing Buckley's 44, possibly the world's only mobile jazz group. One of the O-Week attractions at the Clayton campus, the sextet on wheels played on the move and at several stationary locations in the Forum. PICTURE: BRIAN CARR

Theatre manager honoured by peers

Manager of the Alexander Theatre, Mr Phil A'Vard, has been recognised by his peers for outstanding service to the theatre.

He was presented with a Green Room Award at a reception at the Victorian Arts Centre late last month. The annual awards for achievement in the theatrical arts are voted for by members of the Victorian theatre industry.

Mr A'Vard, manager of the theatre for the past 22 years, said his achievements had been possible because of the vibrant, outgoing attitude of the university.

When appointed in 1968, his only directive was that the theatre should become a part of its surrounding community.

"The theatre's reputation has evolved by presenting high-quality theatre and having a dedicated staff and loyal audience," he said.

"We have created an audience for the theatre amongst adults and children. I feel that my most important contribution to the theatre industry is in developing the audiences of tomorrow."

In the early 1970s he established the Saturday Club, an annual theatre series designed to introduce children to live theatre. The first subscription series of professional theatre for adults was introduced in 1989. The Alexander Theatre is recognised as the centre of amateur the-

atre in Melbourne, giving local companies access to resources not available elsewhere.

Mr A'Vard's next goal is to develop the George Jenkins Theatre, Frankston campus, in a similar way. He also hopes to consolidate professional theatre at the Alexander Theatre.

Ms Irene Mitchell MBE, a previous recipient of a Lifetime Achievement Green Room Award, presents Mr Phil A'Vard with his medallion.



Staff sought for career development

Wanted: 20 perfectionists to improve career prospects part-time.

The Director of the Higher Education Advisory & Research Unit (HEARU), Professor Terry Hore, is seeking highly motivated academic staff to take part in Monash's new professional development program.

"The people enrolling in the program are some of our best and brightest. They are enthusiastic and keen, with a commitment to excellence," Professor Hore said.

He said the \$220,000 pilot program, funded by the Federal Government, would enhance Monash's teaching and research reputation.

The two-and-a-half day a week course over five months covers all aspects of research, teaching and administration.

Subjects include curriculum design and evaluation, staff appraisal, research design, analysis and administration and graduate student supervision.

As well as course material, each participant will prepare a research proposal, redesign a course of lectures, tutorials or laboratory exercise and make a presentation to a school or community group.

"This program is demanding," Professor Hore said. "Participants need to be able to commit themselves to the program, and we'll be covering the cost of replacement staff in their workplace."

"However, it is also important for the participants to stay in touch with their normal responsibilities."

That way, they can apply the techniques they learn during the program. We want the course to be interactive and relevant to their daily duties."

The program is open to staff from all faculties, departments and schools on all campuses. The course begins in July and applications close on 31 March. For more information, contact Professor Hore on 75 3269.



Inside Frank Tate House.

Students move back to the 19th century

A 19th century mansion will be home to 80 Caulfield campus students this year.

Monash University is buying the historic Frank Tate House from the Ministry of Education as a hall of residence. The mansion, on Dandenong Road, Armadale, only a few minutes from the Caulfield campus by train or tram, is set in a large garden with a rose-lined driveway.

It retains many of its original features such as elaborate leadlight windows decorated with bird motifs, a carved wooden staircase, and marble fire surrounds in most main rooms. The 4500 square metre residence has 41 bedrooms and 25 bathrooms.

Commercial Manager, Mr Peter Cunliffe, said the new property was one of best pieces of residential real estate in Melbourne. The university is renting the property on a purchase lease arrangement while the final purchase price is settled.

Resident Manager, Ms Jenni Simmonds, said the first students would move in this week.

The main part of the mansion was built for the Hon. William Winter-Irving, MLC, during the 1870s as a city residence. Mr Winter-Irving named the house 'Noorilum' after

his country property on the Goulburn River.

The west wing was originally a ballroom, complete with an annexe for the orchestra. The east wing was added in the 1930s when the property became the Rio Grande guest-house.

The Ministry bought the property in 1949 for student accommodation. It was renamed Frank Tate House for the first director of education in Victoria, who served from 1902-1928.

Today, the mansion has heated and furnished rooms accommodating up to four residents. Meals will be served in the stately dining room. Other facilities include a quiet study room, television room, reading room, coin-operated laundry, pay telephones, and three pianos. Parking is available at the rear of the property.

International, interstate and country students studying at the Caulfield campus are eligible to stay at the new residence.

Room rates are from \$90 a week, including breakfast and dinner from Monday to Friday.

The residence is also available as a conference venue.



A front view of the new student accommodation.

PMS: treating the person and the symptoms

A sensible diet, daily exercise and reducing stress levels are part of the new holistic approach to treating Premenstrual Syndrome (PMS).

"The approach to PMS in the 1990s recognises that PMS is the result of the complex interaction of hormone changes in the menstrual cycle, the unique personality of the individual woman, and her past and current lifestyle and experiences," Professor William "Bud" Keye, a visiting US PMS authority said.

However, he said that dealing with the emotional aspects of PMS was more difficult than treating the physical symptoms.

Professor Keye, who was in Australia last month as part of Monash Medical Centre's visiting professor program, was speaking on 'PMS you just have to put up with it - or do you?', at an evening session organised by the university's Centre for Reproductive Biology.

A respected obstetrician and gynaecologist, Professor Keye is head of the Division of Reproductive Endocrinology at the William Beaumont Hospital in Michigan. He is known for his research and publications on the emotional and psychological effects of infertility, menopause and PMS.

Inspired by an overwhelming response to an article on PMS symptoms, written by a journalist friend for an American women's magazine, Professor Keye decided on a career in PMS research.

In his address Professor Keye dispelled notions that PMS is a myth, or an excuse for unacceptable behaviour. He urged women to "manage the problem, not be victimised by it."

Holistic approach

He promotes a holistic approach to managing PMS, and believes more rigorous therapies should be considered only if symptoms interfere with the quality of life.

His patients compile a chart of symptoms and dates, which must be kept for several months, to establish a correlation between menstruation and the symptoms.

PMS is characterised by symptoms ranging from mood swings, irritability, bloating and water retention,

fatigue, poor coordination, headaches and binge eating, through to loss of libido. It is estimated that as many as 15 per cent of women are affected by PMS.

Although the cause is unknown, higher levels of progesterone are known to be present during the part of the menstrual cycle when PMS occurs. Professor Keye stressed the importance of a correct diagnosis, because PMS symptoms can be similar to thyroid problems, lupus and Parkinson's disease.

He outlined common therapies including changes in diet and increased exercise levels as well as the use of vitamin B6, diuretics, oral contraceptives, several prescription drugs, progesterone therapy, self-help skills, and oil of evening primrose.

Professor Keye cautioned against mega vitamin therapy, adding that in large doses the use of vitamin B6 may cause neurological syndrome, or multiple sclerosis.

Aerobic activity

In his studies he has noted that 30 minutes or more of aerobic activity a day has had dramatic results in treating PMS. Whether the change occurs because exercise functions as a distraction, or because it changes body chemistry is unknown.

Dietary changes, such as reduction of salt, sugar, red meat and or caffeine may help in varying degrees. Professor Keye stressed that effects varied with each person, and that there was no "sure-fire cure" through dietary means. He also cautioned against fasting, stating that it may aggravate PMS symptoms.

Oil of evening primrose, a herbal cure for PMS, is rapidly gaining popularity. In tests it has been shown to be more beneficial than a placebo.

Progesterone therapy, widely used in Great Britain for treating PMS, is not available in Australia, although research is being conducted by the Monash Medical Centre in this area. In some instances, progesterone therapy had proven to be a successful treatment.

Preserving history

What makes a building historic? Graeme Davison, Professor of History, explains the how and why of preserving historic buildings in his latest book, *A Heritage Handbook*.

According to Professor Davison, joint editor of the book, many people are interested in preserving historic buildings or wish to understand the history of their own towns or suburbs, but are baffled by the technical language and legal complexities.

A Heritage Handbook is a guide to heritage issues in Australia. It explains how the idea of "heritage" developed and outlines the recent

history of the Australia heritage movement. The book also provides a comprehensive review of recent heritage legislation in each state and the Commonwealth and shows, through a series of case studies, how some major heritage issues have been contested and resolved.

The handbook also provides guidelines for researching the history of your own home, interpreting a historic site, determining the historic value of a building and presenting a case to a local planning authority. Historic terminology is explained.

The 274-page book, published by Allen & Unwin, costs \$19.95 in paperback.

RESEARCH

MONASH

Supplement to *Montage* Volume 1 Issue 2

11 March 1991

The greening of agrochemicals

Concern is growing about the effects of agricultural chemicals on the environment and in food. Dr Gottfried Lichti is developing a new generation of environmentally benign chemicals.

By the mid 1990s, some 90 per cent of the agrochemicals in use today will be out of patent. Companies will be at liberty to take the basic compounds and develop new formulations for the market. Given increasing concern about the impact of agrochemicals on the environment, the emphasis will be on developing more environmentally benign versions of today's compounds.

The ideal agrochemical is one that can be applied at the lowest possible concentration, remains where it is needed for as long as it is needed, leaves little or no residues once it has done its job, and is easily handled by farmers with minimum risk to their own health.

