State-of-the-art optical telescope at Wollongong

VISITORS to the University campus have been curious about a structure rising from the roof of the Physics building over the past month or so. The dome-shaped building houses a new, computer-controlled, 40cm (16-inch) telescope manufactured and installed by DFM Engineering of Colorado, USA.

Although not large by international standards, this telescope is the first of its kind in Australia. What it lacks in size the telescope more than makes up in performance. It was chosen after visits to the major telescope manufacturers in Germany, Japan and the USA, because of the similarity of its control systems to those on the world’s largest telescopes. On a command from its control computer it can set, accurately, to any one of hundreds of objects preprogrammed into its computer memory. Alternatively the position of any object may be entered through the computer keyboard. This leads to a highly efficient observing, with the minimum of time spent on acquiring objects.

In addition to the traditional instruments, such as photometers and cameras, it is also intended that a range of instruments based on new CCD (charge coupled devices) be developed. Such instruments will not only enhance the power of the telescope, but also ensure that Physics students at Wollongong have a wide range of experience with the new technologies usually available only at large observatories. Such expertise in detector and instrument technology is applicable to many areas outside astronomy.

Will the telescope be open for general viewing? Yes! Open nights will be held as often as manpower, teaching and research programs, and, of course, the weather permit.

Glen Moore, Bill Zealey, Physics Department

University selected for two key centres of teaching and research

THE University of Wollongong has been selected by the Commonwealth Government for the establishment of two Key Centres for Teaching and Research.

The Centre for Advanced Manufacturing and Industrial Automation will be established by the University, at Wollongong. The Key Centre for the Mining and Minerals Industries will be a joint venture with the University of NSW.

Key Centres of Teaching and Research are concentrations of high-level activity based on the teaching and research work of existing departments or units. This work must already be of a high standard and have the potential to develop increased capacity to attract high-quality students and staff. The centres are expected to enable higher education to respond to the need for high-level and applied research in areas which are important to national development and the community in general.

From more than 200 applications received only 15 centres will be established in 1988. Competition was extremely keen from institutions with teaching and research skills of the highest standard. The government places considerable emphasis on the development of national priority areas and on co-operation between higher education and industry.

Professor Ian Chubb (Deputy Vice-Chancellor, Academic and Research) said that the selection of The University of Wollongong for the establishment of these centres amounts to national recognition of the standards of excellence established by the University in recent years.
The University Library—the greatest source of information in the Illawarra

AS THIS ISSUE of the Gazette went to press, construction work on the University library building is drawing to a close. The extension will almost double the floor space available for library services and provide a building which is flexible enough to cope with collection and service development over the next eight to ten years.

The University library contains information in a variety of formats including microfilms, archives, maps, almost 500,000 books and serials, as well as a large collection of government publications. Space limitations in the old building did not permit this material to be housed properly and access to some of the most valuable information has been restricted.

The new building will permit a more integrated approach to information. Accommodation for the special collections has been enlarged. The layout of both the monograph and serial shelving will be altered during the year to improve access to the collections.

Other services will benefit also from the enlarged building. A larger photocopy room has been included as have rooms for personal computing, reader instruction and for the use of audio equipment.

Special attention has been given to reducing access barriers for people with disabilities. Over the next few years, it is likely that considerable development will occur in the application of computerisation to the storage and dissemination of information. To date, few people have appreciated the full impact which technology will have on libraries and their users.

Libraries of the future will neither possess, nor try to possess, all recorded knowledge. Instead, they will concentrate on accessing information wherever it is housed and in whatever format. Information needs to be perceived as a function, not a format. It is conceivable that, within 15 years, libraries will spend most of their budgets not on the purchase of books but on buying information from databases.

Already, technology has begun to change the operation of The University of Wollongong library. Although books remain integral to its function, the library increasingly functions as a gateway to information stored in libraries and computer databases throughout the world. It is frequently most cost-effective to search a database in California via satellite than to fossick through the book collection for the same information.

Unlike most large academic libraries, the University library has machine-readable records for most of its titles and uses only on-line terminals to access the database. It is already possible to search the library database from terminals located throughout the University. When the campus network becomes a reality late in 1988, this access will be greatly extended and improved.

