Flintoff medal

Prof L. N. Mander

Lewis N. Mander is a professor of chemistry in the Research School of Chemistry at the Australian National University (ANU). A graduate of the universities of Auckland (MSc, 1961) and Sydney (PhD, 1965), he began his career as a lecturer at the University of

Adelaide in 1966 and then moved to the ANU in 1975 as a senior fellow. In 1980 he was appointed professor and served as dean, 1981-86. He has been a Nuffield fellow at Cambridge University (1972), and a Fulbright senior scholar at the California Institute of Technology (1977) and at Harvard University (1986). He was awarded the H. G. Smith medal of the Royal Australian Institute of Chemistry in 1981 and was elected to the Australian Academy of Science in 1983.

His research interests are concerned primarily with methodology and strategies for the synthesis of complex natural products which have interesting biological properties. These activities embrace a second major interest in the molecular basis of plant growth and development, with special reference to the diterpenoid growth substances typified by gibberellic acid. His most recent work has utilised synthesis as a tool to elucidate the structures of a series of naturally occurring diterpenoids which occur naturally in microscopic quantities and regulate sexual development in fern gametophytes.

Scattering of ANU research schools still an option

By KAREN HOBSON, Education Reporter

A proposal to split the Australian National University's teaching and research facilities, which has sparked widespread condemnation on and off campus, is one of the "softer" options being canvassed for the ANU's future.

A more drastic step, and one which has apparently not been ruled out, would be to scatter the university's research schools at campuses throughout Australia.

This strategy was part of a submission to last year's Stephen committee, which reviewed the ANU's Institute of Advanced Studies and, according to a spokesperson for the federal Minister for Higher Education and Employment Services, Peter Baldwin, is still up for consideration.

This lough option is unlikely to win favour with an ANU Council, administration, staff and student body which has already overwhelmingly rejected the recommendation that its teaching faculties be separated from the IAS and merged with the University of Canberra.

This recommendation from the chair of the Higher Education Council, Professor Ian Chubb, has led the ANU Council to call for a moratorium on government-demanded changes to the university's structure, and to warn Mr Baldwin that "mischievous rumours, personal abuse or deliberate scare-mongering" will not contribute to a reasoned debate.

Mr Baldwin commissioned the Chubb report as a follow-up to the Stephen Report which recommended widespread changes to the IAS but not its separation from the ANU. Professor Chubb says the Government should look at letting the IAS stand alone as a national research institution.

Mr Baldwin is expected to make an announcement in the first week of March, concluding discussions with university, government, staff and student representatives this week.

According to the spokesperson the minister has greeted the discussions with an "open mind" and is looking at all options before announcing his decision.

The proposal to relocate the ANU's research schools to varying parts of the country was put to the Stephen committee by "one of Australia's oldest and most traditional universities". It suggests the John Curtin School of Medical Research be next to a major teaching hospital, most appropriately in Sydney.

"The clinical section might remain in Canberra but should become an outpost of an existing medical school, either the University of NSW or the University of Sydney, or Queensland University," it says.

The Research Schools of Chemistry and of Physical Sciences would "achieve greater intellectual and industrial impact" if they were in a large metropolis, the School of Earth Sciences was not appropriately located in Canberra, and there would be advantages in relocating the Schools of Social Sciences and of Pacific Studies.

It advocated the retention in Canberra of the School of Biological Sciences which could form close links with the CSIRO.

Acknowledging practical problems of implementing such a plan in the medium term, the submission says affiliation with interstate universities would be an intermediate step to the "ultimate objective of relocation".

It says one of the original purposes of the IAS, to establish basic sciences in the Australian higher-education system, has been completed and there is no clear evidence that its special advantages have "resulted in significant intellectual leadership in the basic sciences, social sciences and humanities".

Though the IAS continued to attract prominent scientists and scholars to Australia, the goal of national and international exchange could be accomplished by other means and it was "not clear the exchange program should continue to be focused on Canberra".

The submission argues for a change from the annual federal block grant to competitive funding with a five-year transition period.

ANU Reporter Vol 22 No 7 22.5.91

Three ANU scientists honoured

Two scientists from the ANU's Institute of Advanced Studies are among nine recently elected to Fellowships by the Australian Academy of Science. A third ANU scientist has received the Academy's top award for experimental physics research by a young scientist.

Photo: Peter Quiddington

Dr White

The two new ANU Fellows of the Academy are Professor John White, Professor of Physical and Theoretical Chemistry in the Research School of Chemistry, and Dr Stjepan Marcelja, a senior fellow in the Department of Applied Mathematics of the Research School of Physical Sciences and Engineering (RSPhysSE).

Professor John White has made significant contributions to methods of high resolution spectroscopy using neutrons and x-rays. His work has application to a wide variety of fields in chemistry and biology including the structure of polymers of commercial significance to the petroleum industry and the structure of viruses.

He has served as director of the tri-national Institut Laue-Langevin in Grenoble, France, and has also developed a strong international collaboration between the ANU and the Argonne National Laboratory of the US Department of Energy.

In February and March this year, Professor White was Hinshelwood Lecturer at Oxford University. He is a Companion of the Order of St Michael and St George.

ANU chemists discover new plant stimulants

New plant growth stimulants discovered in an international joint project involving ANU chemists could lead to the phasing out of environmentally suspect chemicals now used to boost crop yields.

Together with biologists at the University of Calgary in Canada and CSIRO's Division of Plant Industry, the ANU researchers are working on powerful hormonal regulators called gibberellins (GAs – short for gibberellic acids).

Gibberellins, common to all flowering plants, conifers and ferns, are recognised to have wide applications for agriculture. Commercially, GAs are sprayed on trees to improve productivity in orchard crops, to increase the size of seedless table grapes, to promote early germination and flowering, change the sex of flowers and even speed up ale malting.

Professor Lew Mander, who heads the Organic Synthesis Group in the Research School of Chemistry, has been interested in GAs for more than two decades. He leads the ANU research effort on the compounds.

He believes the new members of the family found through the collaborative fundamental research could pave the way for 'designer GAs' tailored to target desirable aspects of plant development.

The most typical and spectacular horticultural effect of GAs is their ability to stimulate stem growth. This is most obvious in 'rosette' plants like lettuce and cabbage which 'bolt' to seed before flowering.

'Each year the world uses at least 25 tonnes of GAs for various agricultural purposes. This amount goes a long way because they are normally used at dilutions of a few parts per million. Commercially-used GAs retain the tendency to produce excess vegetative growth, so the irony is that much previous research on these compounds has been aimed at 'shutting off' their powerful effects,' Professor Mander said.

GAs were first recorded in Japanese rice crops afflicted with a fungus, *Gibberella fujikori*, which caused 'leggy' seedlings. The gangly growth was eventually traced to a chemical biosynthesised by the fungus, and following extensive studies at ICI in the UK, the chemical was shown to be a GA.

Later, it was discovered that GAs are made by higher plants themselves, and 80 different GAs now have been isolated. They affect almost every aspect of plant growth and development, acting in different ways on plants depending on where and at what stage of a plant's life cycle they are applied.

Many food producers, for example cereal growers, want compact fast-maturing plant varieties so that more energy is directed into the ripening grain or fruit rather than leafy growth. Therefore, they turn to chemicals which dwarf the plants by disabling natural GAs.

Unfortunately, synthetic compounds employed to 'knock out' GAs and produce these dwarf plants must be re-applied over and over again, giving rise to long-term environmental problems.

Professor Mander believes he has an environmentally better solution based on modified GAs. His modified compounds promote early flowering and at the same time interfere with the plants' own production of normal GAs, leading to more natural dwarfing than by synthetic chemicals.

To determine the effects of the new compounds in the laboratory, mixtures containing GAs are extracted from plant tissues then the purified fractions are re-applied to different plant organs. The active fractions are then tracked through the plant to specific sites.

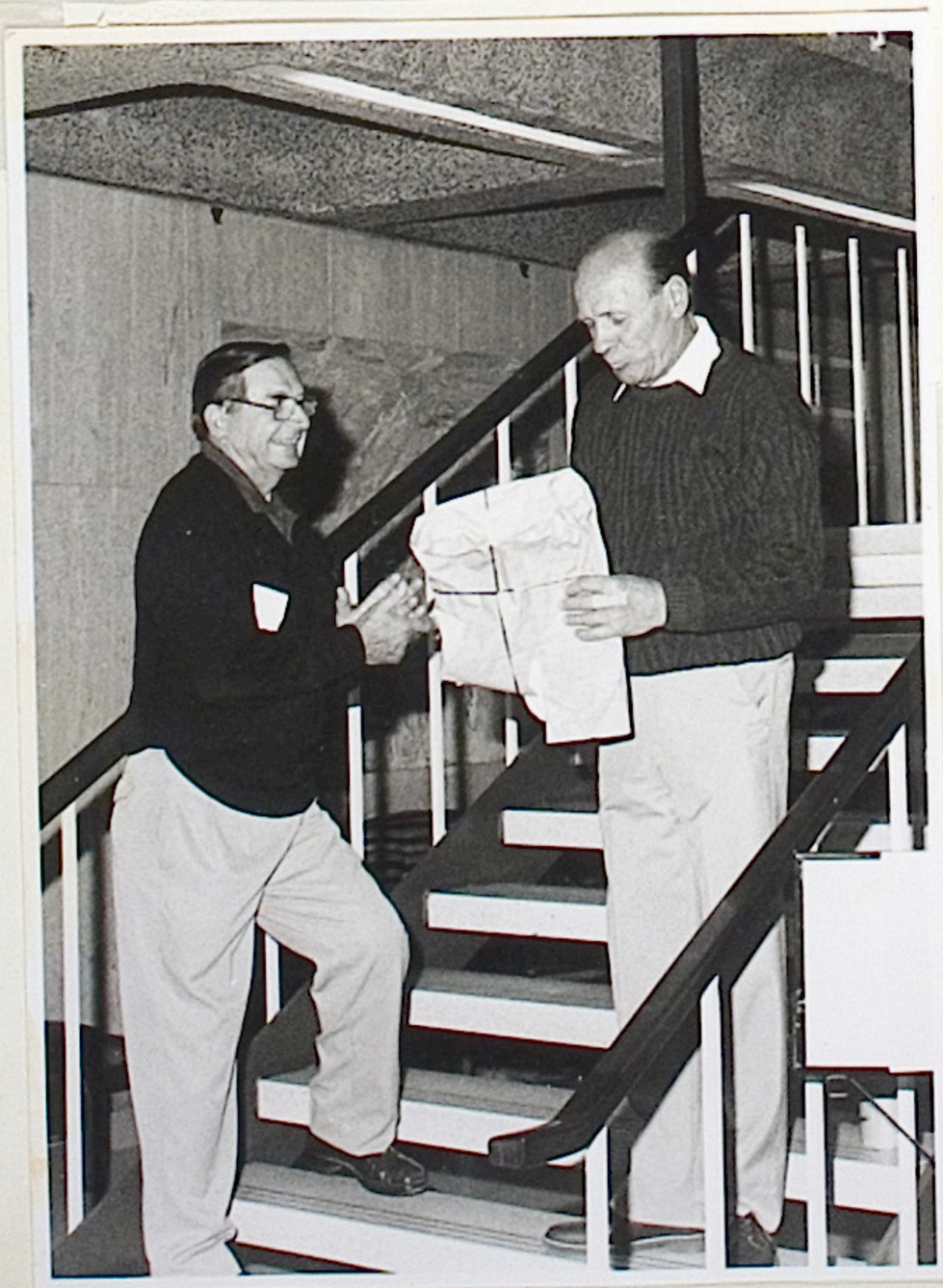
'The new GAs were discovered while we were trying to establish whether naturally-occurring flowering stimulants do exist, whether they are discrete substances or mixtures of substances, if they can be isolated, and above all what types of compounds they are,' Professor Mander said.