Chemist Dr Gottfried Lichti, who heads Monash University's new Controlled Release Sciences Group, believes Australia can develop a lucrative new agrochemical industry, based on controlled-release formulations developed by his research group. The chemicals will be bound to organic materials chosen for being cheap and readily available, and which will decompose naturally when the chemicals they carry have been exhausted.

Dr Lichti, who is employed by Daratech, the commercial arm of Victoria's Department of Agriculture and Rural Affairs, says the most profitable products will be those that are used in bulk, such as herbicides, insecticides and fungicides. The challenge is to develop new formulations that will offer significant advantages over their predecessors, but without significantly increasing costs to the farmer.

He says the active substance does not have to be a chemical – it could be a protein, an insect pheromone, or an intact microbe such as an insect-killing bacterium or fungus.

"The problem is how to improve the active ingredient's activity using

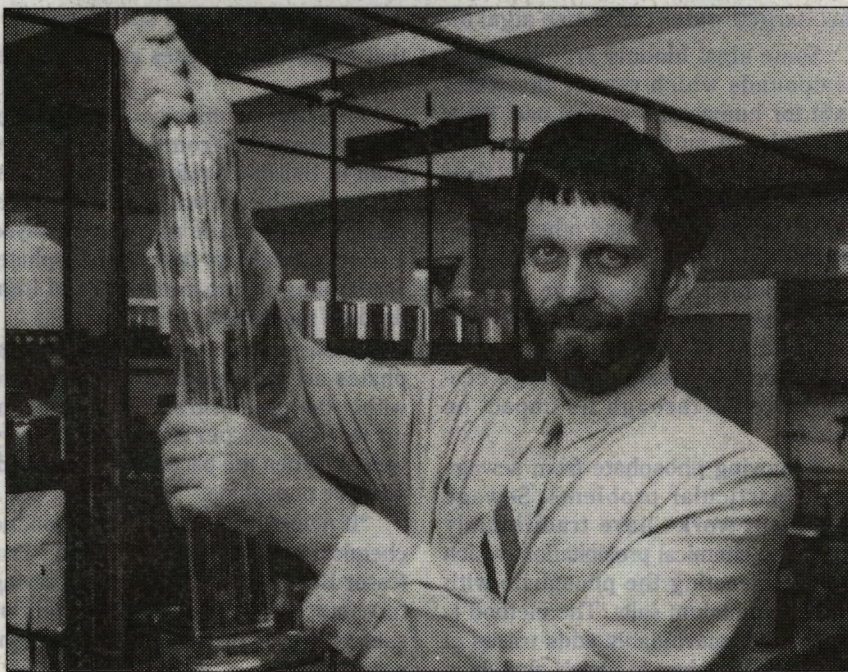
controlled-release technology," Dr Lichti says. "Whereas the basic principle remains the same, that is, to enclose the active ingredient in a skin, membrane or matrix, the next step must be very specific to the structure and behaviour of the ingredient, and the type of problem you are attempting to solve.

"If you have a volatile herbicide, for example, the strategy for making a less volatile controlled-release product is totally different to the approach you would use for a herbicide whose weakness is that it leaches into ground water.

"An insecticide may be applied to the leaves of a crop, so the aim is to develop something that is rain-fast. Rain-fastness may be a total non-issue with pre-emergent herbicides, where you may want it to rain so that the herbicide is incorporated in the soil.

"The science, the skill and the art enter here, because not only do we have to surround the active ingredient with the right material, but for any broad-acre agriculture application, we have to meet stringent cost-benefit criteria.

"If you are developing a human medicine, it may be that you can spend \$100 on a controlled release version of some active pharmaceutical. But in agriculture, where the typical price of a pesticide or herbicide is \$10 per kilogram, there is no point in having a con-



Dr Gottfried Lichti.

trolled-release version at \$20 per kilo, even if it is superior.

"This places severe restrictions on the technology. One of the strengths of our group is that we have worked within this constraint, using only those substances that meet this criterion. We are exploring natural organic materials that break down naturally in the environment. It's a bottom-up approach."

Dr Lichti has already developed a slow-release version of the herbicide Trifluralin, which came out of patent 12 years ago. Daratech has signed a commercial agreement with the Melbourne-based agrochemical company Nufarm, which is preparing to manufacture and market the new formulation later this year.

Trifluralin in its existing formulation has world sales of \$200 million a year, and Dr Lichti says even if Australia captures a fairly small section of that market, there will be good financial returns.

"Not only do we stand to get into this market for royalties, it will be an Australasian company that is involved in the manufacture, export and downstream activities," he says.

Dr Lichti, drawing upon the expertise in organic chemistry available at Monash, has been working on the controlled-release form of Trifluralin for the past three years. That period includes a mandatory two years of field-testing to assess the environmental residues left by the new formulation.

The trials, conducted by the Victorian Department of Agriculture at a number of sites around Victoria, culminated in successful tests last year of a five-tonne batch of a new Trifluralin formulation in all mainland states.

Trifluralin exemplifies the custom-design approach that will be required to make successful slow-release formulations for the diverse range of agrochemicals in use today. Given that each chemical is unique, and must perform a particular role under a range of environmental conditions, it is likely that specialised carrier media will have to be developed for each chemical, rather than any generic formulation.

Trifluralin is a pre-emergent herbicide, that is applied to the soil before the crop germinates in order to kill weeds. It is very effective, but not always easy to apply. Over-application leaves residues that can depress the growth and yield of crops such as wheat and rapeseed.

In its existing liquid formulation, the spray tends to stick to stubble. With the increasing popularity of minimal-tillage techniques, where the stubble is left standing after harvest, much of the herbicide may stick to the stubble before it can reach the soil, and control weed infestation.

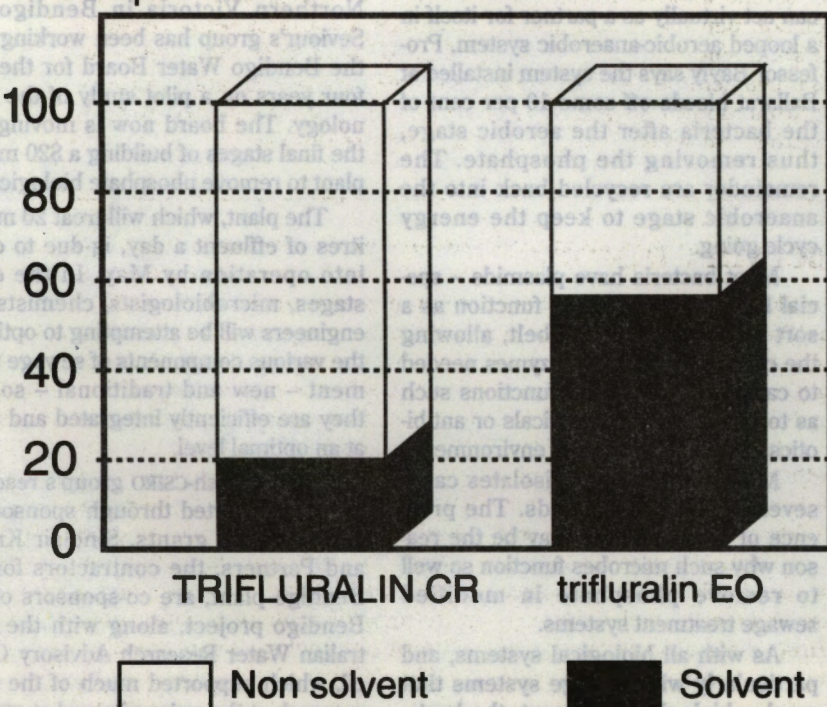
The current Trifluralin formulation employs a volatile hydrocarbon solvent that escapes into the atmosphere and contributes to the greenhouse effect. Dr Lichti describes the total solvent discharge to the atmosphere worldwide as "frightening". The cans in which the concentrate is sold can create a waste-disposal problem on farms using large quantities.

Trifluralin formulations under development in Dr Lichti's laboratories do not cling to stubble and are significantly more potent – less is needed to achieve the same result. The formulations will be less volatile, and will not require incorporation in the soil by tillage, which will help protect Australia's erosion-prone soils. The amount of volatile organic solvent used already has been reduced by half, and future formulations will contain significantly less.

Dr Lichti believes Trifluralin can be coformulated with other herbicides in controlled-release form, to provide broad-spectrum control of mixed weed communities in which some species may be resistant to one herbicide, but susceptible to another.

He believes there are many other opportunities for developing slow-release formulations for pesticides, fungicides and herbicides. The key concept is to deliver the chemical in a form where the active ingredient remains very close to the target site, and persists in its activity without polluting the environment or killing other organisms.

% Composition/Ha



Trifluralin CR contains less solvent than the old formulation.

Putting friendly bugs in the system

An ecological chain reaction can be set off by the nutrients in sewage waste water. A Monash research group has been working on a system to remove phosphates from sewage biologically.

In the driest inhabited continent, water is a precious and sometimes scarce commodity. Disposing of waste water from sewage treatment plants can be a problem, particularly in country centres where residual nutrients in the discharged water can cause algal blooms in rivers, lakes and streams.

Some algal blooms produce toxic compounds which render the water unfit for human and animal use. After they exhaust nutrients, the algae die, and if the growth has been prolific, their decomposition removes oxygen from the water, killing fish and other aquatic organisms.