While the main aim of the library is to provide access to information needed to support the teaching and research activities of the University, it has a much broader role. Just as the University is a part of the local community so, too, the library has a role as an information source. In the wider sense, the University library is part of the national information collection which includes every library, archive and database in Australia.

Graduates of the University, as well as staff and students of other tertiary education institutions, are able to borrow from the library. Other members of the community may use the collection on site and for a fee may become Associates of the University library.

Anyone may take advantage of the University library’s expertise in searching database bases throughout the world. A range of databases can be searched quickly and accurately. Although the cost is often as high as $300 an hour to search a database, it is significantly cheaper than physically visiting an overseas library. For businesses, the cost of an on-line search can often mean significant savings or gaining a competitive edge.

The University library is the greatest source of information in the Illawarra region. As a deposit library for Australian and NSW government publications, it has on-site access to information dating back to the early years of government. The book and serial collections cover every aspect of the University’s activities. With it links to external databases, the library has virtually unlimited access to information and the expertise to find it.

Women in engineering bursaries awarded

FOR the first time in the history of the Faculty of Engineering, three bursaries valued at $500 have been awarded—at a Women in Engineering Information Evening held on May 24.

Female pupils from Years 9 to 12, their parents and School Careers Advisers from the South Sydney, Liverpool, Campbelltown, Illawarra and South Coast areas, were invited to learn about career opportunities in engineering.

The program included information about courses available, talks by women working and studying in the engineering field as well as question and answer sessions.

In order to encourage more women to study engineering, each of the four departments within the faculty offers a bursary worth $500 to the female student enrolling in the first-year full-time (48 credit point) program of the course, who has completed the HSC within the previous two years and has obtained the highest HSC mark of those eligible in the department.

The bursaries were presented to Snezana Dragisic (Electrical and Computer Engineering), Shiva Gahreman (Civil and Mining Engineering) and Elizabeth Sharp (Metallurgy and Materials Engineering).

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 given a place, too. 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 to appropriate sections of the media.

The next issue will appear on October 20 and will close for press on September 15.

The editor is George Wilson, who may be contacted on (042) 270926 or (042) 286691.
Research in a war zone

THE Christmas vacation for two Wollongong University people was spent trudging through the jungle with armed guerrillas, being stalked by head-hunting vigilantes, and dealing with other life-threatening hazards inevitably associated with conducting research in a war zone. Seeking the views of both sides in a civil war is a dangerous business.

Such is the study of current political developments in the Philippines, at least according to Dr Peter Sales (History/Education), a specialist on counterinsurgency, and Ms Cathy Beacham (History and Politics), who is completing a thesis on the ceasefire, an abortive attempt to achieve peace between the Aquino government and the National Democratic Front last year.

It was especially important to Ms Beacham that she interview as many participants in the ceasefire as possible, but the NDF is an underground organisation and making contact with the so-called illegal Left is dangerous. Two months of effort—culminating in an appearance before the Supreme Court of the Philippines—were needed before we could meet Ao Rodolfo Salas, former commander-in-chief of the New People's Army, now in detention at Camp Crame in Manila. The subsequent interview made theAquino government and the National Democratic Front last year.

was recovered from Davao Harbour shortly before Christmas.

Resettlement and other military efforts to curb the communist insurgency have added immensely to social distress. Metro Manila itself has a population of eight million people. The overwhelming majority live in shanty towns like Tondo ('Smoky Mountain') or as beggars on the streets of the tourist areas. Seventy per cent of people in the Philippines live below the poverty line.

On the island of Negros, more and more peasants are becoming refugees as the army imposes food blockades and mounts operations against people condemned to the miserable conditions of the sugar plantations.