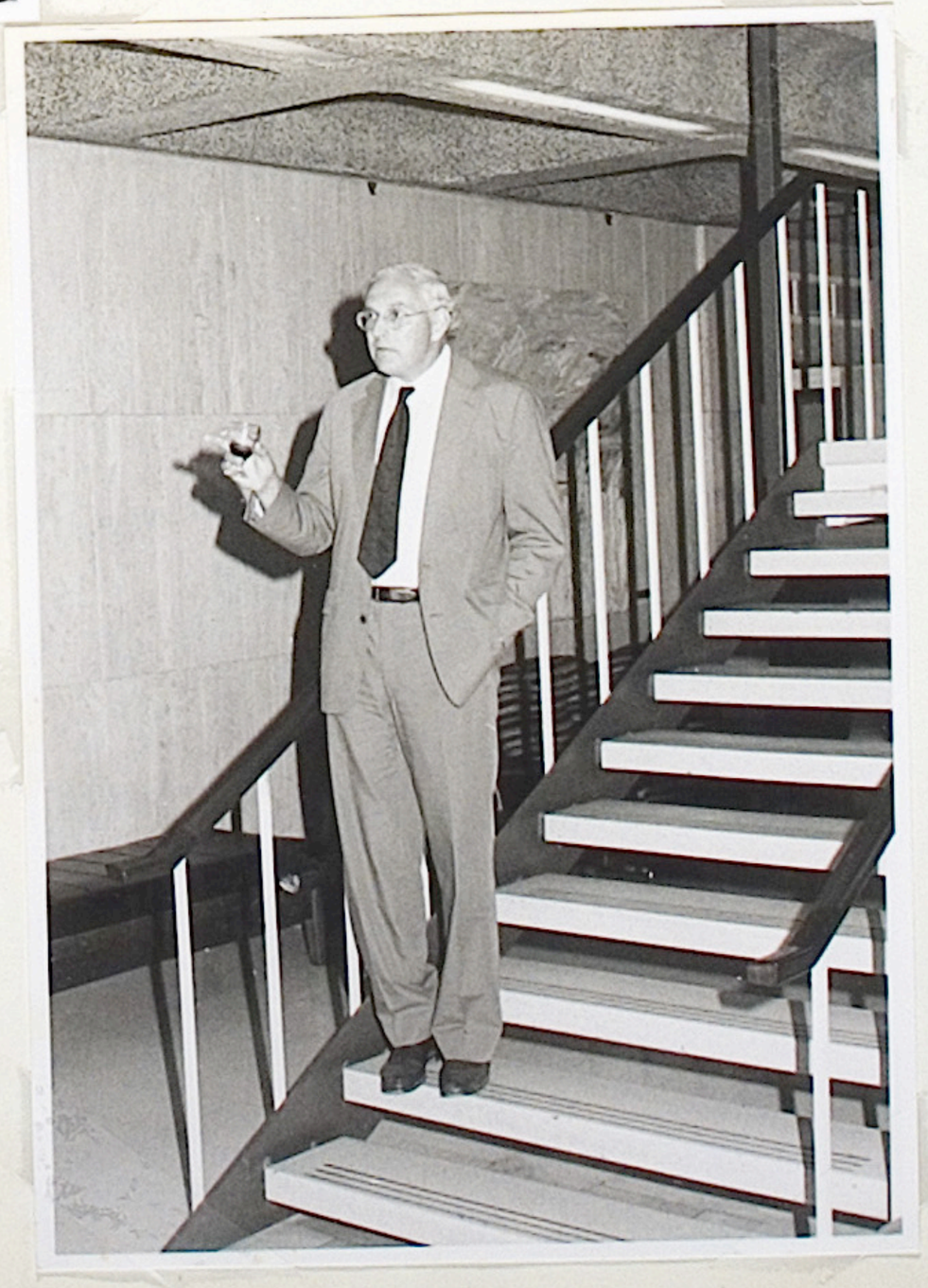
— Marietta McGregor

Farewell to George McLaughlin

A School Function to farewell the Laboratory Manager, George McLaughlin, was held on Friday 31 May. George has been appointed Head of the Management Information Services Division. *RSC News* would like to congratulate George, shown below at the function, on his appointment and wish him all the best in his new position.

1991





Prompt action saves priceless lab samples

A report in a past edition of 'Gases at Work', and a prompt response to a request for help, were instrumental in saving valuable laboratory samples at the Australian National University, Canberra, recently.

At the University's Research School of Chemistry, an ultra low freezer used for storing protein samples at temperatures of around minus 60 degrees Centigrade broke down, putting many years of research in jeopardy.

As replacement parts had to come from overseas, the school's Technical Department was forced to find some alternative method of refrigeration. Liquid nitrogen was immediately considered, but suitable storage vessels (Dewars) were not readily available.

As an interim solution, the samples were packed in solid CO2, but this measure proved to be extremely labour intensive as the coolant had to be 'topped up' at regular intervals, even over weekends.

It was then that John Hush, the school's Head Technical Officer, found a report of a similar problem which had occurred in North Queensland in a five year old copy of 'Gases at Work'.

The report related the failure of refrigeration facilities at the Institute of Marine Sciences at Cape Ferguson when irreplaceable bio samples, normally maintained at a temperature of minus 80 degrees Centigrade were put at risk.

As in the case of the ANU, the Institute tried using CO2 as a temporary measure, but when this proved unsatisfactory, called the local CIG branch for advice.

> "If we had lost these samples we would have thrown away 10 years of research"

"Following this lead, I immed got in touch with CIG and in th usual way, they helped us out," John.

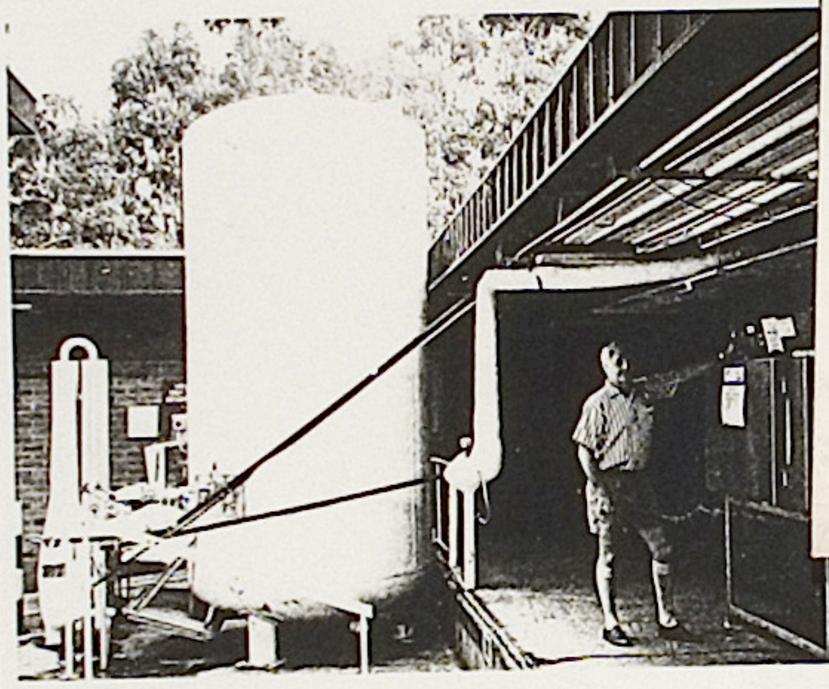
"After a lot of ringing around, they managed to find us a mini batch freezer and we installed this on loan, immediately adjacent to our VIE 7000 litre liquid nitrogen storage tank."

Major disaster averted

"As these units are usually used for snap freezing in 20 minute cycles, we had to modify the controls for continuous storage at minus 60 degrees Centigrade, but it now works extremely well."

It certainly averted a potential major disaster as if we had lost those samples, we would have thrown away ten years of research," he said.

"We are now considering building our own stand-by unit in case of another emergency as there are many



John Hush, Head Technical Officer, Research School of Chemistry, ANU

cylinder demand and handling.

Reader Service No. 119

1992.

EVACUATION GROUP
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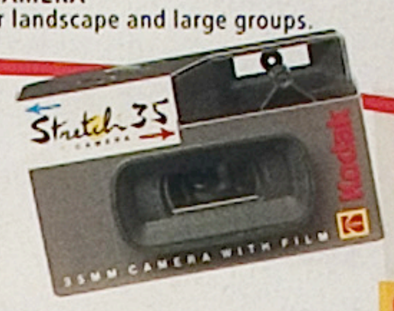

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The case of the intriguing crystal, zirconia

CRYSTALS make up many technologically important materials as well as most of the earth and the other planets and chemists in the ANU's Research School of Chemistry (RSC) are engaged in a project to understand their structure.

Specifically, the RSC scientists are on the verge of solving the mystery of the crystal structure of cubic zirconia.

For more than 25 years the crystal structure (i.e. the way the atoms are arranged) in this industrially-important material has baffled crystallographers and solid state chemists. Australia is a major exporter of zirconium oxide (zirconia) which has commercial importance as gems and also industrial importance for its property of ionic conductivity.

Previous generations of crystallographers were satisfied that they knew all there was to know about crystal structure, but it is now apparent that many of these descriptions of crystalline structure were only approximate. In many cases, industries have been developing materials, discovered on an *ad hoc* basis, without an understanding of why they have certain properties.

Dr John Thompson, a project team member at the RSC, says once the crystal structure of this material is known it will allow a better understanding of the intriguing property of superionic conductivity which cubic zirconias possess when they are subjected to high temperatures. When the zirconia is heated to above 1000°C, the oxygen atoms behave like a liquid and 'float around' in the structure, even though the zirconia is solid. It is this high level of mobility of the 'floating' oxygen atoms that makes zirconia a superionic conductor, which has important industrial applications, for example, in the steel industry for measuring the oxygen content in high temperature blast furnaces. The oxygen ions in the crystal have a charge, so it is possible to electrically measure the oxygen that passes through the crystal.

This research effort by the RSC into crystallography has been recently supported by the Institute of Advanced Studies' 'Strategic Initiatives' program, whereby funds are pooled from all the research schools in the IAS and are allocated to specific projects within the schools on the basis of merit.

Earlier this month, the project team, headed by Dr Ray Withers, produced its first zirconia crystals, using a newly delivered $80,000 furnace. The furnace is specifically designed for this project, to 'grow' crystals of high melting point materials such as cubic zirconia (which has a melting point of about 2600°C).

The crystal-growing method used is called a 'plasma torch'. Dr Thompson describes the process as a cross between a blow torch and a fluorescent tube. An extremely hot argon gas plasma melts the cubic zirconia powder to form a single crystal by recrystallisation from the molten material.

The plasma used to melt the material to form the crystals is hotter than the surface of the sun. The centre of the argon plasma is in excess of 16,000°C, compared with an estimated temperature of the visible surface of the sun of about 6,000°C.

Once the single crystals have been obtained, the next step in studying their structure is to use X-ray or neutron diffraction, which involves firing X-rays or neutrons at the crystal to produce an image of it. Dr Richard Welberry, leader of the Disordered Materials group, has developed an X-ray 'camera' which makes it possible to collect X-ray data of higher quality than previously achievable.