In addition, the discharge of nutrients, such as phosphate and nitrates, into bodies of water may result in eutrophication, leading to large economic losses through its impact on tourism.

Removing phosphate from sewage poses particular problems. Sewage treatment works have traditionally employed chemical precipitation, which involves reacting the phosphate with iron or aluminium salts. The method is costly, and unavoidably adds traces of iron and aluminium to metals already in the waste water stream. The phosphates removed from the water form a slimy sludge that makes transport and disposal difficult.

For the past seven years, a research group led by Professor Ron Bayly and Dr John May in the Microbiology Department has been working with scientists from the CSIRO Division of Chemicals and Polymers on an alternative method of removing phosphate from water – one that relies upon a biological system for removing phosphates from sewage.

In 1975 engineers in South Africa carrying out research on sewage treatment, reported an unusual phenomenon: something in the sludge was removing significant quantities of phosphates from the waste stream independently of the conventional chemical treatment. Interestingly, the phenomenon seemed to be associated with episodes when machinery used to aerate the wastes malfunctioned, suggesting that some anaerobic mechanism was responsible.

CSIRO scientist Mr Bill Raper approached Dr Bayly to investigate the microbiological mechanism responsible. Professor Bayly is a specialist in the genetics and physiology of microbes

that break down wastes and toxic substances.

From the community of microbes in sludge samples from a pilot sewage plant in Ballarat, Professor Bayly isolated a microbe called *Acinetobacter*. Some isolates of the microbe displayed a novel capacity to take up phosphate, assembling it into complexes of hundreds of molecules.

These molecules, called polyphosphates are conveniently concentrated within the organism's cells at levels of up to 15 to 20 per cent of their dry weight. When the bacteria are removed, so is the phosphate.

"If *Acinetobacter* is doing its job, no chemical precipitation is required," Professor Bayly said. "That's a huge saving in costs, and it means no metals or salinity are being put into the effluent water."

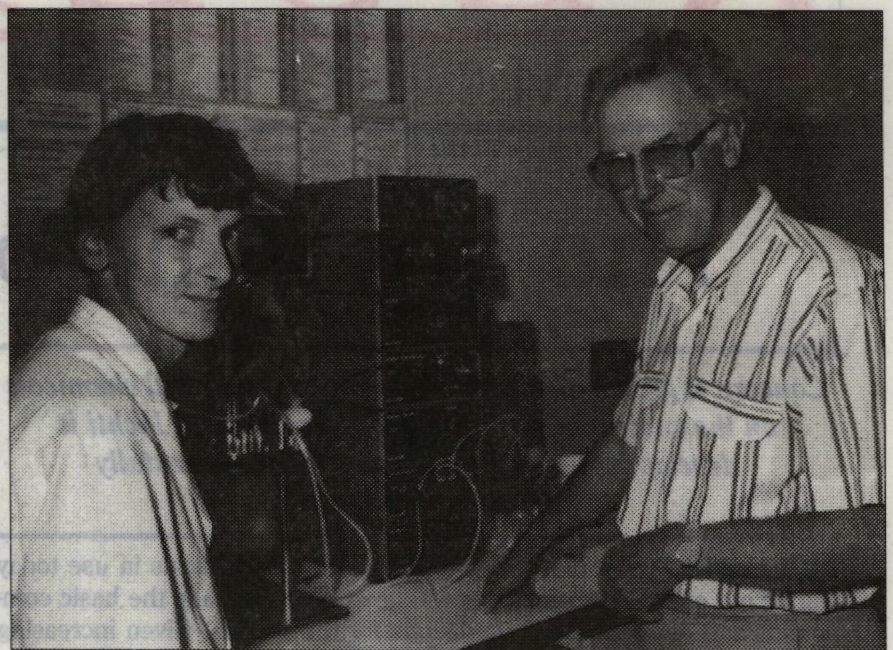
"The Ballarat South Water Board was spending \$250,000 to \$300,000 per year on chemical precipitation. If you could install a plant that would remove phosphates biologically, and keep it operating stably, then you would save all that money."

"In summer up to 80 per cent of the flow of Yarrowee Creek in Ballarat comes from effluent from the sewage treatment system, and it would soon become eutrophic if phosphate was being discharged. Biological removal of phosphate seemed an ideal system because it would also minimise the discharge of salinity and metals into the creek."

"At Monash we've been looking at the basic mechanisms of how *Acinetobacter* form polyphosphate, and trying to define the physiological conditions under which it works best."

"There are marked changes in waste flows through a sewage treatment works during the day, which makes it a very dynamic environment. The challenge is to maintain the bacteria within conditions that allow them to work efficiently despite the variations in flow."

One trick is if the pipeline carrying sewage into the plant is as long as possible. Professor Bayly says the sewage in



Professor Bayly, right, with research fellow, Dr Gavin Rees.

the pipeline effectively becomes anaerobic. This seems to improve the phosphate-removal capacity of the *Acinetobacter* in the plant.

Typically, domestic sewage contains 10–12 milligrams of phosphate per litre. Before effluent is discharged, this level must be no more than 1–2 milligrams per litre.

Professor Bayly said that mechanisms of synthesis of polyphosphate in sewage treatment systems was still the subject of detailed research. It required an unusual series of anaerobic and aerobic recycling processes involving the strictly aerobic *Acinetobacter* and a range of other bacteria.

In the anaerobic zone at the head of the system, anaerobic microbes synthesised carbon-rich compounds known as volatile fatty acids which were taken up by the *Acinetobacter* and converted to a storage compound, polyhydroxybutyric acid (PHB).

The energy for the latter reaction is obtained from the high energy bonds of the polyphosphate formed in *Acinetobacter* in the aerobic zone before they are recycled to the anaerobic phase. When the *Acinetobacter* pass from the anaerobic to the aerobic zone of the system, they use the PHB as a source of carbon and energy, and synthesise polyphosphate from the phosphate in the sewage.

Results from research in this area has enabled the Monash group to propose a mechanism for the synthesis of polyphosphate different to that which has been accepted previously.

It is easy to see how *Acinetobacter* can act virtually as a partner for itself in a looped aerobic-anaerobic system. Professor Bayly says the system installed at Ballarat bleeds off some 10 per cent of the bacteria after the aerobic stage, thus removing the phosphate. The remainder are recycled back into the anaerobic stage to keep the energy cycle going.

Most bacteria have plasmids – special loops of DNA. These function as a sort of Batman's utility belt, allowing the cells to synthesise enzymes needed to carry out specialised functions such as to degrade toxic chemicals or antibiotics encountered in their environment.

Many *Acinetobacter* isolates carry several different plasmids. The presence of some of these may be the reason why such microbes function so well to remove phosphate in modified sewage treatment systems.

As with all biological systems, and particularly with sewage systems that employ biological treatment, the bacte-

ria may be temperamental. For poorly understood reasons, their performance may drop off suddenly, or enter a period of slow decline before recovering spontaneously.

Problems of a short-term nature are usually due to mechanical malfunctions that take the environment outside the bounds that are optimal for bacterial activity.

Professor Bayly believes that the slow decline in activity in phosphate removal is probably due to genetic mechanisms that may be a response to changes in the environment, or to competitive effects. The research team is studying the genetics of *Acinetobacter*, focusing on plasmid genes, to understand what is going on.

The problem is to detect the onset of the genetic decline as early as possible, so that the plant can be kept running at an efficient level. Professor Bayly's team is working to develop DNA probes so the presence of an adequate number of relevant *Acinetobacter* can be monitored.

That is not proving easy, because studies so far have not detected any difference in enzyme activity between active and inactive strains.

Meanwhile, the new technology is already moving into commercial use. The Ballarat South Water Board's treatment works was modified in 1989 for biological removal of phosphate and is now performing satisfactorily.

Monash and CSIRO have been collaborating with another group led by Dr Bob Seviour of the University College of Northern Victoria in Bendigo. Dr Seviour's group has been working with the Bendigo Water Board for the past four years on a pilot study of the technology. The board now is moving into the final stages of building a \$20 million plant to remove phosphate biologically.

The plant, which will treat 20 megalitres of effluent a day, is due to come into operation by May. In the early stages, microbiologists, chemists and engineers will be attempting to optimise the various components of sewage treatment – new and traditional – so that they are efficiently integrated and work at an optimal level.

The Monash-CSIRO group's research is well supported through sponsorship and research grants. Sinclair Knight and Partners, the contractors for the Bendigo plant, are co-sponsors of the Bendigo project, along with the Australian Water Research Advisory Council, which supported much of the early research at the university and at CSIRO.