Child mortality on Negros (where Australian missionary priest Father Brian Gore worked for many years) is among the highest in the world and the island has justifiably been described as the 'Ethiopia of Asia'. Nearly all the children suffer from malnutrition and hundreds die of hunger every year. Attempts at reform are ruthlessly suppressed by military death squads. Dr Sales has been studying the role of terror as a form of social
Microscope aids by research

duced at magnifications from 50x to 800,000x, with the higher levels being sufficient to resolve planes of atoms in crystalline materials. Fine detail of the surface of specimens can also be obtained and the instrument is capable of specialised electron diffraction techniques such as convergent beam electron diffraction (CBED) and micro-diffraction which will enhance research capabilities in the crystallography of materials. Other facilities such as auto-through focus, optimum under focus and minimum dose operation assist observation of beam-sensitive samples. The instrument is also compatible with an energy-dispersive spectrometer which is sensitive samples. The instrument is also compatible with an energy-dispersive spectrometer which is capable of micro-area x-ray analysis of fine particles and phase volumes, and it is hoped that future upgrading of the microscope will be possible to increase further the versatility of the instrument for materials research and characterisation.

The mechanical and physical properties of materials are controlled by the fine internal structure and the surface layer structure in contact with the environment. The electron microscope enables observation of the fine structure both internally and at the surface. Understanding and characterising the fine structure of materials will help in the development of new, improved materials and also indicate the best processing methods to achieve appropriate structures and properties and, ultimately, optimal performance of materials in manufactured products including structural studies of welded steels for high-strength sheet and plate applications in submarines and surface ships, titanium superalloys for jet engines, aluminium/lithium alloys for aircraft fuselage components, copper and iron-based shape-memory alloys for heat sensors and thermal actuators, and iron-based amorphous alloys for magnetic and corrosion-resistant components.

The effects of manufacturing processes, such as microwave refining and melting, rapid solidification and high-speed annealing on the structures of materials, are also being examined.

In the near future the 2000FX microscope will also be used to study polymers and ceramics as the Department expands its fields of research to cover all industrial materials.

The Scanning Transmission Electron microscope in the Department of Metallurgy and Materials Engineering. The microscope enables observation, internally as well as externally, of the fine structure of materials...

Tomorrow's telecommunications

TOMORROW's telecommunications will provide flexibility and numerous services (such as telephony, data transmissions, facsimile, text and even video telephony). They will be affordable for all and easy to maintain. Developments such as those researched in the Department of Electrical and Computer Engineering in the University of Wollongong are bringing 'tomorrow' much closer.

For the average office worker, a telephone is essential, but it would not be of much use if it were not connected to a communications network. The line from the telephone could go either directly to the Telecom network, or via an exchange within the organisation of the user—referred to as a 'Private Automatic Branch Exchange' or 'PABX'. Personal computers, which are increasingly becoming an equally essential part of the office worker's repertoire of tools, are on the whole currently used in isolation. But strong pressures, such as the need to share data and computing resources, are progressively forcing users to attach their personal computers to inter-connecting networks. Such networks (termed 'Local Area Networks'—'LAN') are to the personal computer what the PABX is to the telephone.

While it is possible to use the PABX to achieve communications between computers, this is not particularly satisfactory because of the peculiarities of the communication requirements of computers. In particular, computers require the transfer of irregular high-speed bursts of information, leading to LANs which use shared, high-speed cables to which all computers are connected. A user may suffer delay in achieving communication (the cable might be occupied by transmission from another computer), but as machines are highly tolerant of this form of impairment, this doesn't pose a problem.

As a result of these developments, the current trend in many organisations is to have two separate networks—one for telephony (the PABX) and one or more for computers (the LAN). An increase in communications costs results, not only because of the duplication of wiring and equipment required but because of the labour costs of installing and maintaining the networks. And because of rapid advances in computer technology, computer network users are experiencing advantages that are not always available to their telephone counterparts.

For example, should a need to move offices arise, the personal computer is easily disconnected from the network and reconnected in its new location, enabling normal communications to be continued quickly.

On the other hand, it is usually necessary to inform Telecom of such movements to enable any telephone extensions to be transferred to their new locations. The reason for this difference is that in telephone networks, the switching functions are generally centralised in the PABX (since the telephone is a 'dumb' device), whereas computer networks distribute many of these functions among the intelligence of the subscribing computers. This enables many operations to be carried out independently of the central authority.

When confronted by these issues, the obvious question arises: why not use the computer networks to transmit telephony as well?

