Jobs and risk factors for heart disease

Vital community research program under way at Wollongong University

A relationship is believed to occur between stress and the development of coronary disease. The strength and nature of the relationship is not, however, well defined. A review of the stress and cardio-vascular disease conducted by the National Heart Foundation noted that some research indicates that risk is increased by high-demand jobs, which allow little room for decision making. The review concluded that further research was needed before guidance could be provided for preventive and clinical practice.

Stress—particularly work-related stress—is identified as a cause of heart disease by a majority of the lay public. Lay explanations for this causal relationship centre on a belief that modern urban and industrial environments are inherently stressful and that little can be done, particularly by 'working people', to avoid or alleviate that stress. Scientific explanations for the relationship include both physiological sympathomimetic mechanisms and socio-cultural effects mediated through consumption patterns.

The purpose of research being carried out by Associate Professor Christine Ewan in the School of Health Sciences in The University of Wollongong is to investigate the relationship between cardio-vascular risk factors and objective indicators of high job demand and low decision latitude. High job demand and low decision latitude have been shown to be related to the development of coronary heart disease symptoms and have been proposed as an independent risk factor. No research has been reported, however, which explores their relationship with the presence of other known risk factors such as hypertension, hypercholesterolaemia and truncal obesity.

In addition to this objective assessment of job-related stress, it is proposed to investigate also the relationship between risk factors, subjective reporting of stress levels and lay definitions of stress. Lay definitions and perceptions of personal stress are being investigated by a questionnaire developed from content analysis of 100 semi-structured interviews designed to elicit the main lay categories of explanation.

Relationships between subjective and objective assessments of stress will also be investigated. Elucidation of the strength and direction of such relationships (if any) will form the basis for hypotheses related to the mechanisms which mediate between cardio-vascular risk factors and disease and job-related stress. It will also form the basis for recommendations for preventive interventions.

The data are being gathered by means of a public-risk-factor screening program in the Illawarra. The process began in February this year.

SUPERMAP—the latest in computer technology

The latest in computer technology for the analysis of Australian census data has been acquired by the Department of Geography and the Library at The University of Wollongong. The system, known as 'Supermap', contains all the Australian census data for 1981 and 1986 on one compact disc. At the touch of a button, Supermap can extract census data on, for example, employment, age group, birthplace, income and housing. It can produce and print this information for any area in Australia from Commonwealth and State down to postcodes and collectors' districts. The system also has the capacity to produce maps of the data both on screen and on paper. Agricultural data, the retail census, and a number of other databases are now available.

The Supermap system runs on an extremely powerful micro-computer linked to the compact disc and a colour printer. It was acquired by Professor Murray Wilson in connection with the 'Healthy Cities' project, and will be used to link census data with health data. It also has many other uses in research, planning and teaching. Although the system has been operational for only a few months it is already being extensively used, and aroused considerable interest when it was demonstrated to the public on Open Day. The Geography Department has received inquiries from local businesses and schools requiring specific information. An exciting possibility which is being explored is the collaborative use of the system between local planning authorities and the Geography Department.

At the Supermap in the Department of Geography is Dr Hilary Winchester, a recent arrival at Wollongong
Open Day for Research Students
High standard of work and of presentation

For the many university students postgraduate research is seen as something rarified and esoteric, something concerning only those who would have been described by Miss Jean Brodie, in her prime, as the crème de la crème. The University's first exhibition of post-graduate research, staged at the Union on November 9, tended to confirm this view. Titles of many of the research projects, to a lay mind, were mind-boggling.

But what could be clearly understood by anyone was that this inaugural exhibition, scheduled to appear on the annual calendar of University fixtures, was an eye-opener in several ways. It indicated an extremely high level of teaching and of research. It indicated an extremely close rapport between academic staff and postgraduate students. It indicated a close camaraderie not only between staff and students, but between students from diverse disciplines (for example, the Creative Arts student examining a display from Biology and exclaiming, 'That's something I can use'). These were among the points made by the Vice-Chancellor during his opening address and by Professor David Griffiths during the awards presentation.