The X-ray data is then fed into the ANU's VP2200 supercomputer to test models of the crystal structures against the experimental data. Dr Welberry and Dr Brent Butler from the same group, have developed computational methods for modelling the X-ray data. Computer models developed from the X-ray sources as well as more sophisticated higher resolution electron microscopes have made it increasingly evident that the regular lattice concept of the structure of crystal materials is the exception rather than the rule.

— Kay Barney

Major honours for chemists

BY KAY BARNEY

SCIENTISTS at the Research School of Chemistry have won a number of international and Australian awards for excellence in 1991/92.

The Royal Society of Chemistry (in the UK) has awarded Professor of Chemistry and outgoing Dean of the Research School of Chemistry, Professor Athel Beckwith, a 1991/92 Centenary lectureship.

Only one other Australian has won a Centenary lectureship in the 50 year history of the award. Professor Beckwith is the first Australian organic chemist to win it. He was presented with a silver medal at a symposium in London during his lecture tour in the United Kingdom in January.

Centenary lectureships fund overseas academics to visit the UK to present a series of lectures on their work. Professor Beckwith returned from the UK earlier this month after presenting eight lectures to a wide range of institutions all over Britain.

Professor Beckwith's lectures focussed on his research on free radicals, specifically in identifying and understanding the factors that influence their structure and chemical behaviour. Free radicals are very highly-reactive and therefore very short-lived, chemicals, often existing for only fractions of a second. Until recently free radicals were thought of as curiosities but are now recognised as key intermediates in many processes of biological and practical significance, including the induction of cancer, the ageing process, the formation of smog and the industrial production of important plastics and polymers.

Basic knowledge about the behaviour of free radicals can be applied to the control of undesirable processes such as the induction of cancer and the development of processes for the production of useful new compounds and materials, including pharmaceuticals and other biologically active compounds. Professor Beckwith's group has been heavily involved in work of this type.

Professor Beckwith has been at the ANU since 1981 and is a Rennie medallist and H G Smith memorial medallist of the Royal Australian Chemical Institute. He has also served the Institute in many capacities including that of federal president. He was elected Fellow of the Australian Academy of Science in 1974 and of the Royal Society in 1989.

The Royal Society of Chemistry's 'Nyholm lecturer' for 1991/92 is Dr Martin Bennett, a professorial fellow at the Research School of Chemistry.

Dr Bennett's research interests are in the organometallic and coordination chemistry of the d-block elements, in which he has published more than 170 papers. He has studied the reactions and structure of metal complexes of aromatic hydrocarbons and of acetylenes.

The Nyholm lectureship was founded in 1973 to commemorate Sir Ronald Nyholm, president of the Royal Society of Chemists from 1968-70.

Dr Bennett won a Turner and Newell fellowship in 1961 to work with the late Professor Nyholm at University College London. He stayed as a lecturer at UCL until moving to the ANU in 1967.

The Royal Australian Chemical Institute has awarded the 1991 Leighton Memorial Medal to Professor David P. Craig, Emeritus Professor of Chemistry at the ANU.

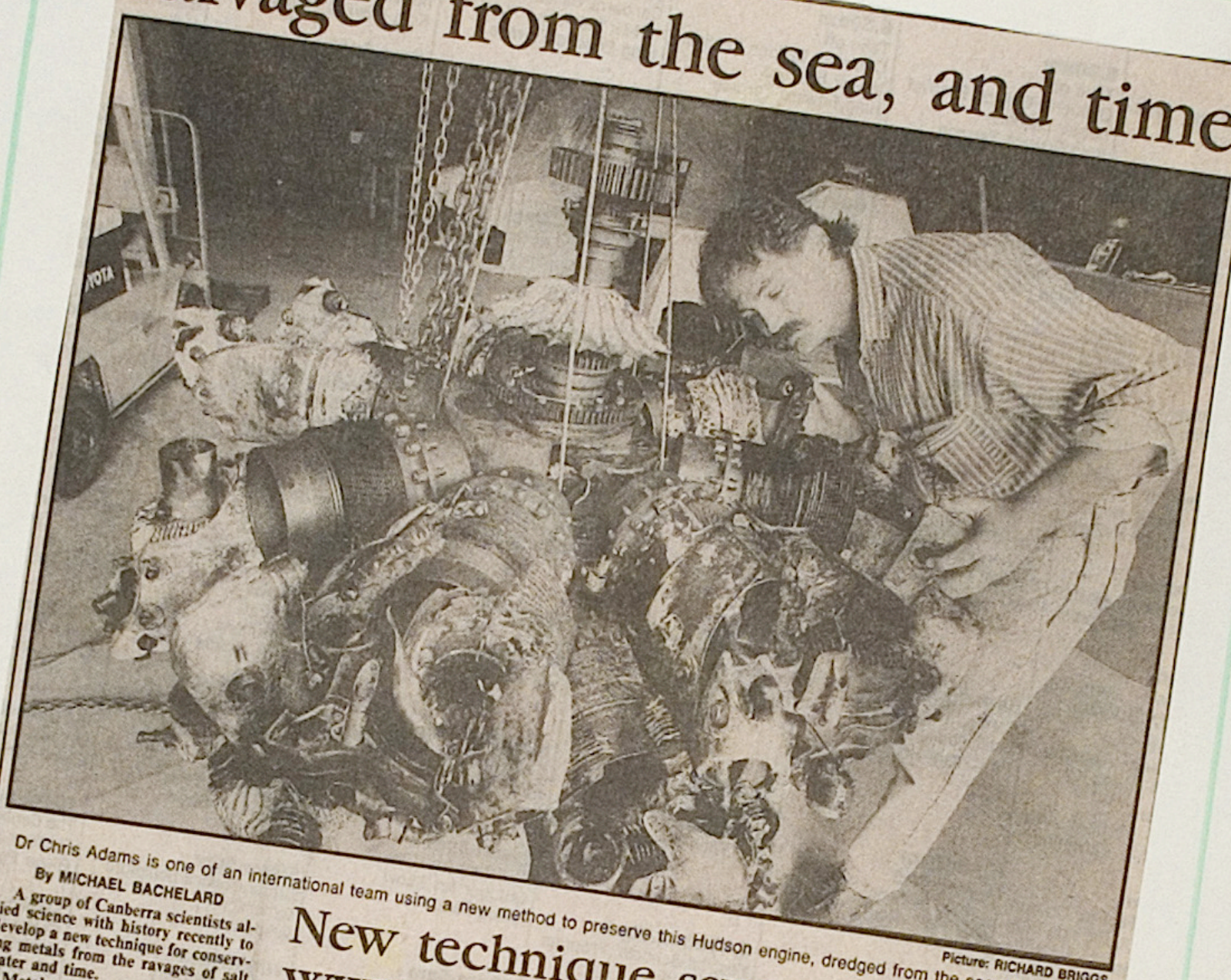
The Leighton Memorial Medal is the Institute's most prestigious medal and is awarded in recognition of eminent services to chemistry in Australia. It was established in 1965 to commemorate the distinguished career of A E Leighton, chemist, technologist and administrator, who died in 1961.

Professor Craig was one of the three advisers to the government who conceived and set up the Research School of Chemistry in the 1960s. He has a first-class international reputation for research in theoretical chemical physics.

In 1985, Professor Craig was honoured for his contributions to the public service of science with the award of Officer of the Order of Australia. He is currently President of the Australian Academy of Science.

ANU Reporter
26 February 1992

Salvaged from the sea, and time



Dr Chris Adams is one of an international team using a new method to preserve this Hudson engine, dredged from the sea off Malaysia.

Picture: RICHARD BRIGGS

New technique saves WWII bomber engine

By MICHAEL BACHELARD

A group of Canberra scientists allied science with history recently to develop a new technique for conserving metals from the ravages of salt water and time.

Metal conservators from the Australian War Memorial, a French chemist, and an electrochemist from the ANU's Research School of Chemistry, have used a revolutionary technique to preserve and stabilise a World War II bomber engine which otherwise would have turned to dust.

The engine, from a Hudson bomber shot down in the days before the bombing of Pearl Harbour, was dredged from the ocean floor by Malay fishermen in 1967. A few years later it arrived in Australia and had sat as part of the Australian War Memorial's collection, corroding quietly, since.

Over the years, the chemically weak metals in the structure — aluminium and magnesium alloys — had almost disappeared.

According to one group member, Dr Graham Heath, a research fellow in the ANU's Research School of Chemistry, all metals except gold begin as oxides, which must be separated from other minerals, using energy.

"What any metallic object is trying to do is return to its natural state. It wants to disappear into the ground, into a pile of salt," he said.

Another team member, conservation scientist Dr Chris Adams, said that before the group had begun its work the engine was "a total disaster".

The engine needed a suitable technique to save it and ensure that it would not corrode again. Last year, under the guidance of a French electrochemist, Dr Christian Degrigny, the group tried out a new method. The technique is a kind of electrolysis, similar to that used to chrome-plate car bumper-bars. Instead of passing an electrical current through a solution to make one metal adhere to another, the damaging salts under the surface of the corroded metal are encouraged to come out into the surrounding solution.

"We're trying to get rid of a rather untidy coating of metal that we didn't want while at the same time to liberate these salts that are impregnating the surface," Dr Heath said.

The entire 14-cylinder radial engine was submerged in a vat of liquid and a current passed through it. The engine became the positive terminal of an electrical circuit, and a steel mesh, also in the solution, was the negative. Slowly the current leached out the salts.

Difficulties arose because this engine was composed of four different metals of varying chemical resilience — all of which would react differently to various solutions and currents. The process involved a compromise between removing the offending salts and preserving as much as possible of the metals.

Dr Heath likened the problems to walking a tight-rope.

"This is an art, or a craft. It is a very finely judged process," he said. "There are very few places that confront the problems that the War Memorial here [is] confronting."

A senior metals conservator with the War Memorial — a member of the group — David Hallan, said, "We ... are pioneering in this area, particularly of modern metals".

The new method was much quicker than previous ones. It only took three months to make the engine stable, as opposed to the years other techniques took.

CANBERRA TIMES
Sunday, March 1 1992.

Mettalurgy centre to have impact on industry

The establishment of the AJ Parker Co-operative Research Centre for Hydrometallurgy will be of long-term benefit to the Australian mining industry according to the Centre's new director.

The Centre was one of 20 the Australian minerals industry recently given funding under try more competitive by im- the Federal Government's Co- proving the intensity of hy- operative Research Centre drometallurgy processing. program.

The Murdoch University sically a low intensity process administered joint project was since the concentration of dis- awarded funding of $1.7 mil- solved minerals in the pro- lion per year over a seven year cessing streams is low. period, with the total grant Greater intensity can be amounting to $10.557 million. achieved through faster reac- Centre executive director, tions, more complete reactions Murdoch University Professor and more selective reactions. of Chemistry, Professor Ian "The research carried out Ritchie said he was delighted within the centre will materi- to receive the funding news ally increase the efficiency of from the federal minister for many of Australia's most im- science, Ross Free. portant mineral exporters -

"It is a great reward for all gold, nickel, mineral sands, the preparatory work put in by alumina, copper and zinc for the various participating or- example - thus helping these ganisations and none of their companies to compete effec- roles should be underestimat- tively in international mar- ed in bringing this project to kets," Professor Ritchie, said. fruition."