Using telephone speech on computer networks has traditionally been resisted because, as explained earlier, local area networks are designed to transmit information in small bursts. This leads to discontinuities in the speech received by the listener; it is disconcerting to a telephone user. The problem is further compounded by the fact that the capacity of all networks is limited. However, due to statistical fluctuations in demand, there are always occasions when the requirements for service exceed the capacity of the network.
**Students write for Carnivale**

Mary Kalantzis and Bill Cope, in the Centre for Multicultural Studies, are co-ordinating a schools writing project for the literary component of Carnivale. A festival sponsored annually by the New South Wales Ministry of the Arts, the project, to cost approximately $25,000, receives financial support from the Australia Council and the Disadvantaged Schools Program.

The Carnivale Schools Writing Project reflects the concern of Carnivale with the experience and celebration of diversity in Australia. Begun early in Term 2, it focuses on the experiences of school students in primary and secondary schools in inner-city Sydney.

The emphasis is not directly on students’ sense of ethnicity. Through an exploration of relationships with peers, parents, people in authority, the media and neighbours, however, the reality of pluralism inevitably finds its voice, interwoven through the challenges of everyday life. In articulating the pleasure and pain of their lives, the experience of cultural diversity is profoundly overlaid by issues such as sex, authority, drugs, school, and so on. The schools chosen are all involved in the Disadvantaged Schools Program and represent an extraordinary variety of Aboriginal, non-English-speaking background and English-speaking background groups.

The project has three broad and complementary objectives: pedagogical, artistic/literary and social. Through the experience of participating in the project we hope that students will give Carnivale a vision of their world view and artistry. The Carnivale organisation will, in return, provide them with the chance to enhance their understanding of the relationship between creativity and craft. All this is set within the overall framework of exploring the critical social issue of diversity and finding a voice and arena for expression.

Working closely with their classroom teachers, students first immerse themselves in the social issues and themes via pre-writing classroom activities and discussion, in order to develop a frank, sincere and open atmosphere.

As visual imagery and layout are critical to the reception of text, the students will also be involved in the production of their work right through to the publication stage. Writing will thus be conceived as a whole production process, not simply the generation of text, but involving typesetting, design and packaging as a book.

It is hoped that the goals of the Carnivale celebrations will thus be enhanced by a well-crafted product and performances by students. Along the way, the participating students will have been involved in a writing/production experience of pedagogical and social value to them. In this way, the whole exercise will be a truly reciprocal community event.

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**National Teaching Company Scheme**

The National Teaching Company Scheme was established by the Commonwealth to promote advances in technology and business efficiency. A joint aim is the formation of long-term partnerships between industry and tertiary education. University researchers thus become exposed to the industrial environment, and companies may benefit from the university research. At the signing of the Agreement, from the left in the picture below, are Mr M. Pauline, Technical Manager, Heat Containment Industries; Mr Jim Peddie, General Manager, Heat Containment Industries; and Professor William Plumbridge, Head of the Department of Metallurgy and Materials Engineering at Wollongong University.

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**Ethnic small business and economic restructuring**

IN AUSTRALIA, migrants from non-English-speaking countries have usually entered the labour market in manufacturing jobs which are characterised by relatively low levels of skill, low wages, poor conditions and labour-intensive production processes. Recently, however, Australia has experienced a period of profound economic restructuring which has particularly affected the manufacturing industry and led to high rates of unemployment among migrant workers in this sector and among newly arrived migrants who would otherwise have found work there.

At the same time there is an indication that the number of self-employed and small-business people has been growing—a contrast to the trend of the post-war years.

There is disagreement over the meaning of this trend. Some have argued that it involves a growth in exploitative forms of self-employment such as outwork and other types of sub-contracting, while others see it as evidence of social mobility among ethnic minority groups. Although some four-fifths of Australian enterprises fall into the ‘five workers or fewer’ category, there has been very little research on the characteristics of small business.

At the University of Wollongong, a two-year research project is funded by the Office of Multicultural Affairs in the Prime Minister’s Department and the Australian Research Grants Scheme. Its specific objectives are:

- To identify the economic contribution of migrants from non-English-speaking backgrounds to the Australian economy;
- To examine the changing patterns of migrant employment in the context of an economy undergoing restructuring, examining particularly the trend away from manufacturing;
- To examine changing migrant career paths and patterns of social mobility;
- To describe trends of self-employment and small business ownership among non-English-speaking background migrants in Australia and more specifically in Sydney;
- To examine the consequences of these trends for policies in the areas of industry planning, employment practices, training and retaining.