In many ways the Open Day was about communication—another point emphasised by the Vice-Chancellor. Too much research and too many researchers remained 'undiscovered', because many researchers had still to learn that communication, outside the boundaries of academe, was as important as the results of successful research.

Of the Exhibition, the Vice-Chancellor said this was a very special day, and one marking another step along the road to maturity. Postgraduate students, he said, were at the cutting edge of University activity. He acknowledged that life was tough on the allowance available.

And on the point of difficulty of communication, he stressed the fact that scientists 'had to learn to get across to lay people details of esoteric research. Scientists who learn to communicate will get a better deal'. 'Getting the message across' was an important aspect of a research career.

At the end of the day it was congratulations all round for the 150 post-graduate students, and their supervisors, who took part in the displays and oral presentations.

Congratulations were in order, too, for Deputy Vice-Chancellor, Professor Ian Chubb, whose brainchild this was, to Professor David Griffiths, who looked after the academic side of things, and for Peter Wood and Denise Stevens of Academic Services, who were behind the organisation and who were able to introduce to many of those present the unit's latest publication—the University's first truly comprehensive Research Report 1987-88.

Library enriched by John Passmore donation

The Library's collection in The University of Wollongong has been enriched by the donation of 1,100 books from the personal library of Emeritus Professor John Passmore. Professor Passmore's distinguished career includes visiting lectureships at Princeton and Rutgers, visiting fellowship at Clare Hall, Cambridge, and All Souls, Oxford, and visiting professor at Brandeis University. He was President, Australian Academy of the Humanities, 1975-77, editor of the Australian Journal of Philosophy, 1947-49, and Director of the Elizabethan Theatre Trust from 1958 to 1966.

Professor Passmore's library reflects the breadth of scholarship of his working life and also his wide-ranging interests. The first part of the donation, mainly general educational, social science and philosophical works, was received in 1984. The present donation, valued at over $16,000, includes rare and significant philosophical works, some history of psychology and writings on various social issues.

The Technical and Circulation Services Librarian, Felicity McGregor, who has been in touch with Professor Passmore since 1981, says that although Professor Passmore was anxious for Wollongong University to benefit from his collection, rather than the better-endowed ANU, he was understandably reluctant to part with the books he has collected during his lifetime.

Professor Lauchlan Chipman, who is both Professor of Philosophy and Chairman of the Library Committee, says: 'The collection will provide considerable enrichment for postgraduate researchers, while supplementing the basic stock for undergraduate teaching.

'Even if we had the money, which of course we do not, we could not have created this collection. Most of the books are now out of print, and some editions go back to the seventeenth century. It can only enhance Wollongong's attractiveness as a place in which to undertake research in the humanities and social sciences in general, and philosophy in particular.

'Professor Passmore is Australia's internationally most-well-known philosopher, and he has paid this university a magnificent compliment, and a great vote of confidence in its future, by choosing it to house his valuable collection.'
FILLIP TO THE NATIONAL ECONOMY
focus on New Metals at Wollongong

THE importance to the national economy of the development and usage of improved materials has been further recognised at The University of Wollongong by the creation of a Centre for Materials. Presently housed within the Department of Metallurgy and Materials Engineering, the Centre will be under the Directorship of Professor W. J. Plumbridge, Head of that Department, and Dr A. L. Wingrove will be the full-time Manager. Dr Wingrove has had many years' experience in a broad range of materials-based activities and is a recognised expert in metallic-coatings technology. Last year his consultancy work in the Department of Metallurgy and Materials Engineering, regarding trailer towbars, made national headlines and has led to more stringent design guidelines for these components.

The Centre will operate over a broad range of activities and time scales, from routine testing to research programs lasting several years. It has received pump-priming funds from Wollongong Uniadvice Ltd, but aims to become self-supporting and profitmaking within two years. The facilities of any participating department will be available to the Centre on a commercial basis.