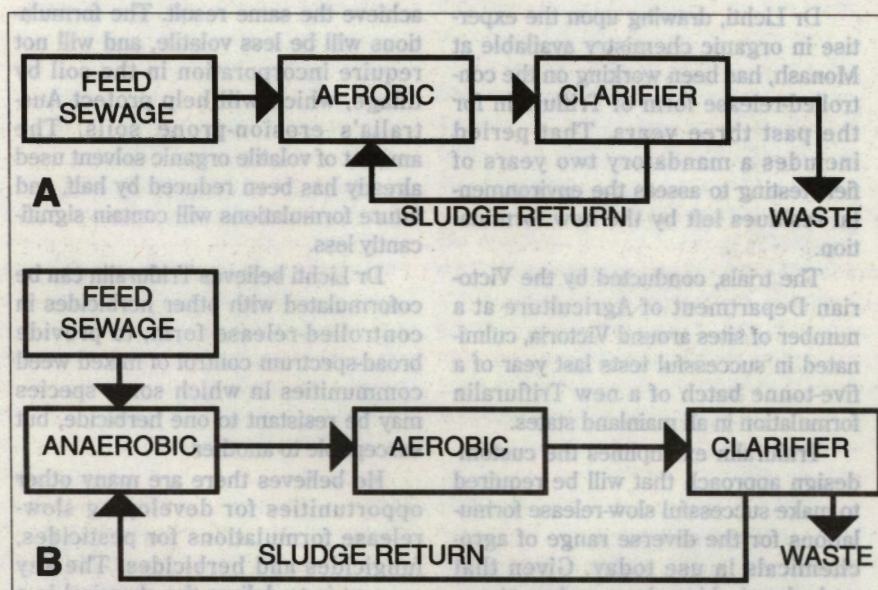


Figure A shows the configuration of a conventional activated sludge plant. Figure B shows a plant modified for phosphate removal.

Reaching towards a robot reality

Robots still have a way to go to catch up to their science fiction image. But Professor Ray Jarvis believes it won't be long before robots are working in industry, agriculture, and even in the home.

A long, long time ago, in a galaxy far away, the popular 'Star Wars' humanoid robot Cee-Threepio (C-3PO) walked, viewed the world in colour stereovision, reacted to environmental stimuli, displayed human emotions and, just for good measure, communicated fluently in a million languages.

Many millennia later, on a more familiar blue planet, there are robots that lack all the major senses, except in rudimentary form. They have tiny brains and know nothing about the real world, except what they are told; they do not speak or comprehend, responding only to digital computer code. They spend a long time thinking before performing the most simple tasks. Like babies, they tend to get lost and blunder into objects.

In the real world, robots are just beginning to find their technological feet.

"The field is in its infancy," says Professor Ray Jarvis, director of Monash University's Intelligent Robotics Research Centre. "But the technology is starting to catch up - we can now do some of the things we only dreamed of doing a few years ago.

"It's exciting because there is enormous potential for creative experiments and scientific endeavour. There is lots of room for lateral thinking and bright ideas. That makes it interesting for students."

At the Intelligent Robotics Research Centre, Professor Jarvis and his team of six academic researchers, five students and five support staff are focusing on two difficult technical challenges - robot perception and robot navigation.

The centre is concentrating on two aspects of machine perception - vision and touch. A robot must be able to see to navigate, and sometimes recognise objects in its environment, before it can accomplish any task.

After recognising an object, a robot may be required to pick it up or manipulate it - in human terms, it requires hand-eye coordination.

Its mechanical hands must be properly positioned, and must tell the robot's computer brain that contact has been made. The robot must grasp the object correctly, and with appropriate pressure, to avoid damaging or mishandling it.

Professor Jarvis's team has been experimenting with video cameras,

using them at least two at a time to simulate binocular vision.

A typical two-dimensional colour video image contains 512 X 512 pixels, each with 24 kits of colour information. A single image contains some .77 million bytes of information. New frames must be stored and analysed many times a second if the robot is to function in "real time".

"The data tends to be vast," Professor Jarvis explains. "So we employ a technique called segmentation, which involves breaking the data down into large chunks that hopefully correspond to recognisable entities in each image.

"The computer extracts features of the components, looking for particular patterns that correspond with descriptions in its memory. We end up with a scene description, which answers questions like what and where things are.

"The next step is task planning, followed by trajectory/obstacle avoidance planning. The plan is then translated for motion control, which delivers the instructions to the servo motors that control the robot's actions and movements.

"Each step is a research topic in its own right, and computer-intensive. Then the whole system must be integrated."

Professor Jarvis says that putting the components together takes a lot of time, and compromises must be made to achieve reasonable performance.

"We do our best, but there is only a certain amount of time that one can devote to computational analysis at each step, without making the robot too slow to be of any use," he says. "A lot of the frustration is that we may know of good methods, but are not able to meet realistic time constraints with them.

"It is possible to achieve useful solutions by restricting the domain of applicability - we limit the robot to specific environments. If it's working in a nuts-and-bolts environment, it doesn't go looking for eggs and cats.

"Ultimately, we and other groups are trying to push towards more general capabilities in robots. We know it's not



Professor Ray Jarvis with a prototype robot.

impossible because we humans do it ourselves."

The problem is that so little is known about how human sensory systems work. Professor Jarvis says his team often uses biological systems as inspiration, for example the use of stereopsis for range-finding. By analysing disparities between left and right images of the same scene, as viewed by two video cameras, it is possible to determine the distance to particular objects.

But there are alternative ways to obtain ranging information, that have little to do with human vision. The Monash researchers have done experiments with a technique called time-of-flight ranging, which involves bouncing a laser beam off the target object and measuring how long the beam takes to make the round-trip.

Neural networks, a new approach to computing that mimics the function of interconnected nerve cells in the brain, has considerable promise as a means of analysing scenes to identify objects. Neural networks are particularly suited to rapid recognition of structures and patterns, shortening the time required to extract features and compare them against the robot's data base of expected objects.

"Once the robot knows where and what things are, it moves on to task planning, which has to do with evaluating how to move from its current state to a goal state," he says.

"Task planning may involve working out in what order to perform a particular task - for example, how to pick up the lowest block in a stack of three blocks. The robot has to work out an order-of-action strategy, and then plan a trajectory for its own movements to achieve the task.

"The robot must plan its trajectory so that it doesn't knock over other objects, because as soon as that happens, it has altered the state of its environment in a random way, and it must begin scene analysis and planning all over again."

A flexible robot must have the capacity to navigate in its work environment, even in areas it may have not encountered before. The group has been working on sensory-based navigation, which involves equipping the robot with cats-whisker, tactile sensors and rangefinders.

The task is similar to that of recognising objects in the hand-eye coordination model, except that now the robot must recognise objects in its broader environment and go through the same steps of feature extraction and pattern recognition, to construct an internal model of its environment.

In some ways, the task is simpler. "If you want to avoid something, you don't need to know what it is, only what space it occupies," Professor Jarvis says. It is also more difficult because the environment is less structured. "The robot can easily be tricked by shadows," he says.

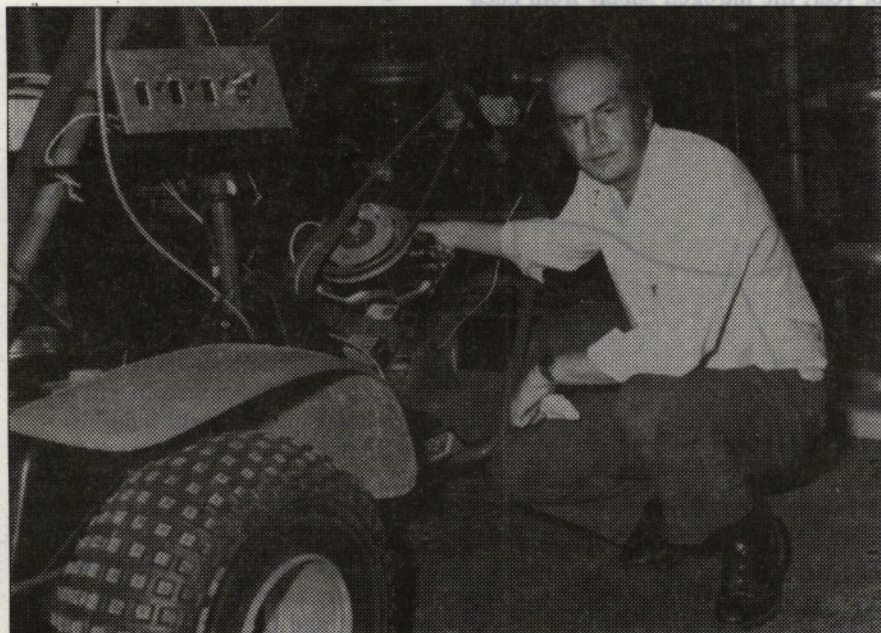
Professor Jarvis says vision is a more difficult but better method for localisation than using beacons because it offers more information about the environment.

He sees many applications for the technology being developed at the centre. An example might be a robot that packs chocolates into boxes, or sorts prawns on the basis of size. Any robots handling soft objects need gentle hands, which is where tactile sensors come in. Robots could be used to shear sheep or to provide assistance to disabled people.

Mobile robots, might be used to transfer components or tools from one part of a factory to another, such as in car-assembly plants, or stacking wool bales in a warehouse. They could be used as messengers in offices, to deliver drugs in hospitals or, equipped with intrusion detectors, as nightwatchmen.

In agriculture robots could be used for lawn-mowing, harvesting or laser levelling for irrigated crops. They could replace humans in mining plants or in nuclear power stations.

Ultimately, he believes they could find their way into domestic environments.



Professor Jarvis with a robot dune buggy.

Getting teeth into animal design

We are what we eat. Dr Gordon Sanson is giving this saying new meaning with his studies into how the design of teeth ultimately influences animal biology, ecology and behaviour.

The little Northern Territory rock wallaby *Peradorcas concinna* and Florida's manatee, *Trichechus manatus*, could hardly differ more in size, appearance and ecology.

One is a land-dwelling marsupial, the other a marine eutherian mammal, yet they share a trait possessed by no other mammal – the capacity to replace their teeth continuously throughout life.