The CRC is a joint project industry is something like a involving personnel, funding $28 billion export industry. and other forms of support The section that involves hy- from Murdoch University, the drometallurgy, which is pro- Division of Engineering and cessing in solutions, makes up Science at Curtin University, a significant proportion of that the West Australian Chem- and we've only got to make a istry Centre, the CSIRO Div- very small improvement to ision of Mineral Products, any of those industries to not Australian Mineral Industries only "pay for ourselves", but Research Association (AMI- also to make a substantial eco- ern Mining Corporation and nomic contribution to the na- Tiwest. tion.

Professor Ritchie said that "Initially we are setting out although each of the four par- damental understanding of the ticipating institutions currently solid/solution interface which occupy separate laboratories, controls most of the major much of the centre will even- processes in the hydrometal- tually be located in a new lurgy industry. building which is scheduled to The Parker Centre is be constructed in the next few named in honour of the foun- years by the WA State dation Professor of Chemistry Government, which also plays at Murdoch University, a major role in the future of Professor AJ Parker (1933- the centre. 82), a leader in the field of

The centre aims to make metallurgy in Australia.

ANU REPORTER — Volume 23 No. 3
Wednesday, 25 March 1992

ANU scientist at NATO conference on 'bucky balls'

PARTICIPANTS in a NATO symposium later this month will hear first-hand the results of ANU research into the remarkable 'bucky ball' carbon molecule.

The North Atlantic Treaty Organisation (NATO) is not generally known in Australia for its scientific endeavours, though the organisation is in fact a major sponsor of scholarly symposia in the United States and Europe.

Dr Graham Heath of the Research School of Chemistry heads an electrochemistry group which is investigating the properties and potentials of buckminsterfullerene, more commonly known as bucky balls. The pioneering work he and his team have done has revealed characteristic features in the near-infrared spectrum - a discovery which has major implications for future bucky ball research and may assist astronomers to locate derivatives of the molecule in interstellar space.

Dr Heath is one of the few non-NATO scientists to be invited to present a paper and his participation is a recognition of the significance of his research.

The meeting is titled *Molecular Electrochemistry: NATO Advanced Research Workshop*' and starts today in Sintra, Portugal and finishes on Saturday.

From Earhart to a Hudson bomber

Photo courtesy of The Canberra Times

Left to right, Chris Adams from the Australian War Memorial, Graham Heath from RSC and George Bailey of the War Memorial with the engine from the Hudson Bomber.

BY LIZ TYNAN

THE international historical group which last week claimed to have located American aviator Amelia Earhart's aircraft after 55 years, is also providing some funds for an aircraft conservation project involving the ANU's Research School of Chemistry, the Australian War Memorial (AWM) and a French expert.

TIGHAR – The International Group of Historic Aircraft Recovery – made a direct financial contribution to the Australian group's conservation of the World War II Hudson bomber engine. The work has resulted in a new technique which promises to change the way aeronautical alloys are conserved and to open new possibilities for preventing corrosion.

The engine has proved beyond doubt the efficacy of electrolytic treatment of metals to arrest corrosion and conserve them.

Dr Graham Heath heads the Inorganic Electrochemistry Group at the Research School of Chemistry which has been involved with the project for about eight months. At the AWM, senior metals conservator Mr David Hallam, conservation scientist Dr Chris Adams and objects conservator Mr George Bailey have all worked on the engine at their Mitchell laboratory.

For six months until December last year, Dr Christian Degrigny from Electricité de France was attached to the Research School as a visitor. He brought to the project a wealth of experience in conserving corroded metal objects, having been involved with work on salvage from the *Titanic*.

The Australian Air Force Hudson bomber which was powered by the 14 cylinder radial engine, was shot down off the coast of Malaysia about six hours before the Japanese raid on Pearl Harbour. This hostile act took place well before Australia was officially at war with Japan.

Two of the Hudson's crew are thought to have survived and were held as POWs by the Japanese. The engine went to the bottom of the sea, where it stayed until 1967. A Malaysian fisherman dragged it up with his fishing net and later presented it to the chief of his village.

It remained in the village for a further 10 years, subjected to the punishing humidity, before being sighted by an Australian tourist.

In a state of advanced decay and actively corroding, the engine eventually came to the AWM. Corrosion is self-propagating, like cancer, and cannot be arrested without exhaustive removal of deeply penetrating salts.

Dr Heath was approached by the AWM's David Hallam at the end of 1990 and work soon began to save the Hudson's engine. Research done by Dr Heath's group on the electrochemical behaviour of metal chlorides and bromides provided part of the scientific knowhow needed to tackle the conservation problem.

The engine comprises a variety of alloys and simple metals, all at different stages of decomposition, so the treatment had to be carefully planned to ensure that none of the components was damaged.

Before treatment, the exact composition of each alloy was established at the ANU using an electron microscope.

The conservation technique is classically simple, though requiring great finesse in its execution. In a three-month step-by-step process, the engine was immersed in a variety of solutions contained in a 3400 litre tank. A precisely measured electrical current was passed between the engine and stainless steel mesh in the solution, thereby forming an electrical cell.

The electrolytical process developed for the Hudson engine has much in common with automotive chromium plating, in which immersion and electrical charging causes the chrome to plate the host material. In the new technique, the problem was not getting a metal to stick, but rather to dislodge the corrosion-causing salts from deep within the metal.

When a metal corrodes, it is demonstrating one of the basic principles of materials science: the tendency of metallic substances (other than 'noble metals') to return to an oxidised state. Oxidation means the loss of electrons from the metal's atoms, resulting in conversion to salts.

Put simply, electrochemistry enforces the reverse chemical change by transfer of electrons from an electrode placed in the solution.

The Hudson Bomber engine has now been stabilised and eventually will go on display at the War Memorial.

OBITUARY

Noel Victor Riggs (1923-1991)

Noel Riggs was born in Adelaide on May 6, 1923. He attended Adelaide High School, entering the University of Adelaide with the Thomas Price Scholarship in 1940. He completed a B.Sc. degree with First Class Honours in 1943. After a short period in industry in Adelaide and a lectureship in chemistry at the University of Western Australia, Noel secured a CSIRO Senior Studentship and proceeded to Cambridge University to undertake a Ph.D. under Alexander Todd. He returned to Australia in 1949 to a research position with CSIRO in Melbourne.

In 1952, Noel made the move to the New England University College, subsequently to become the University of New England. This was to be his academic home for 33 years, until his retirement in 1985. Noel was appointed Professor of Organic Chemistry in 1964, head of the newly amalgamated Department of Chemistry in 1981, and elected Emeritus Professor following his retirement in 1985. He served two periods as Dean of the Faculty of Science. One of the highlights of Noel's career was the naming of one of the three buildings comprising the Department of Chemistry at the University of New England as the N. V. Riggs Building in 1989 in recognition of his great contribution to chemistry at the university.

Noel was an active supporter of the *Australian Journal of Chemistry*, publishing a significant proportion of his papers in that journal and serving on the Advisory Committee for a number of years. He was also active in the Royal Australian Chemical Institute and was elected Fellow in 1955.

Noel's chemical research spanned three fairly distinct areas: natural product organic chemistry, physical organic chemistry and theoretical organic chemistry. He made major contributions in all three, a feat which is particularly impressive given the modest resources that were available in Armidale.

His earliest work was concerned with natural products, particularly those materials that contained toxic substances. One of the new compounds that he isolated from *Macrozamia riedlii* was later shown to be an active carcinogen and this led to Noel's involvement in collaborative work with the National Institute of Health.

Noel was one of the pioneers on the Australian scene in the field of NMR spectroscopy. He was particularly interested in the application of NMR to study stereochemical problems.

In his later years, Noel turned his attention to computational chemistry. His major work in this area began in 1976 when he spent a period of sabbatical leave in my research group at the Australian National University. Noel wanted to see whether computational calculations could be usefully applied to the organic chemical problems in which he had an interest. The answer was an emphatic yes. Noel took to this new area like a duck to water and became highly skilled in the application of quantum chemical procedures. A highly successful and productive collaboration followed from that time on, initially via regular brief visits to Canberra and since 1985 on a full-time basis. It was still in full swing when he died. Indeed, one of his most exciting pieces of research, involving predictions of the structure, thermochemistry and vibrational spectra of the highly-strained trithiapropellane molecule (C_7S_3), will appear in the *Journal of the American Chemical Society* early in 1992.

Noel's research was genuinely curiosity-driven. He was a true and proud scientist. In this age when many people work simply because they are paid to work, it is delightful to find situations such as Noel's: he worked because he loved what he was doing. He searched for problems which he felt were important to tackle and then set about trying to solve them. This was particularly the case since Noel's so-called "retirement" and the move to Canberra. Noel would come in to the Research School of Chemistry at 8.30 every morning, would work a full day and continue his work at night. He was fully committed to the search for new knowledge. He found it a stimulating intellectual challenge and, dare I say it, he found it to be fun. The expression "a gentleman and a scholar" is probably overused but it does epitomize Noel's personality: a gentle, caring person with a keen enquiring mind.

In his position as a Visiting Fellow at the ANU, Noel's relaxed and easy-going disposition contributed to a harmonious atmosphere. He gave generously of his time so all could benefit from his wealth of experience and expertise. He interacted delightfully with the younger members of the group who saw Noel as an elder statesman. And he interacted particularly effectively, both scientifically and socially, with many of the senior professors who came from overseas as visiting fellows. He was a true ambassador for science.

Noel died on the morning of October 10, 1991. He is survived by his wife Joan and his four children, Vicki, Paul, Leslie and Hilary. He was a kind, gentle, tolerant and caring person, an inspiration to family, friends, colleagues and students alike. Chemistry in Australia will be the poorer for his passing.

Leo Radom (FRACI)

Chemistry in Australia
Volume 59 - No 3
March 1992

US journal puts ANU chemists among the tops

MAY 92

Chemistry at the ANU has received signal recognition by being ranked by the US journal *Science Watch* within the first 50 in the world in terms of the impact of its research work on other scientists.

Professor Arthur Birch, the Foundation Dean of the Research School of Chemistry, and now a Visiting Fellow at the Department of Chemistry, The Faculties, said this conclusion was based on citations of its scientific publications by others in their scientific papers, and was at least a rough measure of world scientific influence during 1984-90.

Professor Birch said the ANU was the only Australian university on the list, and was placed higher than the University of Oxford.

In the six-year period 879 papers were cited 9,050 times, or 10.3 citations per paper.

'This method permits comparisons of small with large universities,' Professor Birch said.

'Exact figures on citations for each staff member cannot be given because of overall problems of definition of 'staff', but on reasonable grounds ANU chemistry is, on the figures given, within about the first ten in the world.'

He said the number of papers quoted by the survey for the ANU as a whole, including a substantial contribution from the Department of Chemistry in The Faculties and the John Curtin School of Medical Research, was about the same as that published from the Research School of Chemistry during the period.

'So the RSC clearly plays a major role, but the rest of the ANU is included,' Professor Birch said.

'This pleases me and Emeritus Professor David Craig, since our aim was to support the level of all chemistry within the ANU, not just to found a research school.

'For this reason we sited, over opposition, our school building adjacent to the department, and from the beginning in 1967 encouraged the use by faculty staff and research students of the school's powerful and organised major instrumental facilities.

'The research school staff has also been involved in undergraduate teaching programs.

'This assessment is a good augury for the 25th anniversary of the School to be celebrated in October 1992 with a series of discussions on its achievements, and the destinies of its past staff, post-doctorate fellows and students, some of whom will participate.'

ANU REPORTER

Chemistry medal

24.6.92

Professor Alan Sargeson, of the Research School of Chemistry, has been awarded a 1992 Centenary Lectureship and Medal by the Royal Society of Chemistry (UK).