Professor Plumbridge says that the establishment of the Centre at Wollongong is both logical and timely. State and federal governments have identified New Materials as an area of investment because of their high potential to contribute to economic recovery. The Wollongong district is a hive of materials-related industrial activity which, contrary to much popular opinion, involves many other metals apart from steel and, in addition, includes a considerable commitment to the new materials, ceramics and polymers. It is in these areas that growth in small companies (and employment) in the region is expected.

Finally, in the materials sphere, The University of Wollongong has a very wide range of expertise. In addition to that provided by the Department of Metallurgy and Materials Engineering, this includes the Development of New Polymers (Chemistry), Fundamental Studies in the Solid State (Physics), Large Scale Mechanical Testing (Engineering) and Stress Analysis and Computation of Materials Behaviour (Mathematics). Two other University Centres, the Microwave Applications Research Centre and Centre for Biology Research, also have materials interests. At present the extent of interaction between these groups is not high, but the existence of the Centre for Materials, open to anyone wishing to be involved, will act as a catalyst for much beneficial cross-fertilisation. This should facilitate one of the more unusual targets of the Centre—that of Product Development.

In the longer term the Centre will seek national recognition and funding.

Helen Gamble for Wollongong
Prominent Lawyer to establish Chair of Legal Studies

Chairman of the NSW Law Reform Commission, Ms Helen Gamble, has resigned her position. She has done so to establish a Department of Legal Studies at The University of Wollongong. And so that she may concentrate all her attention to the new job, she has also resigned from the Australian National University where she is senior lecturer in Law.

After taking up her position at Wollongong, and establishing a chair of Legal Studies, Ms Gamble will develop a department to provide a fresh course.

This is a new department—the first of its kind in Australia—in a young and vigorous university. Both are factors which have provided the magnet to draw this eminent lawyer from the NSW Law Reform Commission.

Helen Gamble's role at Wollongong will be to teach non-law students about the law: to increase legal awareness among students from a range of Faculties.

What she will be teaching in 1990 is not Law, per se, in the sense that she will not be turning out lawyers. That will come later. What she will be teaching to Wollongong students initially will be legal awareness—what the law is all about.

The Gazette
The Gazette is published by The University of Wollongong in the second half of April, July, October and December.

The content is chiefly concerned with University research but other University news and developments are also given a place.

The journal is distributed to all graduates of the University, and to the Friends of the University as well of course as to staff.

Copies are also sent to certain government instrumentalities and the appropriate sections of the media.

Material published in the Gazette is free from copyright. Editors of national, regional and local media are invited to make free use of published material. Further information on articles will be willingly provided by a telephone call to heads of relevant departments, or to the editor, George Wilson—Tel. 042-28 6691.

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Intelligent Materials

New-materials technology and the analytical sciences at Wollongong University

In the issue of the Gazette for May-June this year, we reported on the research collaboration between the Department of Chemistry in the University of Wollongong and industry. The project concerned the design and development of an analytical instrument for use in recording toxic plant chemicals in glucosinolates in samples of crushed rapeseed. The meter which evolved from the research has other applications, with far-reaching promise in Australia’s trade with China.

Now comes news of further outstanding research in the Department of Chemistry, resulting in further University-industry collaboration. Heading the research team under review is Dr Gordon Wallace. Such is the spate and calibre of his research work that Dr Wallace, since joining the Department less than four years ago, has attracted over half a million dollars in funding from industry, commerce and other sources.

His research group employs 14 people. His field is new materials technology and analytical sciences. His title for the research work—Intelligent Materials—is characteristically terse. Dr Wallace writes:

Intelligent Materials

A new material may be defined as a solid with unique chemical and/or physical properties. In recent years the engineering world has accelerated the search for stronger, lighter, more corrosion-resistant materials. New materials for use in biotechnology and communications have also been vigorously sought.