It has been said that all biology reduces to chemistry, and all chemistry reduces to physics. Dr Gordon Sanson's unconventional theory about teeth traces a species' physical characteristics, its ecology and behaviour, back to simple chemistry and physics.

All animals must eat to stay alive. They must obtain nutrients from the environment and process them into a form that they can digest. Dr Sanson, of the Department of Ecology and Evolutionary Biology, points to the crucial role of teeth in this process.

"I became interested in teeth because they are the first point of contact between an animal and its nutritional environment," Dr Sanson explains. "But if you look in any textbook on animal anatomy, teeth are always treated as a part of the skull, not the digestive system."

"An animal must conserve its teeth because they are the only organ system that wears out, apart from the central nervous system.

"Rodents solve the problem by having teeth that grow continuously, but other animals must be careful and select certain diets."

Dr Sanson points out that animals that grow teeth continuously cannot develop the complex crown structure needed to grind their food, since the crown wears away. Some animals, including fish, amphibians and reptiles, have unlimited tooth replacement, but among mammals, only the manatee and rock wallaby have this capability.

Many mammals have deciduous or milk teeth in infancy, which are shed and replaced by permanent teeth that must last throughout adult life. Humans are in this category, and have teeth with thick, hard crowns designed to last at least 70 years with reasonable care.

But human teeth tend to wear away at the edges, creating gaps. Dentists describe a phenomenon called mesial drift, in which the teeth move forward in the jaw, closing up any gaps thus created.

Other mammals, for example, kangaroos, have refined mesial drift by having four pairs of molars that migrate forwards in the jaw as the preceding teeth wear out and are shed. Elephants do something similar.

Dr Sanson says that in the wild, any animal that wears out its teeth prematurely will starve. Teeth are a vital resource, and each species must manage tooth wear and replacement rates to suit its lifestyle. The animal invests energy in growing teeth so they must not be ejected before they have worn out, nor must they wear so rapidly that the animal runs out of teeth while still in its prime.

The hazards of premature tooth wear are clearly evident in some coastal areas of southern Australia, where sheep graze pastures containing high levels of abrasive silica. Veterinarians sometimes fit valuable rams with false teeth to prolong their stud careers.

Dr Sanson has conducted experiments that attempted to relate tooth wear to diet in kangaroos. A subtle cost-benefit equation governs a kangaroo's diet; the animal may conserve its teeth by concentrating on plants whose tissues contain abrasive substances but are high in food value, rather than softer plants with lower food value.

The way this equation balances out depends in turn on how efficiently the teeth preprocess the plant tissues before they enter the digestive tract. Finely chewed particles present a greater surface area for digestion biochemicals to work upon. Coarser particles take longer to break down, so must spend a longer time in the gut.

Dr Sanson looks at the animal as an integrated package in which the design of the teeth influence the design of its digestive system. The digestive system influences body size and shape, which impose constraints on how the animal moves about to gather its food.

Food is never distributed uniformly in the environment, and varies both in quantity and quality with the seasons. The animal must adapt accordingly, and the manner in which it exploits its environment, matching its food intake to its own varying nutritional needs, determine how it behaves and whether it pursues a solitary or social lifestyle.

In other words, by understanding the design and function of an animal's teeth, one can make important inferences about the animal and its ecology, whether the teeth are from an extant species, or from an animal long extinct.

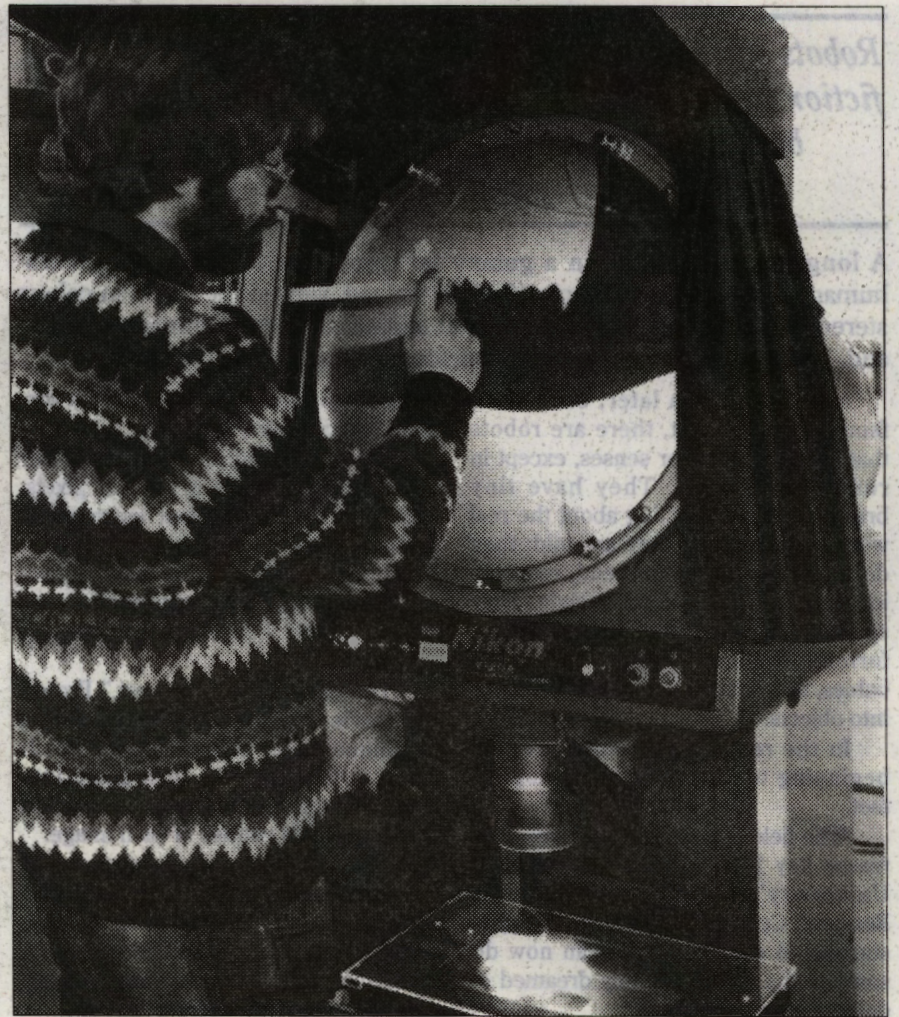
Palaeontologists and taxonomists have long exploited the fact that animals exhibit differences in dentition, and that there are fine structural differences even between closely related species. "These differences indicate that some very fine occlusal mechanics are taking place, but nobody has asked how the teeth really work," Dr Sanson said.

He believes that minor differences in the structure and composition of teeth may be as revealing as the gross differences that separate, say, the teeth of carnivores from those of herbivores.

In testing and refining his ideas, Dr Sanson has focused on Australian marsupials, selecting species that exhibit both differences and similarities in diet and lifestyle.

He has studied two marsupials that eat eucalypt leaves – the ringtail possum, *Pseudocheirus peregrinus*, and the koala, *Phascolarctos cinereus*. Eucalypt leaves are tough, typically low in nutrients and laced with toxic oils, and surely rank with the most unpromising food sources eaten by any mammal.

In both ringtail possums and koalas, Dr Sanson and former students Ms Jan Gipp and Ms Janet Lanyon have shown that older individuals with worn teeth don't digest their food as well as younger animals. They must eat more than younger animals with teeth in good condition, and invest more time and energy in foraging.



Dr Gordon Sanson measures a magnified lower jaw profile.

Koalas eat nothing but eucalypt leaves and do not chew the leaves as finely as do ringtail possums. The koala compromises by having one of the longest digestive tracts of any mammal, but as its teeth wear out it confronts the law of diminishing returns. Koalas seek out particular eucalypt species whose leaves may contain more nutrients, so koala teeth may ultimately determine the distribution of koalas.

Taking the example of the koala, and noting that many species live much longer in captivity than they do in the wild, Dr Sanson wonders if teeth may play a much more important role in determining the life span of an animal than anybody has suspected.

Female ringtail possums breed in spring and in autumn, when there is a flush of new growth from eucalypts. The new growth is high in nitrogen, an essential element for synthesising protein.

Dr Sanson says that in spring, the female ringtail doubles her food intake, so that she can sustain lactation for her newborn offspring. Spring and autumn breeding is not optional – at other times of year, the nitrogen supply from eucalypt leaves may be insufficient to sustain lactation.

Since the design and composition of an animal's teeth reflects its need to

cope with a particular diet, Dr Sanson sought to understand the physical properties of particular diets. His investigations have taken him beyond biology into physics and engineering.

"We're interested in the physical properties of grasses and other plants – how do they break when the animal chews them," he said. "We talk about cutting, grinding, chopping, shearing actions, but we need to understand how tooth design relates to diet, we need to know the physics of each action – grinding, for example, has both lateral and compressive components."

Dr Sanson says the forces generated by teeth must relate to the physical properties of the food. The resistance of different foods to fracturing can be related to Young's modulus, a measure of the food's elasticity.

Young's modulus is calculated by plotting stress (the amount of force applied per unit area) against strain (the change in length of the material when it undergoes stretching).