This is the second such award for the School in two years. The Centenary Lectureships were founded at the time of the Society's centenary in 1941, when a fund was instituted enabling the Society to invite distinguished chemists from overseas.

Professor Sargeson will be presented with the medal at a symposium in London during his lecture tour in September/October. He will then give a series of lectures on his work to a wide range of institutions in Britain. His research has been primarily in basic synthesis, stereochemistry and reactivity of coordination complexes.

ANU REPORTER
24.6.92

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...science and technology writer JULIAN CRIBB

The Australian Wed June 17, 1992

...TANTALISING fragments of ...human ancestor more than ...r million years old are draw-...g Professor Martin Williams ...agnetically back to the Great ...t Valley in Ethiopia as a dec-...de of war sputters to an end.

...Convinced he and his colleagues ...ve at last found the cradle of ...e human race, the Monash Uni-...rsity scientist has waited pa-...iently for 10 years for this chance ...prove it – and to fill in some of ...e vital gaps in the evolutionary ...hain of evidence.

The picture emerging is of an ...bscure primate driven by vast ...imatic events and changes into ...daptations that placed it inevi-...bly on the path to humanity. ...ut off from similar hominoid pop-...lations in Asia and Europe, only in ...frica was the fateful boundary to ...uman status crossed.

Even before the Ethiopian war intensified, Professor Williams and colleagues Professor Desmond Clark and Professor Tim White of the University of California at Berkeley, digging on an ancient lake shore in the east of the Awash Valley, had found a layer of volcanic tuff 3.8 million to 4 million years old.

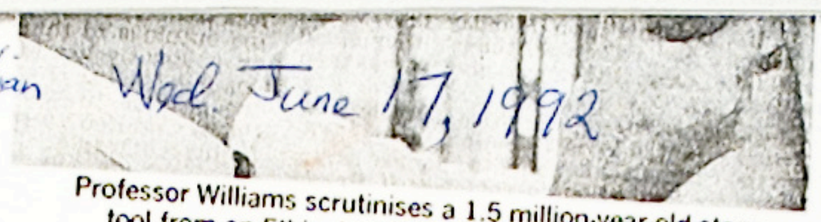
Some metres below (therefore older than the volcanic layer), they found fragments of bone from small human-like creatures. These appeared substantially more ancient than the famous skeleton named Lucy taken from Hadar, on the other side of the valley and dated at between 2.8 million and 3.1 million years old.

Some of the team had earlier located a site in the Gona Valley, dated roughly 2.5 million years, which contained the first deliberately made tools found – a handful of razor-sharp flakes of volcanic glass, capable of slitting the hide and severing the ligaments of a rhinoceros or hippopotamus.

Not far away, they discovered the fossilised remains of a hippopotamus carcass, surrounded by many worked tools – some of the earliest firm evidence that humans had become committed carnivores, and either hunters or very efficient scavengers.

Behind this fateful adaptation lay a climatic crisis. About 6.5 million years ago, the climate began to cool and dry out. A huge expansion in the west Antarctic ice-shelf locked up vast quantities of water. Ocean levels fell 40m or more. The Mediterranean was cut off from the Atlantic – and dried into a harsh salt desert, in which virtually nothing could survive. The Nile gouged a 2km-deep canyon in the Earth's crust, severing Africa from Asia. The Red Sea formed another, uncrossable, salt desert barrier.

In an epoch known as the Great Messinian salinity crisis, the Mediterranean basin dried out and refilled a dozen times over one million years, probably unleashing mighty tectonic forces, which caused the Earth's crust to ripple, Professor Williams believes. These could have triggered the volcanic activity in the Rift Valley, which laid down the strata palaeontologists use to date their finds.



Professor Williams scrutinises a 1.5 million-year-old stone tool from an Ethiopian dig — Picture: JAMIE DAVIES

...ired that were competitive, co-operative and mixed feeders, able to sustain themselves during periods of poor plant growth by feeding on flesh, and able to harvest the flesh more efficiently.

Human ancestors, like today's chimpanzees, were probably casual tool users, but the art of making them, of choosing suitable stone then flaking it to achieve a sharp cutting or scraping edge did not emerge until this period, Professor Williams says.

They displayed a good knowledge of geology – of which stones were most suitable for forming cutting edges.

Professor Williams daily awaits confirmation from Ethiopia that the area is settled enough to allow the digs to restart – and fill in the final pieces of the human jigsaw.

He hopes to find traces of human ancestors eight to four million years ago – a big blank in the family tree – in the form of fossil bones and possibly footprints.

Deposits in the Rift Valley up to 10 million years old have been identified and marked down for investigation.

ANU chemistry wins credit for global influence

THE Australian National University's Research School of Chemistry has been ranked among the world's top 50 chemistry departments in a survey by United States magazine Science Watch.

ANU was the only Australian university to feature on the list, which used the number of citations of published research papers as an indicator of scientific influence.

Between 1984 and 1990, the School of Chemistry had 879 papers cited a total of 9050 times – an average 10.3 citations a paper. This gave it an overall rank of 45th, ahead of Oxford University.

The leading institution for citations was Caltech, with an average of 18.44 a paper, followed by Harvard with 17.56. Tel Aviv ranked 20th, the Swiss Federal Institute of Technology 33rd, Cambridge 35th, Bristol 37th and Frankfurt 41st.

The acting dean, Professor Denis Evans, said the school's work was well cited despite it being considerably smaller than many in Europe and North America.

The school, which celebrates its 25th anniversary this year, is best known for work in synthesis of natural biological compounds, exploring free radicals, and developing cage compounds for novel drug-delivery systems.

Professor Evans said the school's policy was to continually broaden the scope of its activities.

Promising new fields of investigation are in protein crystallography and in better understanding the chemical structure of minerals and zeolites.

A comparison of international research publications and citation made last year by the federal Department of Industry, Technology and Commerce shows that during the 1980s Australia produced 2.1 per cent of the world's scientific literature.

Its share of publications was well above average in biology (4.8 per cent), earth and space sciences (3 per cent), and above average for medicine, maths and biomedical research. It was below average for engineering, chemistry and physics.

However, the impact of Australian chemistry judged on the rate of citations by other researchers was high, in spite of a falling trend in the number of papers, with an average 1.3 citations a paper. Biology was close behind with 1.2.

Other fields in which Australian researchers were highly cited included fertility and obstetrics (1.78 per cent) and botany (1.5 per cent).

Australia's output of scientific literature was not large compared with that of the US, UK or Japan, but it ranked fifth in the world for the number of research papers published per head of population.

The leading nation was Sweden, with 80 papers per 100,000, followed by Canada (65), the US, UK and Australia with 50-55 papers.

– JULIAN CRIBB

OVERSEAS

French group calls for rethink on unis

PROFESSOR Jacques Derrida, the ...rench philosopher who last week ...eceived an honorary doctorate from ...ambridge University after a heated row ...er his credentials, has called for a ...mplete rethinking of the country's ...niversities.

They said changes are imposed from above and then modified according to the "reactions of exasperation they provoke".

Putting Americans first

RESENTMENT at spending on overseas students has led to the introduction of a Bill in the United States House of Representatives ...

...nalise the universities through teaching costs that would be higher than those of their polytechnic counterparts.

If accepted, it would be a victory for the polytechnics, which are due to become universities at the end of this month.

A paper from officers attached to the new Higher Education Funding Council has revealed deep divisions between vi...

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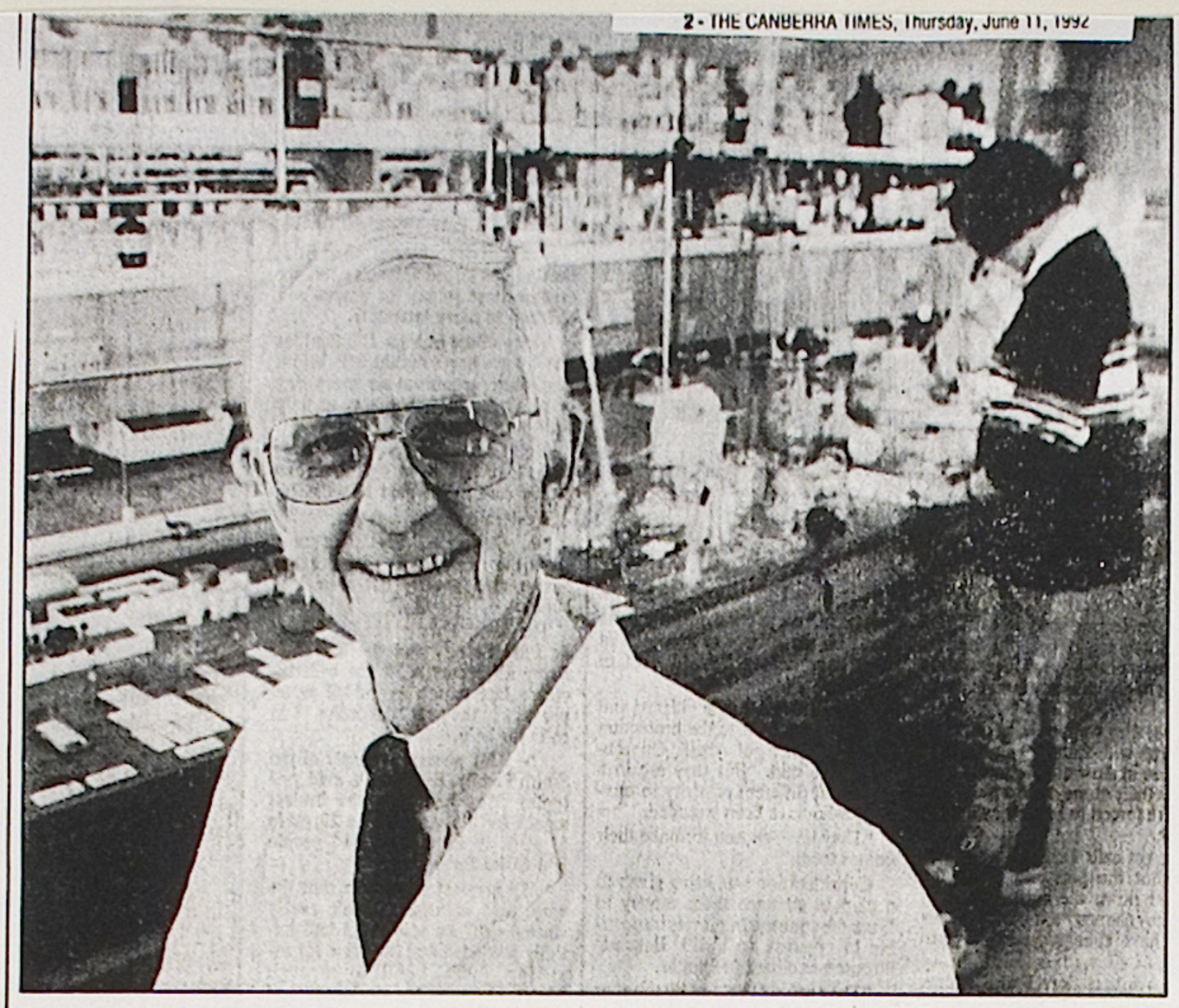

Picture: RICHARD BRIGGS

The Dean of the Research School of Chemistry at the ANU, Professor Lew Mander, was "obviously delighted" the research school had been ranked among the top 50 in the world, and the best in Australia, by an American science journal.

ANU's research in world's top 50

By KAREN HOBSON, Education Reporter

An American science journal has ranked chemistry research at the Australian National University among the top 50 in the world — above other Australian universities and the University of Oxford in England.