As a result of this, a wealth of information on new materials has appeared in the scientific literature and at least two challenges to those involved in the analytical sciences have resulted—one involves the analytical characterisation of new materials; the other involves the utilisation of such materials in practical analytical devices.

The chemical analysis of new materials containing trace constituents remains a demanding area where the results are critical to the design of future materials. The design of intelligent materials, capable of operating as sensors, sample pre-treatment devices, or chromatographic resins, is now feasible and the challenge to develop practical devices suitable for the marketplace is now in place.

In the course of research work in the Chemistry Department over recent years, expertise in the synthesis, characterisation and application of new materials has been developed.

We have, for example, synthesised a range of conductive and non-conductive coatings on substrates as diverse as platinum, plastic films, metal foams, quartz fibre optics and glass.

Polymeric materials containing enzymes, antibodies, electrocatalysts, corrosion inhibitors, complexing agents and other chemically active species have been prepared. Synthesis of polymeric layers or co-polymers is easily achieved. Devices capable of releasing these reagents under chemical or electrochemical control have been developed.

In our research group we now have a range of facilities and the expertise necessary to carry out characterisation of these new materials. These facilities include state-of-the-art electrochemical instrumentation, allowing voltammetric or potentiometric analyses to be carried out. Scanning electron microscopy and electron probe microanalysis are used routinely. Fourier transform infra-red spectroscopy is available. So, too, is thermal gravimetric analysis. A technique which enables direct-insertion fast-atom bombardment mass spectrometry to be employed has been developed in our laboratories.

A range of chemical sensors suitable for use in both the gas phase and in solution has been developed. The sensors containing intelligent materials are capable of recognising specific chemicals or biochemicals in the sample matrix. The sensor can then carry out a chemical derivatisation, if necessary, and generate an optical or electrochemical signal.

Devices capable of selective analyte pre-concentration while retaining maximum chemical information, or suitable for electrochemically controlled release of reagents, have also been developed.

A range of chromatographic stationary phases capable of reversed phase ion exchange and even gas chromatographic separation has been developed. The properties of the polymeric stationary phases can be reversibly altered during the chromatographic separation runs.

Ongoing research includes work which is aimed towards developing a range of intelligent materials for use as gas sensors, biosensors, water treatment, chemicals or corrosion inhibitors.
Graduation
At the October conferring-of-degrees ceremony, 236 students became graduates—the first to take part in such a ceremony in the Sports Hall of the Sports and Recreation Centre. The Union Hall, traditional venue for graduation ceremonies, can no longer cope with the numbers involved—1,393 graduates in 1988 as compared with 498 in 1983. The Occasional Address at the ceremony was given by Dr Gregor Ramsey, Interim Chairman of the Higher Education Council of the National Board of Education and Training.

THAT WAS A WEEK THAT WAS
A graduation ceremony, Stage 3 of the Library declared open, a mace received and the University rewards its long-stayers

Library extensions opened
At the lectern is Gregor Ramsey, who formally declared the extensions open. With him are, from the left, The Vice-Chancellor Professor Ken McKinnon, the Chancellor Mr Justice Hope, and the University Librarian, Mr John Shipp.

Ethel Hayton mace
At the time of her death Ethel Hayton MBE had intended presenting the University with a ceremonial mace. The project was taken up by Mr George Parianos and Mr Giles Pickford on behalf of the Friends of the University and manufactured in stainless steel, its head in the symbolic shape of the flower of the Illawarra Flame Tree and, inset, a carved piece of the campus figtree. At the handing-over ceremony are Mr Parianos, the Chancellor Mr Justice Hope, Mr Gino Sanguinetti (the artist and craftsman) and Mr Pickford.
Long-service awards

Those honoured for their 25 years of service to the University are, from left, Noel Kennon, John Wells, Rod Hollands, Max Lowrey, Bearene Henderson, Tom Horner, Bill Uppold, Peter Arnold, Ron Kinnell, Abe Segal, Keith McLellan, Ian Lowe and Peter Bolton

Advanced metal/matrix composites

There is today a world-wide demand for high strength, lightweight, corrosion-resistant metals with improved high-temperature properties of aluminium-based composites. Metal/matrix composites of aluminium/silicon carbide (Al/Sic) offer the potential for excellent structural materials in a wide range of applications.