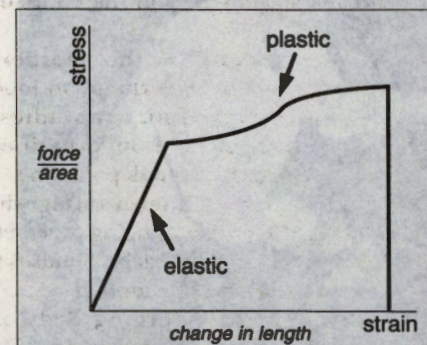
Up to a certain point, a stressed material undergoes an initial change in length but will recover to its original length when the stress is released. Physicists call this the elastic phase and the slope of the line is Young's modulus.

Beyond this point, the material begins to deform plastically. It no longer returns to its original length when the stress is released. Further stress will cause the material to rupture or fracture.

That work is performed by the animal's teeth and jaws. "It's obvious, but I'm not aware that anybody has said it previously – teeth must be built of a material that will not deform, but which must break materials which do."

Dr Sanson sees a strong relationship between social behaviour and diet, one that is strongly influenced by tooth design.

He has provided a new perspective on the way animals relate to their environment, and how the demands of the environment influence animal biology, ecology and behaviour.



A typical stress/strain curve showing its elastic, plastic and fracture points. The area under the curve represents the amount of work the animal must do to break up the food into smaller pieces for digestion.

Advancing Australia in sports and medicine

Two Monash identities are among ten Victorians presented with Advance Australia awards.

Mr Doug Ellis and Professor Michael Adamson were recognised for their outstanding contribution to the enrichment and advancement of Australia.

Mr Ellis was chosen for his service to sports education. He was one of the first members of staff appointed to Monash in 1960. During his 30 years at the university he has been instrumental in the development of sports and recreation facilities for both students and staff.

He was the first laboratory manager to be appointed, and the first deputy warden of the Union. In 1985, in recognition of the growth that had taken place in sports and recreation activities, the university established the Sports and Recreation Association and appointed Mr Ellis as its foundation director.

As director, and an executive member of the Australian University Sports Association, he has also contributed at local, national and international levels of sports education.

Professor Adamson, of the department of paediatrics, was recognised for his service to medicine. He is co-founder of three major hospital units: the Neonatal Intensive Care Unit, the Centre for Early Human



Mr Doug Ellis, left, and Professor Michael Adamson, right, with the State Chairman of the Advance Australia Foundation, Mr Brian Powell, at the awards presentation at Government House.

Development and the Sleep Research Laboratory.

In 1969, Professor Adamson was appointed to the department of pae-

diatrics. Over the past 14 years he has studied breathing patterns in infants and provided invaluable information to the Sudden Infant Death Syn-

drome Foundation. He now works closely with the foundation, providing expert advice to staff and counselling families.

Redressing the balance of care

The health professions need to concentrate more on caring, according to a visiting fellow to the Caroline Chisholm School of Nursing, Frankston campus.

US academic Dr Jean Watson says it is time for academics and health professionals to redress the balance. "The health profession has reached a point where caring is no longer present," she said.

Dr Watson is a former dean of nursing at the University of Colorado, and is now the director of its Centre for Human Caring. She has an international reputation for her writing and research into the art, science and ethics of caring.

She was instrumental in establishing the interdisciplinary centre, which undertakes academic and research projects.

"Those in the health professions tend to treat disease as an isolated unit rather than dealing with the human dimensions of care," Dr Watson said.



Dr Jean Watson.

"There is a need to move from a focus on the person as an object to diagnose, treat and cure, to really looking at the whole context of the individual person, their responses and what their illness means to them."

"This shift has always been nearer nursing but has never been put into practice. We need to bring about a whole different relationship between care provider and patient."

Dr Watson is working with the School of Nursing to explore setting up a Centre for Human Caring at Monash. The Faculty of Professional Studies hope to use the centre at Colorado as a model.

"The interdisciplinary nature of the faculty would lend itself to the establishment of such a centre," she said. Dr Watson also has been looking at developing a masters degree for nursing students in the ethics of caring.

As a result of the merger, Monash had an opportunity to look at new interdisciplinary studies, shared degrees, and opportunities for exchange between departments.

"A centre for human caring will benefit Monash by bringing together people with diverse backgrounds for common interest to look at what I think of as an emerging body of knowledge in human caring," Dr Watson said.

"The whole phenomena of having an absence of, or crisis in, caring is really coming from the public at large - it is now up to the academics and practitioners to formally address the problem."

Staff development programs branch out

Staff development programs to familiarise employees with the greater Monash are moving into specialist areas.

Last month the Career Planning and Development Unit ran an Understanding Monash program designed especially for 30 staff from the Caulfield/Frankston branch library.

Staff Development officer Ms Beverley Dianiska said the unit was looking to offer more programs for particular interest groups, in addition to the four already planned for this year.

"We are available to discuss particular needs of departments in developing their own induction pro-

grams which can include attending an Understanding Monash program," she said.

Speakers at these programs talk on issues such as strategic planning for the university, the academic perspective and student services.

Participants also are given a brief introduction to areas of the university that provide services to help staff with their work.

Half-day Understanding Monash programs will be held on 13 March, 24 June, 13 September and 15 November.

Experts meet to examine role of outdoor education

Outdoor education experts, teachers and enthusiasts from around Australia and overseas gathered at the Frankston campus earlier this year to examine ways to improve outdoor education in Australia, and to identify its challenges in the 1990s.

The 1991 National Outdoor Education Conference theme, 'The Quest for Quality,' encouraged delegates to examine the role of outdoor education and re-establish links with contemporary educational philosophies.

Senior lecturer and course leader of the graduate diploma in outdoor education at Frankston campus, Mr Leon Costermans, said outdoor education was much more than a series of adventure programs.

"It forms a valuable part in the

schooling of troubled youth and people with disabilities. More recently it has been used as an effective method of training managers and staff from the corporate sector," he said.

Conference workshops covered topics including, the environment, aborigines, women, spirituality and fatalities in adventure programs, through to curriculum issues.

Four keynote speakers explored the conference theme, and the importance of outdoor education in the overall learning experience.



Research grants

NH & MRC R. Douglas Wright Awards

The R. Douglas Wright Awards are designed to provide outstanding researchers, at an early stage in their career, with an opportunity for independent research together with improved security. The award will provide a salary starting in the range of Senior Research Officer Level 2 to Senior Research Officer Level 5, for a duration of four years. 19 April.

NH & MRC International Research Fellowships

Applications are invited from the young Australians and other nationals who are permanent residents in Australia working in the biomedical sciences, to enable them to undertake research in health-related fields in any biological or medical laboratory in the United States for two years. Candidates must have obtained the equivalent of a US doctoral degree in one of the health sciences preferably within the last 6 years and not more than 10 years ago and have demonstrated outstanding research promise. 15 March.

Further information and application forms are available from the Office for Research, extn 75 3085 or 75 5134. Applications must be lodged by the date specified.



Scholarships and Fellowships

Allan White Scholarship

RSCPA Australia Inc. is offering a scholarship to honour the services of Allan White to the animal welfare movement worth \$2500. Undergraduate and postgraduate students undertaking full time studies in an Australian Institution are eligible. The application form must contain a summary of the applicants involvement in animal welfare and must reach Mr Charles Wright, Executive Officer, RSPCA Australia, 4 Hotham Crescent, Deakin, 2600. 15 March.

Irish Government Scholarships

The Irish government will offer a scholarship in the 1991-92 academic year (October 1991 to June 1991) to enable an Australian postgraduate to undertake course work or research work in any discipline at an Irish university. The award consists of a living allowance and covers the payment of registration and tuition.

For application forms and further details, contact the Secretary, Irish Government Scholarship Section Committee, DEET, GPO Box 9880, Canberra 2601. 15 March.

Beit Fellowship

The Beit Fellowship is offered to students from a Commonwealth country with outstanding research ability in order that they may undertake a PhD in science and technology at the Imperial College, London University. The award is tenable for three years and covers university fees and an allowance of £UK5400 a year. Further details and application forms can be obtained from the Senior Assistant Registrar (Admissions), Imperial College of Science, Technology and Medicine, London SW7 2AZ. 30 April.

Asahi Fellowship Program

The fellowship program offers non-Japanese scholars, journalists and artists the opportunity of a year's stay in Japan to develop academic/professional expertise as well as increase their knowledge of Japan. The award covers air fares and includes a grant covering the cost of research projects. Applicants with a doctoral degree and those fluent in Japanese will be given preference. 31 March.

Villa I Tatti Awards

The Harvard University Centre of Italian Renaissance Studies will offer 10 stipendiary and a limited number of non-stipendiary fellowships to encourage studies on aspects of Italian Renaissance. Applications for the academic year 1992/93 are invited from scholars of any nationality, preferably holders of a doctorate, who can undertake full-time research at the Harvard Centre. The stipend will vary according to the research project but will not exceed \$27,000. Further details and application forms may be obtained from the Director, Villa I Tatti Office, Harvard University, 124 Mt Auburn St, Cambridge MA 02138, USA. 15 October.

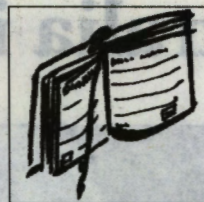
Marine Research Grants

The Victorian Institute of Marine Sciences supports postgraduate studies in the marine sciences and technologies in the south-eastern Australian region. Grants of about \$1,000 may be obtained to supplement the funding of research projects already under way. Application forms, to be completed jointly with the main supervisor, are available from the Director, Victorian Institute of Marine Sciences, 14 Parliament Place, East Melbourne 3002. 15 March.