The ANU was the only Australian campus to make the *Science Watch* list which was based on citations of its scientific publications from 1984 to 1990.

Although he was not "doing handstands" yesterday, the Dean of the Research School of Chemistry, Professor Lew Mander, said he was obviously delighted. While not surprised that the university had ranked so highly, he had had no idea that the article was forthcoming.

The ANU was 45th and one of only eight universities outside America to make the list. It had 879 papers cited 9050 times during the six-year period, or 10.3 citations per paper. The top university was Caltech which had less papers published, at 873, but a higher rate of 18.44, or 16,101 citations.

Professor Mander said the analysis was based on academic papers contributed by the whole university, including chemists in other research schools and the chemistry department in the faculties.

He said the analysis was not a "complete picture" of the university's output — the number of publications quoted for the whole campus was similar to that produced by the chemistry research school alone — and indicated that the ANU would rate higher under a more complex analysis, possibly in the top 20.

News of the top ranking comes amid repeated calls from Australian academics and education unions for a significant boost in tertiary funding to improve university infrastructure, stem the exodus of academics to campuses overseas and shorten the waiting list for student places.

The latest, from the Union of Australian College Academics this week, urges a radical improvement to science and technology policy and a revamping of the Australian Research Council.

The chair of the UACA science, technology and engineering working party, Professor David Booth, said the council's smalls grants scheme had to be expanded and funds more equitably distributed between campuses as new universities had been "effectively left out" of the scheme.

The council's schemes had to include funding to "kick-start" new researchers and those changing their research areas into ones more appropriate to Australia's needs, infrastructure support for research and teaching in science and technology needed to be at least doubled and the number of postgraduate awards increased by at least 600.

Professor Mander said the ANU's chemistry ranking was indicative of the results which could be achieved.

Dean on lecture tour of Germany

News of the ANU's world ranking for chemistry research came on the heels of another significant achievement for the Research School of Chemistry.

The school's dean, Professor Lew Mander, leaves today for a three-week lecture tour of Germany.

Speaking on the eve of his departure, Professor Mander said he was the first Australian to be invited to give the series which is sponsored by the German chemical company, Merck-Schuchardt.

He will give 10 lectures at universities around the country.

THE AUSTRALIAN 17/6/92

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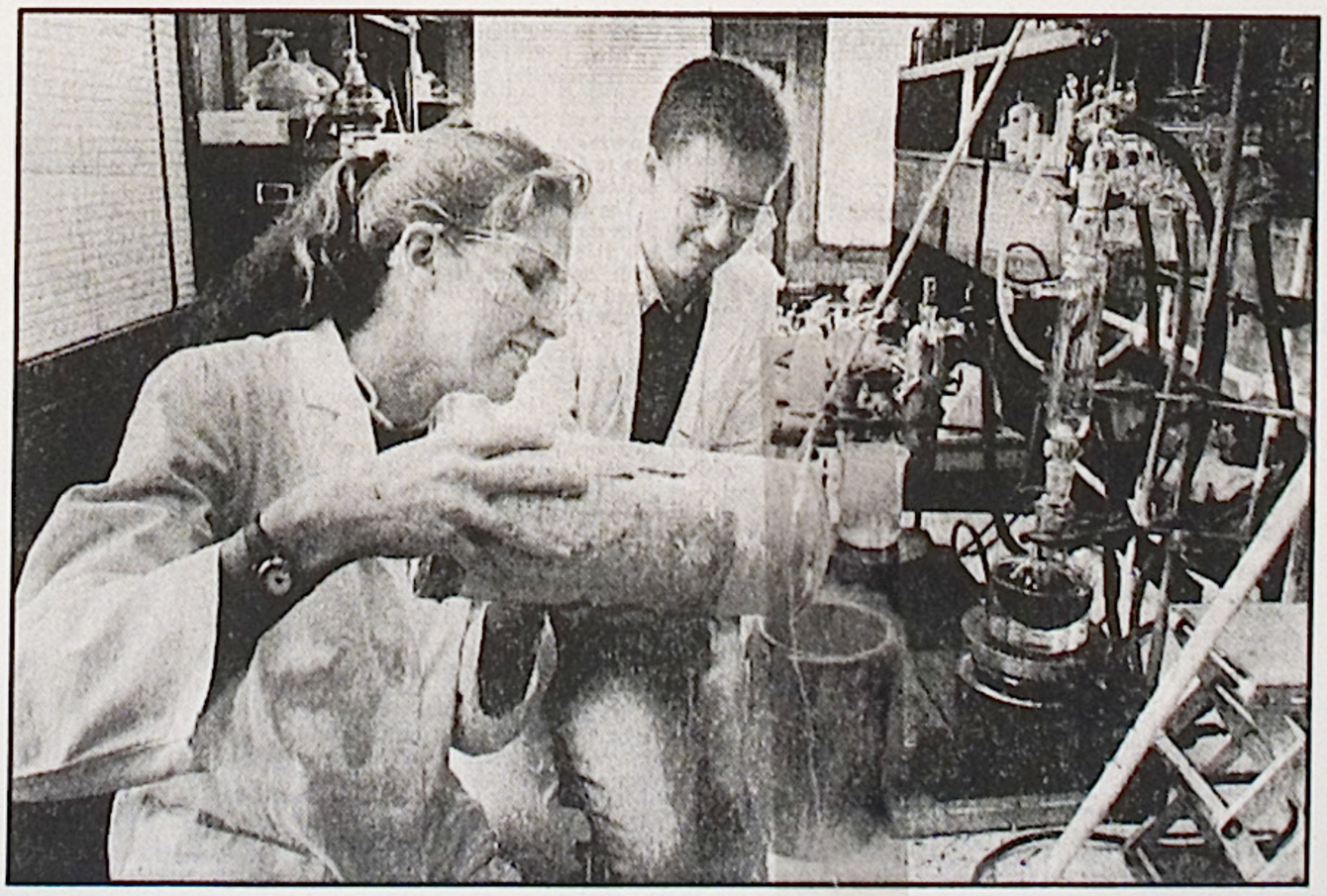
— JULIAN CRIBB

Students do holiday research at ANU



Picture: GRAHAM TIDY

Jodie Garrett, of the University of Queensland, and Brett Yeomans, of the University of Adelaide, at work in the Australian National University's Research School of Chemistry. They are two of about 100 students from universities all over Australia and New Zealand taking part in an ANU holiday scholarship program which aims to encourage further studies.

Princess is promoting country and chemistry

By DAVID MUSSARED,
Science and Environment Reporter

While the British Royal family is battling broken marriages and compromising photographs, Thailand's youngest princess is touring Australia promoting her country and her pet subject — organic chemistry.

Her Royal Highness Princess Chulabhorn, Professor of Organic Chemistry at Bangkok's Mahidol University, visited the Australian National University yesterday to deliver an academic lecture on "synthetic studies of the isoindolobenzazepene alkaloids".

It is hard to imagine anything more different from a British Royal tour. The audience was made up mostly of chemistry students armed with lecture pads who had come to hear about the Princess's scientific work.

Accompanied by an entourage of Thai and Australian media and security staff, the 35-year-old Princess was given a quick tour of the ANU's Research School of Chemistry before beginning her lecture.

"I'm very honoured to be here giving a lecture to this university," she said.

Princess Chulabhorn began by promoting her own project, the Chulabhorn Research Institute, which is a centre she founded in Thailand for research and education in the life sciences.

She said it was her first visit to Australia, and she wanted to tell the audience something about the Institute.

It was dedicated to applying science to improving the quality of life in Thailand, and the shortage of qualified scientists in Thailand meant education was an important part of its work.

The institute also brought together scientists from all over Thailand and the world for basic and applied research.

The Dean of the School, Professor Lew Mandel, said the university was very fortunate to have such a distinguished visitor, and suggested Australia would do well to have a patron who was so committed to science.

"We would find it somewhat unusual I suppose," he said. "But I guess Australia itself would welcome such a public patron of science in this country.

"Thailand must consider itself very fortunate to have a royal sponsor of all these activities, and indeed a major participant as well."

Princess Chulabhorn is the youngest child of Thailand's King Bhumibol and Queen Sirikit.

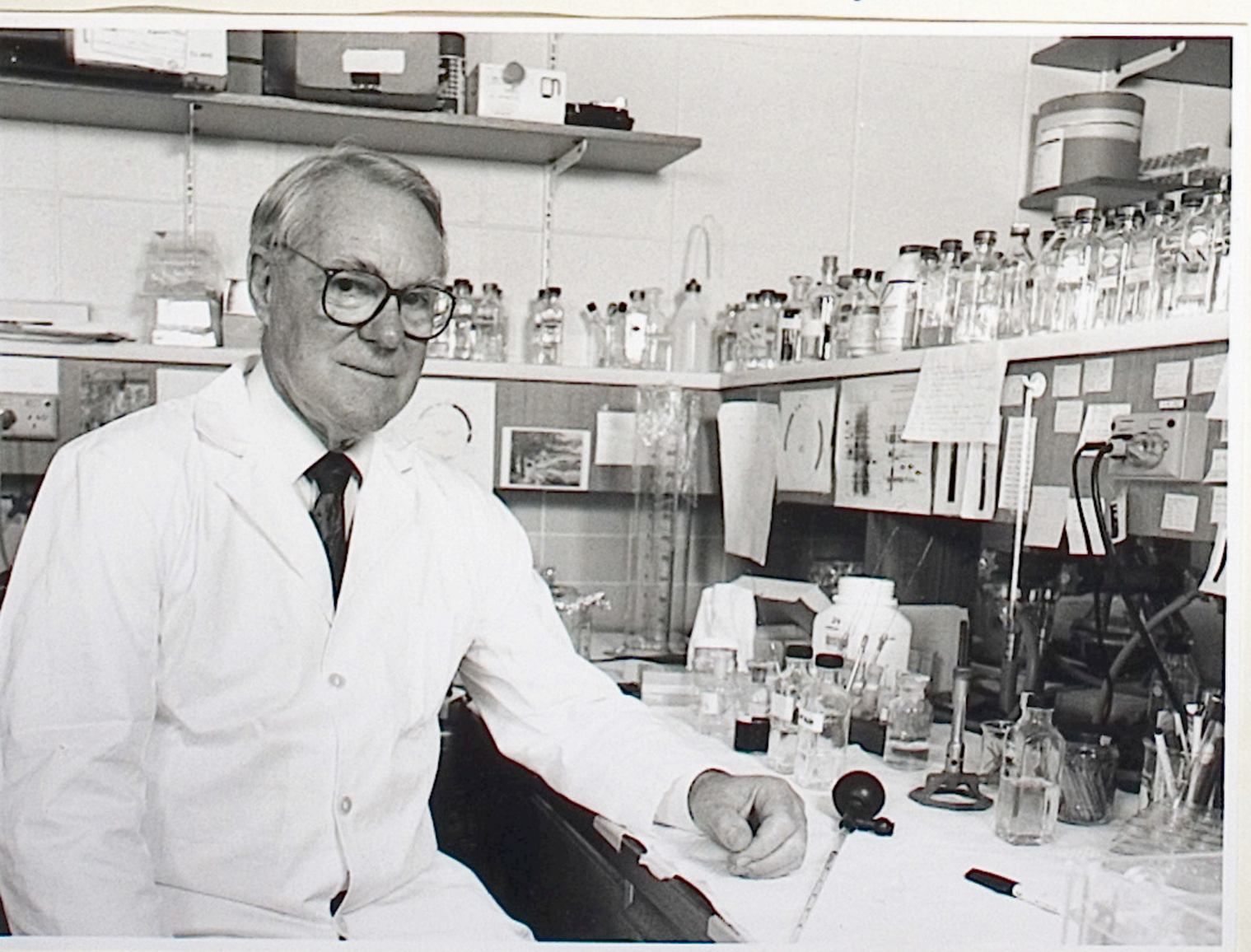
She will be in Canberra until Friday and will spend a weekend at the snowfields before continuing her Australian tour.