Metal matrix composites enjoy property advantages over present organic matrix composites in temperature capabilities, environmental stability and design flexibility in joining. Al/Sic composites are well known as high-tech material for aircraft structures and structural members for superfast trains (Rapid Transit Systems such as are to be seen in Japan, France, Canada and the US; Australia is planning such a system now), since these metal matrix composites, due to their lower density and higher stiffness, significantly contribute valuable savings in weight. Then, too, Al/Sic composites are a focus of attention because of their potential in compressor blades in gas-turbine engines, and for structural components in high-temperature environments. Research into high-temperature deformation of these materials has become an area of considerable technological importance.

Dr Tara Chandra is currently involved in a study of the high-temperature deformation characteristics of two-phase Al/Sic composites. His research has attracted interest from overseas as well as in Australia. Alcan, the giant Canadian company, has supplied expensive material for preliminary research and, stimulated by Dr Chandra's findings of the behaviour of the composites at elevated temperatures, Comalco Australia Limited is also keen to participate.

This research has been initiated and carried out only at this University. Testing facilities have been designed and developed by Dr Chandra, and his colleague Mr Malcolm Atkinson, in the Department of Metallurgy and Materials Engineering.

A Gender and Education Unit has been established at Wollongong, within the School of Learning Studies, to provide a more structured focus for research and teaching in the area of gender studies within the School, the Faculty and the University.

The unit aims to act as a co-ordinating centre for researchers and teachers; it will be a clearing house for the diverse range of materials increasingly produced by governments, private organisations, community groups and individuals on and off campus. It will allow for more efficient co-ordination of the present separate collections in the area of gender and education which now reside with individuals. The unit is particularly concerned to encourage and, when asked, to co-ordinate relevant aspects of honours and postgraduate programs.

Members of the Gender and Education Unit include Dr Noeline J. Kyle (Deputy Head, School of Learning Studies), who heads the unit; Ms Jan Wright (SLS), Ms Jan Black (SLS), Ms Jillian Tresize (Director, Kids Uni), Ms Deslea Konza (SLS), and Dr Jennifer Jones (SLS). Links have been established with researchers working in the area of gender studies across campus, in the community, women's studies centres and organisations in the public and private sectors.

The unit has received a Challenge Grant of $3,190 to buy computing equipment to facilitate research. Dr Kyle and Ms Wright have currently funded programs of research. Dr Kyle is researching the educational contribution of Lady Caroline Edgeworth David to Australian schooling. Dr Kyle is also negotiating with the New South Wales Nurses' Association with a view to that body funding a biographical study of the educational and life experiences of Mary Kirkpatrick, a midwife in the late 19th and early 20th century in NSW.

Dr Kyle is also producing a historical biographical register of women teachers. Ms Wright is collecting data on mixed and single-sex physical education lessons in private and government schools to assess the factors affecting the participation of girls in physical activity. The unit is currently canvassing funding within the Commonwealth Department of Education particularly in the area of Girls and Maths/Science/Technology.

Members of the unit have offered an undergraduate subject, Gender and Education, for the first time in 1988 and a Masters Pass specialisation in Gender Studies will be offered for the first time in 1989.
Ultimate load tests

A series of five half-scale models of reinforced-concrete, flat-plate structures—of the type used in buildings—has been tested in the Department of Civil and Mining Engineering. The last test was completed on September 20.

Test procedures were carried out on the 5000 kg flat-plate slabs in the Department of Civil and Mining Engineering. Seen here is Mr Masood Falamaki, a PhD student who is studying at Wollongong under an Iranian government scholarship. His PhD is being supervised by Associate Professor Yew-Chaye Loo.