Stuart Simson Scholarship

Applications for the Stuart Simson Scholarship are invited from full-time male students enrolling for the first year of an undergraduate course at Monash in 1991. The scholarship, awarded for proficiency at the Victorian Certificate of Education or equivalent, provides assistance towards the payments of residence fees in one of the university halls of residence for one year.

For further information on these and other scholarships, fellowships, study grants and prizes, contact the Higher Degrees and Scholarships office on extn 75 3009. Applications must be lodged by the date specified.



Diary

14 March **Koorie Studies 1 lecture** *Pre-European history - the contribution of archaeology* by Dr David Frankel. Rotunda 6, Clayton campus, 1 pm. All welcome.

14 March **Biology seminar** *Biology of the Galapagos, a brief view* by Dr Clare McArthur, Ecology and Evolutionary Biology. S8, 1 pm.

15 March **Linguistics Seminar** *Business: Writers and Readers* by Nick Renton, Media Consultant. Room S246, Menzies Building, 11 am.

16 March **Youth Orchestra concert** Melbourne Youth Music Council presents *Melbourne Youth Orchestra* conducted by Spiros Rantos, deputy conductor Peter Leech. Melbourne Youth Symphonic Band conducted by Russel Hammond, deputy conductor Ken Waterworth. Robert Blackwood Hall, 8 pm. For further information and tickets, contact 690 8624.

17 March **Friends of Monash garage sale**. In the Arts car park, 8 am - 1 pm.

18 March **Lunch time concert** *Victorian State Opera* presenting a program of works by Mozart. Robert Blackwood Hall, 1.15 pm. Admission free.

19 March **Monash Women's Society Luncheon** To be held in the private dining room, Student Union, at 12.30 pm. The cost is \$12.50 a person and new members and visitors are welcome. For further information, contact Mrs Margaret Krishnapillai on 544 7124.

19 March **Gillian Bouras public lecture** The author of *Foreign Wife* and *A Fair Exchange* will speak on *Bouzoukis play Waltzing Matilda: some thoughts on the cross-cultural experience*. R3, Clayton campus, 1-2 pm.

20 March **Science education seminar** Another look at capturing classroom practice by Dr Warren Fineberg, Faculty of Education. A discussion on how to capture quality classroom science practice. Room 324 in the Education faculty, 1 pm.

21 March **Koorie Studies 1 lecture** *Post-contact history - the frontier* by Dr E. Fesl. Rotunda 6, Clayton campus, 1 pm. All welcome.

21 March **Ecology & Evolutionary Biology seminar** *Adaptations to locomotion in the emu* by Dr Annette Patak, Zoology department, La Trobe University. S8, 1 pm.

24 March **Indian Music concert** *Anup Jalota - King of Ghazals, Bhajans and Punjabi Songs* presented by the Victorian Indian Community Charitable Trust and Australia India Society of Victoria Inc. Robert Blackwood Hall, 5.30 pm. For further information and tickets, contact 417 2123, 885 6644 or 544 1634.

25 March **Lunch time concert** *Ensemble I* presenting a program of works by Mozart. Robert Blackwood Hall, 1.15 pm. Admission is free.

28 March **Ecology & Evolutionary Biology Seminar** The causes and consequences of sexual cannibalism by Dr Mark Elgar, Zoology department, University of Melbourne. S8, 1 pm.

Japanese studies

The Japanese Studies Centre is offering a full range of Japanese language and studies courses during the coming semester. The studies courses are short one-month courses (4 sessions). Reduced tuition rates apply for students at Monash.

Language courses

Beginners A 20 March & 26 March (City Office), 7.30-9 pm.

Beginners B 21 March & 25 March (City Office), 7.30-9 pm. **Intermediate A** 18 March, 7.30-9 pm.

Intermediate B 21 March, 7.30-9 pm. **Advanced A** 26 March, 7.30-9 pm.

Refresher course for Japanese language teachers A 19 March, 5.30-7 pm.

Studies courses

Literature and Society in Contemporary Japan 5, 12, 19, 26 March, 7-9 pm.

Japanese Musical Instruments 7, 14, 21, 28 March, 7.30-9.30 pm.

Introduction to Japanese Law 9, 16, 23, 30 April, 7-9 pm.

Japanese Business Etiquette 2, 9 April & 7, 14 May, 7-9 pm.

Industrial Relations in Japan Today 7, 14, 21, 28 May, 7-9 pm.

Communication Problems in Australia-Japan Contact Situations 8, 15, 22, 29 May, 7-9 pm.

Japanese Dance Past and Present 9, 16, 23, 30 May, 7-9 pm.

For more information and a brochure on these and other courses, contact the Centre's Research Assistant, Mrs Mala De Silva on 565 2260.



Accommodation

House sitter(s) wanted

Non-smoking house sitter(s) required for Canterbury family home, plus cat, for five weeks from 2 April. Contact Anne on extn 75 3794

For rent

Furnished two bedroom flat in St. Kilda. Sunny, tasteful, older-style, close to transport. From mid-July to 1 January 1992. \$560 per calendar month. Phone 534 3698 (a.h.), or Rose Lucas on extn 73 2374.

Notes and Diary

Send contributions to the Editor, Montage, Public Affairs Office, Gallery Building, Clayton campus, by Monday of the week prior to publication. Extn 75 2067, fax 75 2097.

Gallery joint venture boosts contemporary art

Monash University has joined forces with the Australian Centre for Contemporary Art (ACCA) in South Yarra in a new joint management initiative that will boost Australian contemporary art.

The Vice-Chancellor, Professor Mal Logan, who also is Chairman of the Board of ACCA, described the move as exciting.

"The agreement is based on the recognition of existing common interests between the two galleries, and can only stand to benefit Australian contemporary art," he said.

Professor Logan will continue as chairman, but the Board will remain independent.

The Director of the Monash University Gallery, Ms Jenepher Duncan, will retain her current position, while also becoming director of ACCA. Monash Gallery staff will divide their time between ACCA and the Monash Gallery.

"This move will stabilise the future of ACCA as a national institution. ACCA will continue to provide a forum for ideas about contemporary art in Australia," said Ms Duncan.

The two galleries would retain their own identities, programs and contributions. "It is important to emphasise that the exhibition programs are quite separate - ACCA is not functioning as an extension of Monash Gallery," said Ms Duncan.

Part of her work at the gallery will be to consolidate the directions set up by former director, Grazia Gunn.

Although both galleries are aimed at the general public, Monash Gallery also has more of an educational role, as well as contributing to art documentation.

"ACCA is more about providing artists with opportunities not given elsewhere. It focuses on experimental art and a freedom to move both conceptually and formally," she said.

Some of the ancillary events at the Monash Gallery, such as public lectures, screenings and forums, may also be held at ACCA.

"The joint initiative demonstrates Monash's continuing commitment to the development of Australian arts," said Ms Duncan, citing Playbox Theatre as another example of the university's involvement in the area.



Australia for Sun and Surf, a 1931 colour photolithograph by Gert Sellheim.

Posters make their mark

Trading Places, an exhibition of Australian travel posters from 1909-1990, opened last week at the Monash University Gallery.

The gallery and the National Centre for Australian Studies have selected about 120 works from state, national and private collections.

Artists represented include Sir William Dobell, Percy Trompf, Harry Weston, Eileen Mayo, Sir Will Ashton, Gert Sellheim, Martin Sharp and Ken Done.

The exhibition, according to the catalogue, explores a rich and largely uncharted history, from the commemorative posters of early this century to the distinctive colours of 1930s and 1940s graphic design, and the rise of photography.

Today, in a country that earns \$6 billion a year from tourism, the travel poster is a key part of advertising campaigns to attract visitors from Asia, Europe and the US.

It is one of the most potent forms of marketing, because, at a glance, it can conjure up images of a country or a specific place.

Although posters have been commonly produced in Australia since the 1880s, it is only since the 1970s that collecting institutions have found them worthy of study.

Sponsored by the Victorian Health Foundation's 'Life. Be in it' program, Trading Places will run until 11 May. The gallery is open Tuesdays to Fridays, 10 am to 5 pm, and Saturdays, 1 pm to 5 pm.



A new jazz venue featuring top-line performers from Australia and overseas opens at the University Club on Friday 15 March.

Monash graduates are the featured performers in the first concert in the series, showcasing the Tony Gould Trio and resident quartet Four and More.

"Jazz at the Club," held each week at 8.30 pm on the Clayton campus, will be open to staff, students and the general public.

As most of Melbourne's jazz venues are in the inner-city area, the idea behind the new club is to bring jazz to the large audience in the south-eastern suburbs.

Pianist Tony Gould, who has an MA in music from Monash, will appear with Ben Robertson on acoustic bass and percussionist George Polyhronakos. Currently a senior lecturer at the Victorian College of Arts School of Music, Dr Gould took his PhD at La Trobe University in 1989.