Picture: DEAN McNICOLL

Her Royal Highness Princess Chulabhorn, of Thailand, who was a guest lecturer in organic chemistry at the Australian National University yesterday, where she delivered a talk on "synthetic studies of the isoindolobenzazepene alkaloids".

The Canberra Times, September 3, 1992

Professor John Conforth
25.9.92



ANU Reporter Volume 23 No 16
Wednesday 14 October 1992

Leo Radom wins Maccoll Prize

The 1991 Maccoll Prize for the most outstanding paper published in *Organic Mass Spectrometry* during that year has been awarded jointly to Professor Leo Radom, Research School of Chemistry and a collaborative Canadian group from Queens University, Kingston and the National Research Council, Ottawa.

This is the second year of the award, set up in recognition of Professor Maccoll's 21 years as Founding Editor and Editor-in-Chief of *Organic Mass Spectrometry*.

All 43 editors and members of the Advisory Board of the journal are asked to vote for the paper or papers that they consider to have made the most significant contribution to science. Professor Radom's winning paper was entitled *Chemistry by Computer: A Theoretical Approach to Gas-phase Ion Chemistry*.

Chemistry's 25th anniversary

BY LIZ TYNAN

The Research School of Chemistry will mark its 25th anniversary next month with a combination of scientific meetings, celebration and reunion, as well as a new publication.

A Silver Jubilee symposium titled *Reflections on the Past and Visions for the Future* is being held at the School on 8 and 9 October, featuring speakers who are either past or present members of the School.

Among past RSC personnel who have gone forth to a variety of high level positions and who will be speaking at the symposium will be the former Chairman of the Australian Science and Technology Council, Professor Ray Martin, the Director of the Australian Governmental Analytical Laboratories, Dr Colin Dahl, and Deputy Secretary and Chief Science Adviser of the Department of Industry, Technology and Commerce, Dr John Bell.

The 'serious' aspect of celebrations will be leavened by a Silver Jubilee dinner on 8 October and a 25th birthday party on the afternoon of Friday 9 October.

The symposium will have two main themes. A small number of speakers will present 30 minute historical talks while a larger number will give 15 minute descriptive talks, illustrating, among other things, the diversity of paths that former members of the School have followed.

Foundation professors and former Deans of RSC, Professors David Craig and Arthur Birch, will offer, respectively, historical and philosophical perspectives on the quarter century of RSC's existence.

They were involved in laying the groundwork, between 1965 and 1967, for the new School. It was established on different organisational lines to other ANU research schools, in that it had a non-departmental structure headed by a Dean rather than a Director, giving the School a distinctive 'collegial' atmosphere.

The Research School of Chemistry also is heralding its 25th anniversary with a unique publication. The 32 page colour booklet, titled *Creative Chemistry*, has been produced to coincide with both the ANU Open Day and the Silver Jubilee symposium. There has been a growing conviction within the School of the pressing need to publicly proclaim its contribution to Australian science and education. This is in the light of a continuing squeeze on government support for Australian research.

RSC is one of Australia's leading centres both for chemistry research and for training academics to staff chemistry departments throughout Australia's tertiary sector. Recently, a United States science journal named ANU as among the top chemistry research institutions in the world, based on citation of scientific papers. Its prestige is well known in chemistry circles, but much less recognised outside.

RSC's 25th ANNIVERSARY

People the big contributors to Research School's good chemistry

BY JOHN G THOMPSON*

COMMENT

In helping prepare for the Research School of Chemistry's Silver Jubilee symposium, *RSC-25*, I had to ask myself just what had been achieved in 25 years.

It was natural to think first of the 3,000 or so refereed publications, the international reputations of many of the School's research group leaders, and the recent Science Watch ranking, based on citation rate, which placed ANU chemistry research among the handful of world leaders.

However, in terms of industry interest and resultant technology, I have to concede that the School has not been such a high achiever. There have been relatively few patents and a paucity of GIRD grants, industrial dollars and Cooperative Research Centres.

Upon further reflection I realised that I had overlooked the School's most important product – its people. While excellence and productivity in research are important and necessary for RSC to live up to the vision of its founders, it is undoubtedly the people – the hundreds and hundreds of students, postdoctoral and research fellows, and longer-term visitors – who are the crowning achievement of the first 25 years of RSC's life.

The full impact which RSC alumni are now having in Australia became even clearer as an up-to-date address and affiliation list of all the former RSC chemists was collated. They are everywhere, both geographically and careerwise.

So where are these alumni? Who do they work for?

While most of them are still chemists in the broadest sense, each of their careers has evolved uniquely. There are people from government departments and organisations such as DITAC, CSIRO, and the Australian Government Analytical Laboratories. There are people in industry, e.g. ICI, Kodak, BHP. There are academics in chemistry departments all over Australia. And there are others in private enterprise, from a forensic consultant to a cherry farmer.

It is not just the organisations for which these alumni work but the positions which they hold. Running your finger down the alumni list, you read titles like senior departmental secretary, director, division head, manager and head of department. The training and experience gained as chemists at RSC does not guarantee eventual promotion to senior and influential science positions, but it seems to help.

Despite its relatively short 25-year history, the RSC is now having a profound and increasing influence on the chemistry culture of Australia.

In the past decade many of the new or vacant chemistry positions at state universities, including the former CAEs, have been filled by RSC non-tenured academics. Most of the successful candidates have been Australian chemists returning from overseas to work at RSC, who, after two or three years of productive research, have been offered lectureships in chemistry departments.

Back in the 1970s and early 1980s a lesser proportion found their way directly into academia, possibly because the lack of teaching experience acted against them. Various CSIRO divisions and industrial research laboratories were the major beneficiaries, and still are to a lesser extent.

For those whose career pathways have taken them beyond chemistry, and in some cases beyond science, the discipline and problem-solving skills acquired during their graduate studies and/or postdoctoral research experience at RSC have served them well.

As for the hundreds of international PhD students and postdoctoral workers who have returned home, they work for much the same organisations and occupy similar positions to their Australian counterparts. During their time at RSC they contributed substantially to the overall research effort, to Australia's advantage. Now many of them hold sufficiently important positions in the international science community and, in some cases, in their countries' industries and government organisations to influence attitudes towards, and relations with, Australia.

During the present lull in the ongoing battle in defence of the Institute of Advanced Studies, maybe the Silver Jubilee of the Research School of Chemistry can teach us something.

When we are asked by external reviewers, many of whom are economic rationalists, what it is that we do for Australia, perhaps we shouldn't rave on as much about our publication rates, international reputations and research achievements. This is not to deny our striving for excellence, and often achieving it, but rather to avoid the necessary comparisons which must be drawn with our colleagues in state universities. What better way to alienate the very people whose support we need in order to survive and flourish?

We should emphasise the people product of RSC. This will cause much less acrimony, and why should our colleagues in state universities mind? After all, they are among the major beneficiaries of the School's principal product. And it is not just the high-quality RSC chemists whom they gain. Increasingly they enjoy fruitful collaborative links with the RSC, taking advantage both of the facilities and the present personnel.

It is relatively easy to defend that which is unique, and in its people product RSC is unique. It is even easier to defend that which is unique and beneficial Australia-wide. In these terms, the congregation at the Silver Jubilee symposium on October 7-9 not only represents the past and present of the Research School of Chemistry, but it also represents its future.

** Dr Thompson is a Research Fellow in the Research School of Chemistry.*

ANU Reporter - Volume 23 No. 15
Wednesday 23 September 1992

OCTOBER 1992

Chemists gather for ANU school birthday

Chemists from across Australia converged on the Australian National University yesterday to celebrate the 25th birthday of their *alma mater* — the university's world-renowned Research School of Chemistry.

The school was established in 1967 by the Government of former Prime Minister Bob Menzies to bring home Australian chemistry greats who had been lured overseas and to provide a centre of postgraduate chemistry research for Australia.

This week many of the school's former fellows have come home for a special symposium focusing on the work of the centre over the past quarter of a century, during which time it has grown to become recognised as one of the top chemical-research institutions in the world.

Luminaries at the symposium include "founding fathers" — world-renowned chemist Professor Arthur Birch and the president of the Australian Academy of Science, Professor David Craig.

Among the speakers are former students who have made their mark in industry, research and the public service.

One of the school's current fellows, Dr John Thompson, said it was easy to forget that the crowning achievement of an institution like the Research School of Chemistry was not its science, but the people it produced.

Former fellows of the school could now be found in high positions in all walks of life, he said.

THE CANBERRA TIMES, Monday, Oct. 12, 1992 13

Scientists should have ethics code

By DAVID MUSSARED, Science and Environment Reporter

Australia's scientists need to become true professionals instead of using their status as an excuse for self-indulgent egotripping, according to a senior official of the Australian Institution of Engineers.

The official, national director Michael Dack, told a chemistry conference at the Australian National University scientists needed to form a professional association which laid down and policed a code of ethics.

Dr Dack said engineers, doctors, lawyers and other tertiary-trained professionals belonged to professional associations and all had to adhere to a code of ethics.

"Scientists give no such public undertakings," he said. "They are neither subject to disciplinary action for breaches of a code of ethics, nor do they as a group in the workforce appear to feel the responsibilities that come from being part of a profession."

He said university researchers often fell into the trap of thinking that their only obligation to the taxpayers who funded them was to achieve scientific excellence in their work.

Scientists should band together to form a single professional association with a code of ethics which put the needs of the community above all else.

Dr Dack said none of the three main existing bodies — the Federation of Australian Scientific and Technological Societies, the Australian Academy of Science and the Association of Professional Engineers and Scientists — was suited to be a professional association for scientists.

He suggested instead a national professional body along the same lines as his own association, the Institution of Engineers.

Dr Dack, a former research chemist from the ANU's Research School of Chemistry, was speaking at a special symposium held over the past two days to mark the school's 25th anniversary.

PROGRAM

RSC-25

SILVER JUBILEE SYMPOSIUM

REFLECTIONS ON THE PAST AND VISIONS FOR THE FUTURE
Research School of Chemistry, Australian National University
October 7–9, 1992

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PERSPECTIVE

THE CANBERRA TIMES, W

Excellence remains RSC's hallm

By JOHN THOMPSON

SCIENCE

BACK in September 1967, when Canberra's population had topped 100,000 and Lake Burley Griffin had been full for two years, the Research School of Chemistry at the Australian National University was officially opened for business.

Last week, 25 years later, that business stopped for two full days. On Thursday and Friday the Research School of Chemistry hosted a unique symposium to mark its silver jubilee. Former RSC chemists converged on the school from all over Australia and beyond.

Most Canberrans are unaware of the existence of the Research School of Chemistry. Perhaps they glimpse it through the eucalypts as they speed along Barry Drive, but few actually know, let alone understand, what goes on inside its laboratories.

An insight into the school's workings is gained by delving into the history of its creation.

The original ANU was established as a research and postgraduate institution under the Australian National University Act in 1946. It consisted of the Research Schools of Pacific Studies, Physical Sciences and Social Sciences, and the John Curtin School of Medical Research. Some chemical research was conducted within the John Curtin School.