The research team comprises: Professor Stephen Castles, Head, Centre for Multicultural Studies, University of Wollongong; Caroline Alcorso, Research Fellow; Kathy Gibson, Lecturer, University of Sydney; David Taitt, Research Sociologist; Jock Collins, Lecturer, Kuringai College of Advanced Education.

The team would welcome suggestions or comments on the project, or input from people who may wish to be involved.

Contact numbers are Centre for Multicultural Studies: telephone (042) 27 0780; Kathy Gibson/David Taitt: (02) 560 0094.
Fulbright Award to ecologist

Dr Rob Whelan, Senior Lecturer in Biology, is one of the eight Australians selected for Fulbright Senior Awards for 1988. The names of the award recipients were announced in the magazine of the Australian-American Educational Foundation, The Fulbrighter.

This award will permit Dr Whelan to spend a six-month study leave in the United States in the first half of 1989. The basis for Dr Whelan's award was a research proposal centred on collaboration with colleagues at the University of Florida and at San Diego State University in two areas of research: pollination ecology and fire ecology.

Professor Peter Feinsinger will host Dr Whelan's visit to the Zoology Department at the University of Florida. Professor Feinsinger's research team has been engaged in studies of pollination of Costa Rican cloud forest plants which parallel the research interests of the ecology/ecological genetics group, headed by Dr Whelan and Dr Ayre, at The University of Wollongong. Both groups are examining questions central to pollination ecology, such as: Do plant species compete for the services of pollinators? and What are the genetic consequences of different mating systems in animal-pollinated plant species?

While in Florida, Dr Whelan also plans to continue a long-term research project, with the support of the State of Florida Department of Natural Resources, examining the effects of management burning in different seasons and at different frequencies on the regeneration of native tree species. This same topic concerns land management authorities in many fire-prone parts of the world, including the Illawarra region.

Geography Department attracts second rainforest research grant

THE Department of Geography at The University of Wollongong has recently been awarded a $10,000 grant, under the National Estate Grants Program of the Commonwealth Department of Arts, Sport, the Environment, Tourism and Territories, to enable a detailed study of the conservation needs of the rainforests of the Illawarra region.

The study will be carried out by Dr Kevin Mills, a Research Associate in the Department. Dr Mills has been researching the flora and fauna of the region for many years and has a special interest in rainforests. He recently completed a report to the New South Wales National Parks & Wildlife Service on rare rainforest plants in the Illawarra Region.

Dr Mills said that the aim of the study is to develop a rainforest conservation strategy which will provide conservation and management guidelines for the region's rainforests.

The objective of this study is an important one. My previous research indicates that approximately 75 per cent of the Illawarra's rainforests were destroyed during the clearing of the vegetation associated with settlement of the area by Europeans.

For this and other reasons we must ensure that our remaining rainforests are managed appropriately. Special attention must now be directed towards describing the forests, identifying features and sites of conservation importance and making recommendations for their long-term conservation. It is only when we understand the ecology of the rainforests that they can be managed in an effective way. We now have a good deal of information on the way in which these rainforests work and can thus begin to formulate management guidelines.

The study will begin almost immediately and will be carried out over a period of approximately 18 months.

Management education for China

A DELEGATION of senior academics and public servants led by Wang Zucheng, Director of Education, Ministry of Metallurgy, People's Republic of China, visited the University on June 8. They had come to Australia to learn about management education—particularly that of engineers and metallurgists engaged in the metals industries. The delegation, which spent the day with the Department of management, learnt first-hand from postgraduate students, local companies and teaching members of the department about the nature, content and structure of management programs at the postgraduate and post-experience level.

Through a joint venture between the Australian and Chinese governments a new management institute is being established at Wollongong and members of the Wollongong staff have been invited to China to participate in some of the developments. In spite of its grounding in capitalist system, the delegation was interested in many aspects of management education.
Demand for TASC expertise continues to grow—$½ million and rising

THE growing importance of the effective development and application of technology in Australia’s economic performance, and of TASC’s reputation as a quality performer of strategic research to assist decision-making in the public and private sector, is reflected in the growing demand for TASC’s services.