Four and More features Simon Pilbrow on piano, Edward York on

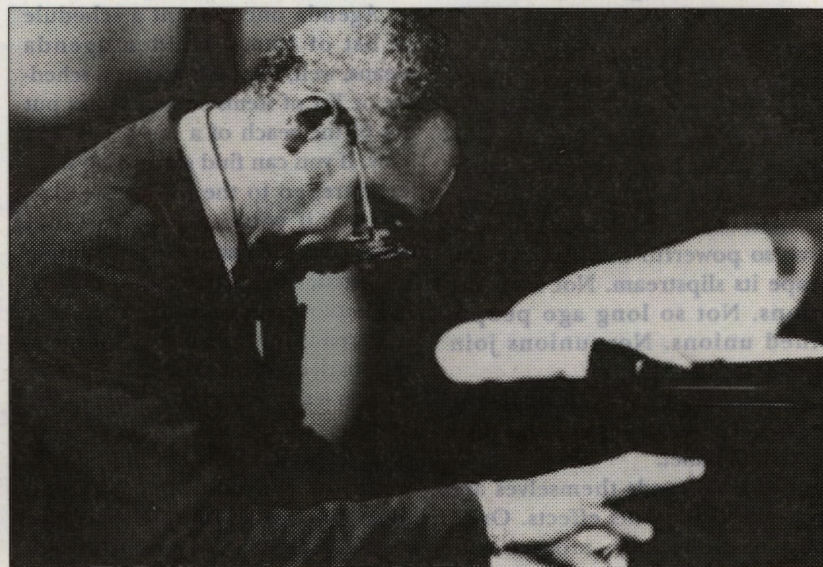
drums, Nick Haywood on double bass and Julian Driscoll on trumpet and flugelhorn. Following the opening, the resident group will appear every second week.

Forthcoming attractions include the Mickey Tucker Trio on 22 March and Bob Sedergreen on 12 April.

Tucker is a US pianist, now living in Australia, who has worked with many influential artists including the Benny Golson/Art Farmer Jazztet, Thad Jones/Mel Lewis Orchestra, George Benson, and Art Blakey and the Jazz Messengers.

Bookings can be made by phoning 75 3992, or over the counter at the Alexander Theatre. Tickets for the first concert cost \$11. A student discount is available.

Meals will be served at the club before the performance and drinks will be at bar prices.



Jazz pianist Mickey Tucker will be appearing with his trio on 22 March.

There is no doubt Australia is a clever country. I am less convinced, though, that it is smart.

Our industry needs all the help it can get from the tertiary educational and research institutions. The trouble is that industry is yet to recognise it, and the fault is as much ours as theirs.

In earlier years, universities had a much narrower base, both in the disciplines they contemplated and the population they served.

Today they have the additional role of teaching a wider cross-section of society destined to spend their lives in a wider range of pursuits and of addressing a broader spread of applied, rather than pure research, opportunities.

Increasingly they are also called upon to bring people back to education and to work with outsiders in the pursuit of answers. It is therefore quite a Houdini effort to balance where the joys of academic freedom may be availed, and where hard-nosed directed and applied approaches are needed.

The very fact that universities were first established and have continued to survive throughout the centuries is due to the ability to remain independent of external pressure, dedication to the search for knowledge and truth, and capacity to attract people of commitment and excellence.

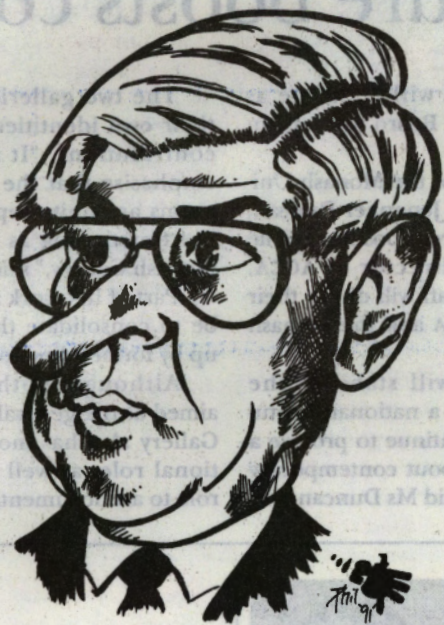
Sole adherence to all three today, though, could be a recipe for disaster. The trick is clearly to retain these talents whilst addressing the issues of the times.

Universities have always been a critical part of the world's search for knowledge, and independence of thought and inquiry. They have been a treasure house of truth and ideas for future generations.

Few would challenge the importance of universities retaining the right and ability to unfettered independence in these critical tasks.

However, even fewer would be prepared, especially in the modern world, to finance it. That is the dilemma we face.

There is an almost universal recognition of the middle ground and that there should be a degree



by Brian Powell

of funding always reserved for the independent role.

Perhaps I am old-fashioned in my belief that the academic mind is the sharpest and most disciplined, but I do believe that there is a strong case for the academic community to recognise the advantage of their situation.

Frankly, the universities have captured a new or additional market, not a replacement one. It is a matter of balancing their efforts between the two.

Also it has enormous potential, in an increasingly tight economic system (and climate) to add to, rather than detract from the independence of these institutions.

Universities have become too exposed to the one major source of support (government) in Australia and it is in the primary interest of universities to counter this.

I can see no real argument for a reduction in Government support for the tertiary sector. What is needed, though, is for a greater proportion of our national income and our national wealth to be washing around in this area.

Universities have to clearly demonstrate they will use the funds as efficiently and effectively as any other sector of the economy, and will work to direct the benefits back into the economy.

This will mean some structural change in tertiary institutions but in my view the academic staffs have more to gain than to lose.

The present system for relations with the business sector is haphazard and laughingly biased against the universities and staff. It will remain so for as long as there is no concerted approach to addressing the problem.

The Montechs of this world provide the opportunity and the wherewithal, but the system has not yet had the nerve to let enough of them do the job properly.

Montech is on constant touch with people in industry and we can find out, what they want researched, what funds they might have, and what their training needs might be.

We can assist in finding potential partners and advise on when and how to go about it. Often, we know what others are doing in the same field or with industry.

Through regular contact with the business community, Montech is also well placed to explore financing opportunities for research and development. We also have a broad range of contacts at political and bureaucratic levels.

In short, Montech should be the first group you think of for developing any idea.

It is time we looked more closely at what university-based innovation a consultancy companies, such as Montech, might be able to achieve in cooperation with the institutions they serve.

Brian Powell is managing director of Monash University's business and consulting arm, Montech.

DIOGENES



Just as we were trying hard to remember a time when we didn't have to console ourselves by remembering a time, our life sentences have become even more abbreviated.

All in the name of streamlining, a force so powerful that no one can escape its slipstream. Not even the unions. Not so long ago people joined unions. Now unions join unions.

Streamlining has a lot to answer for. Even the word moves faster than a breeding pullet.

And now words themselves are beginning to feel its effects. Once upon a dictionary, most words enjoyed the single life - occasionally

they'd find themselves hyphenated, but usually it was just a one-page stand.

No more. A dictionary dating service is hard at work.

For instance, when was the last time you saw that old workhorse "agenda" drifting across the printed page on its own, its definition intact? Now it's rarely seen in public without "hidden" on its arm.

That raises the question: exactly what is a hidden agenda? The expression is tossed around like a baby at a christening, yet is so worn out that it is now meaningless.

Agenda once meant a schedule or list of items. Hidden agenda means, well, maybe it means a schedule or list of items someone has put out of the reach of a newly baptised baby. If you can find something sinister there, go to the top of the class (that is, if you can find one that hasn't - in the name of streamlining - merged, amalgamated or affiliated, and imploded as a result).

Streamlining is also leaving its ugly mark on our traffic system. (Forget cars - the reason that most of the new ones are contoured has nothing to do with increasing speed and lowering fuel consumption. It's done merely to avoid people who jam notices under windscreen wipers claiming damages for the injuries

they suffered while stretching across unstreamlined bonnets.)

No, the problem is roads. The marriage of the South-Eastern and Mulgrave freeways, for instance, was meant to streamline the flow of traffic into the city. Oh yeah?

But let's be fair - maybe the planner's pen slipped, and the proposed bridge at Warrigal Road became obscured beneath a quart of engineer's white-out. There seems to be no other explanation.

I would like to mention one of the more recent experiments in streamlining: Met ticket. But I can't. Nothing more remains to be said on the subject, because the entire collection of editorial attacks, public outrage and opposition criticism has been streamlined to save space in the government's vaults.

It took a powerful computer to come up with the two words that summarised what the critics thought was behind the government's move. Hidden agenda.

Funny thing is, everyone thinks they know what it means.

Autumn in Australia has always had something of an image problem. In North America, where it's known as fall (or "fahl"), the season's colours hit you like a writ. They take your breath away.

But here autumn is looked on as the aftermath of summer and the prelude to winter - a seasonal punctuation mark that promises more than the ads deliver.

A comparative lack of colour means that autumn doesn't get a very good press around these parts. There are exceptions - the Royal Botanic Gardens do a good autumn, so do most suburbs. But out in the sticks, where it really counts, it's like black and white television this time of year.

As a result, one large advertising agency employed by an exclusive out-of-town hotel has come up with the idea of colour bombing huge tracts of nearby state forest to give tourists their money's worth.

Operation Palette will involve a fleet of converted fire bombing aircraft dropping water-soluble paint in a carefully timed sequence over a period of weeks. Gold will be followed by red, russet and finally, brown.

Also noted in the proposal is the option to drop white paint during a mild and snowless winter.

And to give tourists an extra frisson (and the forest an added touch of authenticity), coats of yellow, red, orange, and later, black paint, could be slapped on during a cool and fire-free summer.