Used commonly on multi-storey buildings, a flat-plate structure consists of slabs and columns only, i.e., no beams or girders are used. Because of its simplicity, the flat-plate system, from an architectural and construction point of view, is an excellent structural form.

But the understanding of certain aspects of the behaviour of this type of construction is still, today, incomplete—a factor which gives rise to a lack of precision in analysis and design. There is insufficient experimental data. In Australia, before the Wollongong project, only two successful models were tested—both in the University of NSW.

The current work is in fact a PhD thesis project conducted by Mr Masood Falamaki under the supervision of Associate Professor Yew-Chaye Loo. Mr Falamaki received an Iranian government scholarship, which included also a $4000 grant towards experimental expenses.

Large-scale model tests of this type are a very labour intensive and an expensive business. The technical staff of the Department of Civil and Mining Engineering have contributed greatly to the preparation and testing of these models, each weighing about 5000 kg. In addition, the local industry, Wollongong TAFE and the School of Civil and Mining Engineering of Sydney University have in one form or another contributed toward the costs of this experimental program. Those who have supported the project include Acrow Pty Ltd, Anitech NSW, ARC Engineering Pty Ltd, ASC, Austral Standard Cables Pty Ltd, Baines Concrete Pumping, Cable Makers (ACT) Pty Ltd, Cleanaway, School of Civil and Mining Engineering, Sydney University, Go Hire, KGR Fabrications, Kenweld Constructions Pty Ltd, Newtek Electronics, Nippy Crete Concrete, Vernier Engineering Pty Ltd, Wollongong TAFE, in particular the Departments of Carpentry, Fitting and Machining, Hydraulics, and Welding, and the Steel Store.

It is anticipated that the outcome of the research will bring new knowledge to the analysis and design of reinforced concrete flat-plate building structures.

Gift of valuable software

An integrated ore-reserve evaluation computer software package has been donated to The University of Wollongong. The package, which has a market value of $27,000, was presented to the Department of Civil and Mining Engineering by Giant Resources Ltd.

Ore-reserve evaluation and mine planning involve the sequential analysis of geological, structural and economic data. Starting point of the process is the evaluation through basic statistical and geostatistical analysis of exploration data. After ore-reserve calculation, detailed mine-planning and economic analysis can be performed. The combination of PC-XPLOR and PC-MINE software packages provides an extensive suite of integrated modules designed to evaluate orebody both efficiently and accurately.

PC-XPLOR provides powerful and flexible database management, graphical display and analysis of exploration data. Following on from the database system provided by PC-XPLOR, PC-MINE provides an integrated environment for both two- and three-dimensional orebody modelling, together with mine design and scheduling. PC-XPLOR and PC-MINE will be excellent tools to assist mining-engineering students to plan and to evaluate economically an orebody. Both packages will undoubtedly open various avenues of applied research work in mine planning and development within the Department of Civil and Mining Engineering.

Wollongong to train Senior European and Asian Managers

Dr Ray Markey, Director of the Centre for Work and Labour Market Studies (CWALMS), returned recently after having been a keynote speaker at the International Round Table on Workers' Participation in Conditions of Contemporary Technological Change at Belgrade, Yugoslavia.

Dr Markey's paper on the lessons for other countries which may be drawn from recent experiences in Australia aroused considerable interest, as did his research report concerning the Port Kembla Harbour Task Force entitled Industrial Democracy at Port Kembla.

As a result of his visit an exchange relationship has been negotiated between CWALMS and the Centre for Executive Training in Ljubjiana, Yugoslavia. This Centre trains most of Yugoslavia's senior management executives as well as those of a number of other countries such as China, Holland and Germany. Dr Markey has been invited to offer a short training package to groups of Chinese and Dutch managers.

Dr Markey has also been invited to attend the Centre for the Theory and Practice of Self Management, also based in Ljubjiana, to discuss Australian developments in employee participation.