Ten new contracts have been obtained, in the first five months of 1988 (see list), taking the total income thus far above the half-million-dollar level.

Bond Corporation—Preliminary Technology Evaluation of Gallium Arsenide Microwave Monolithic Integrated Circuit Based Products in the Communication Industries.

JETRO—Government Support for Industry Research and Development.


Institute of Engineers—Interactive Science Centre.

Curriculum Development Centre—Towards a National Science Education Statement.

CRA—Management Development Program.

NIES—Model of University Industry Interface Strategies.

Tomorrow’s telecommunications from page 5

So in order to prevent congestion under these circumstances, the network will impose a limit on access. For example, most of us have had the experience of lifting a telephone handset—and instead of obtaining a dialling tone hearing the engaged signal. For human users, being refused access to the network is annoying but acceptable. Computer networks don’t control demand in this way. Rather do they cause instantaneous regulation of the flow of information between computers. This is equivalent to the PABX allowing a caller to begin a conversation, then requiring the caller to stop in the middle of a sentence. And that, of course, simply won’t do.

Despite these problems, many researchers believe that the most appropriate way in which to integrate communications of differing types is to use computer networks—and to adapt the telephone system to make it possible to transmit voice over them in bursts. A team of researchers in the Department of Electrical and Computer Engineering at The University of Wollongong, led by Professor Hugh Bradlow, has been developing such a system. This research has resulted in a new method of converting voice signals into a form that is compatible with transmission over computer networks. The technique has been used to design a special telephone which plugs into the expansion bus of an IBM-type Personal Computer. With this new system, provided it is connected to a network, any person with a personal computer will be able to convert the computer into a telephone. Work is currently proceeding on the software to complete the system, which, when finished, will achieve important cost savings and offer other advantages as well, since the operating power of the computer can be used to provide assistance to the telephone user. For example, it will be possible to access the telephone directory on the computer and to search by name for the party whom you wish to call.

Once located, the computer will proceed to dial the number and, if engaged, could be requested to try at regular intervals or at some specific time. The computer could also be programmed to serve as an answering machine to take messages. Should you leave your office but still wish to receive calls, the nearest ‘computer-phone’ can be instructed to accept all your calls. As we said at the beginning, tomorrow is coming very much closer.

Research in a war zone from page 4

control, especially in feudal strongholds such as Negros.

A personal highlight was the opportunity to participate in the march to commemorate the first anniversary of the Mendiola massacre. Led by the charismatic peasant organiser Jaime Tadeo, thousands of rural workers returned to the place where the military had fired upon a similar rally 12 months earlier, killing several people and wounding many more. The international contingent marched immediately behind the leaders in case the soldiers again opened fire, a device which gave foreign visitors a chilling reminder of the courage needed by Philippine activists today.

More than two years after the overthrow of Marcos, danger lurks everywhere and terror remains a part of everyday life. The hospitality and kindness of people caught in these terrifying circumstances were deeply moving. Whether involved with church, human rights, and welfare organisations or with unions and cause-orientated groups, they ask only that the true story of their country be reported to the outside world.

By the end of what was never an ordinary field trip, Dr Sales and Ms Beacham were being monitored and watched (a stage called ‘pinpointing’ in a process which can lead via ‘targeting’ to ‘salvaging’ or death for Filipinos who anger the armed forces). Late in the piece, and without causing surprise, counter-intelligence chief Colonel Robert Delfin (allegedly a notorious Marcos torturer, known as ‘Mr Electricity’) suggested that the intrepid Wollongong pair should leave the Philippines.

This was an offer too good to refuse. But having left many good friends behind, the pair plan to return to the fray in December this year.

Among other activities, meanwhile, Dr Sales is co-organiser of a conference on Low-Intensity Conflict (LIC) which is to be held during August at Monash University in Melbourne. LIC is a form of US counter-insurgency being applied in Central America, the Philippines and southern Africa. Described as ‘total war at the grassroots level’, it is the means by which the Reagan administration has sought to curb what it sees as unwelcome change in the so-called Third World. The Melbourne conference will bring together a number of international experts to discuss this element of US foreign policy.