The ANU's original brief was to undertake fundamental research and educate graduate students. It remained a research-oriented university up until 1960, when it absorbed the undergraduate operation of the Canberra University College.

At this stage the ANU's original Research Schools became the Institute of Advanced Studies, while the undergraduate operation became the School of General Studies, later known as The Faculties.

By the 1960s the need for a separate Research School of Chemistry was recognised. In 1962, an advisory group was established, including three high-profile Australian chemists who were working in Britain at the time — Arthur Birch, David Craig and Ronald Nyholm. With their input, the objectives and organisational structure of RSC were mapped out. Professors Birch and Craig were each to become founding members of the school.

The Prime Minister of the day, Bob Menzies, was persuaded to provide £2 million for project "C" at the ANU, and by 1967 the building to house the school was completed.

In September that year the foundation members of the school conducted their first chemical experiments in the building. However, it was not until September 1968 that the school was officially opened by Nobel-prize winner and Professor of Organic Chemistry at the University of Cambridge, England, Lord Todd of Trumpington.

A quarter of a century on, the school has grown from a few dozen scientists and supporting staff to over 220 employees and students. There are 18 tenured research group leaders and more than 40 post-doctoral researchers from Australia and overseas whose appointments are from one to three years. There are also a similar number of PhD students.

In 25 years there have been more than 3000 scientific publications, and many of the school's research group leaders have developed international reputations in their areas of chemical research.

A recent survey of chemical research by the international journal *Science Watch* ranked the ANU in the top 50 of the many thousands of chemical research institutions in the world.

ANU was one of only eight institutions outside the United States to make the top 50, and the only Australian university. Its organic chemistry research ranked in the top 10. The journal's analysis was based on how frequently scientific papers from the different institutions were cited.

While excellence and productivity in research are important and necessary for RSC to live up to the vision of its founders, it is undoubtedly the people — the many hundreds of students, post-doctoral and research fellows, and longer-term visitors — who are the crowning achievement of the first 25 years of RSC's life. These are the alumni of the Research School of Chemistry.

So where are these alumni now? For whom do they work?

While most of them are still chemists in the broadest sense, each of their careers has evolved uniquely.

Lord Todd of Trumpington, right, opens the Research School in 1968.

There are people from government departments and organisations, such as the Department of Industry, Technology and Commerce, CSIRO and the Australian Government Analytical Laboratories. There are people in industry, in companies like ICI, Kodak and BHP. There are academics in chemistry departments all over Australia. And there are others in private enterprise, from forensic consultants to cherry farmers.

Despite its relatively short history the Research School of Chemistry is now having a profound and increasing influence on the chemistry culture of Australia.

In the past decade many of the new or vacant chemistry positions at state universities, including the former colleges of advanced education, have been filled by non-tenured academics from the Canberra School.

For those whose career pathways have taken them beyond chemistry, and in some cases beyond science, the discipline and problem-solving skills acquired during their graduate studies and postdoctoral research at the school have served them well.

As for the hundreds of international PhD students and postdoctoral workers who have returned to their overseas homes, they work for much the same organisations and occupy similar positions to their Australian counterparts. During their time at RSC they contributed substantially to the overall research effort, to Australia's advantage.

Now many of these foreign chemists are in sufficiently important positions in the international science community and, in some cases, in their countries' industry and government organisations to influence attitudes towards and relations with Australia.

It is also reasonable to ask the parochial question: how does the Research School of Chemistry benefit the ACT?

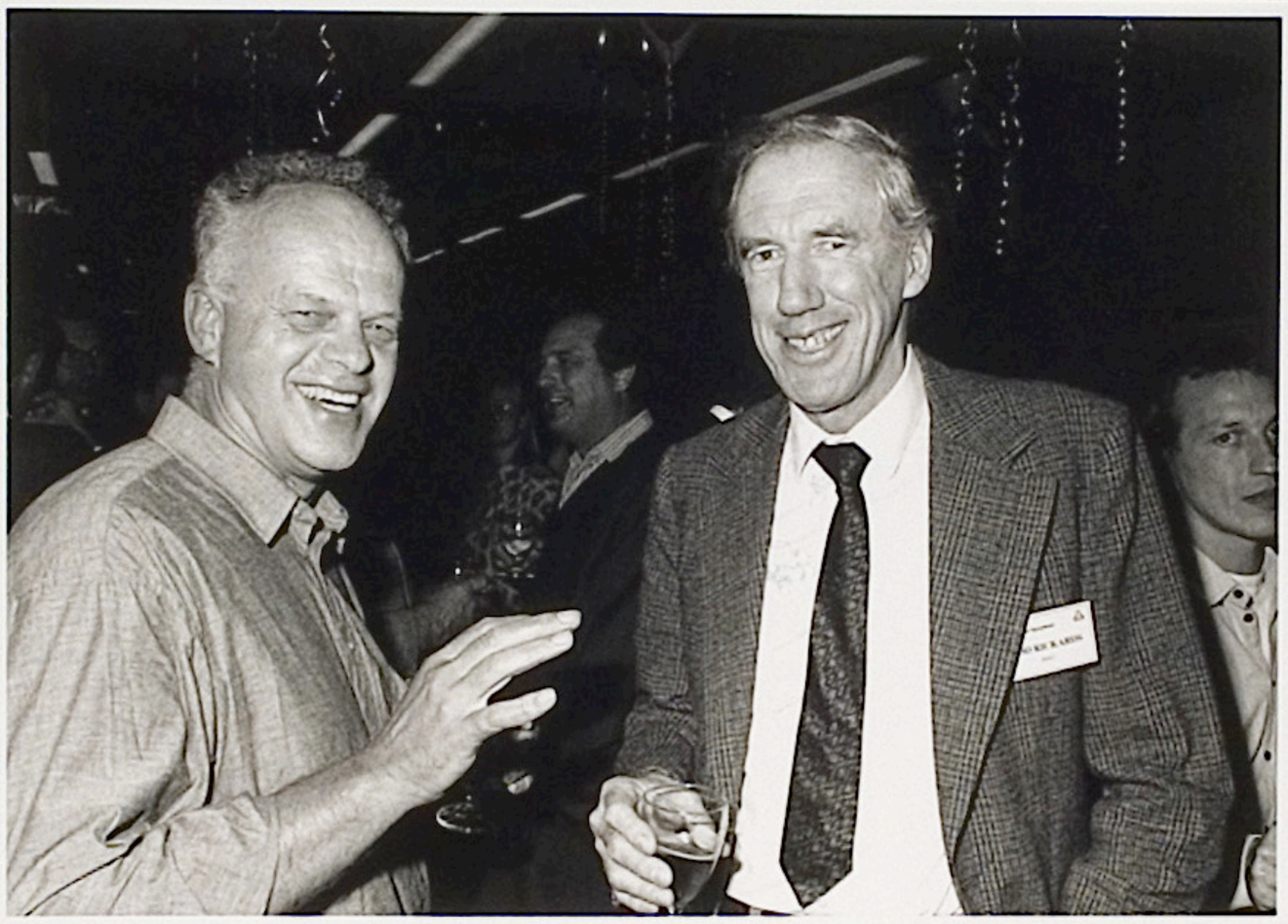
On the ANU campus the School is located right next to the Department of Chemistry in the Faculties, where undergraduates are taught. This means ANU chemistry courses are able to tap into the wealth of expertise and take advantage of many of the facilities next door. This enables the ANU, despite its size, to offer an undergraduate chemistry program to Canberrans which is among the best in Australia.

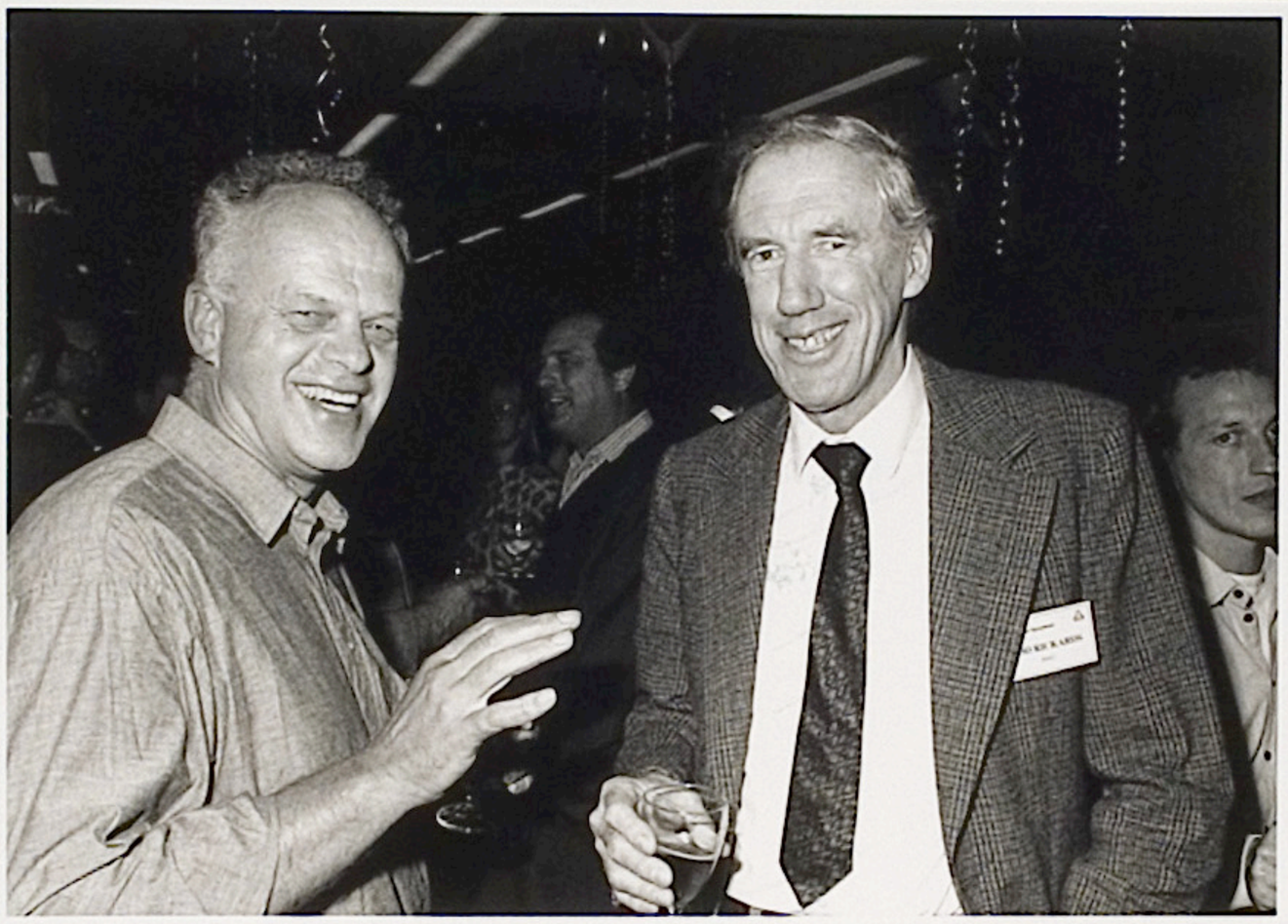
Off campus, chemists and science students throughout the ACT are also beneficiaries. RSC chemists are often invited to talk in colleges and schools.

There are collaborative research projects with other Canberra institutions and organisations, such as the University of

RSC-25
PARTY 9.10.92

RSC-25
DINNER 8.10.92



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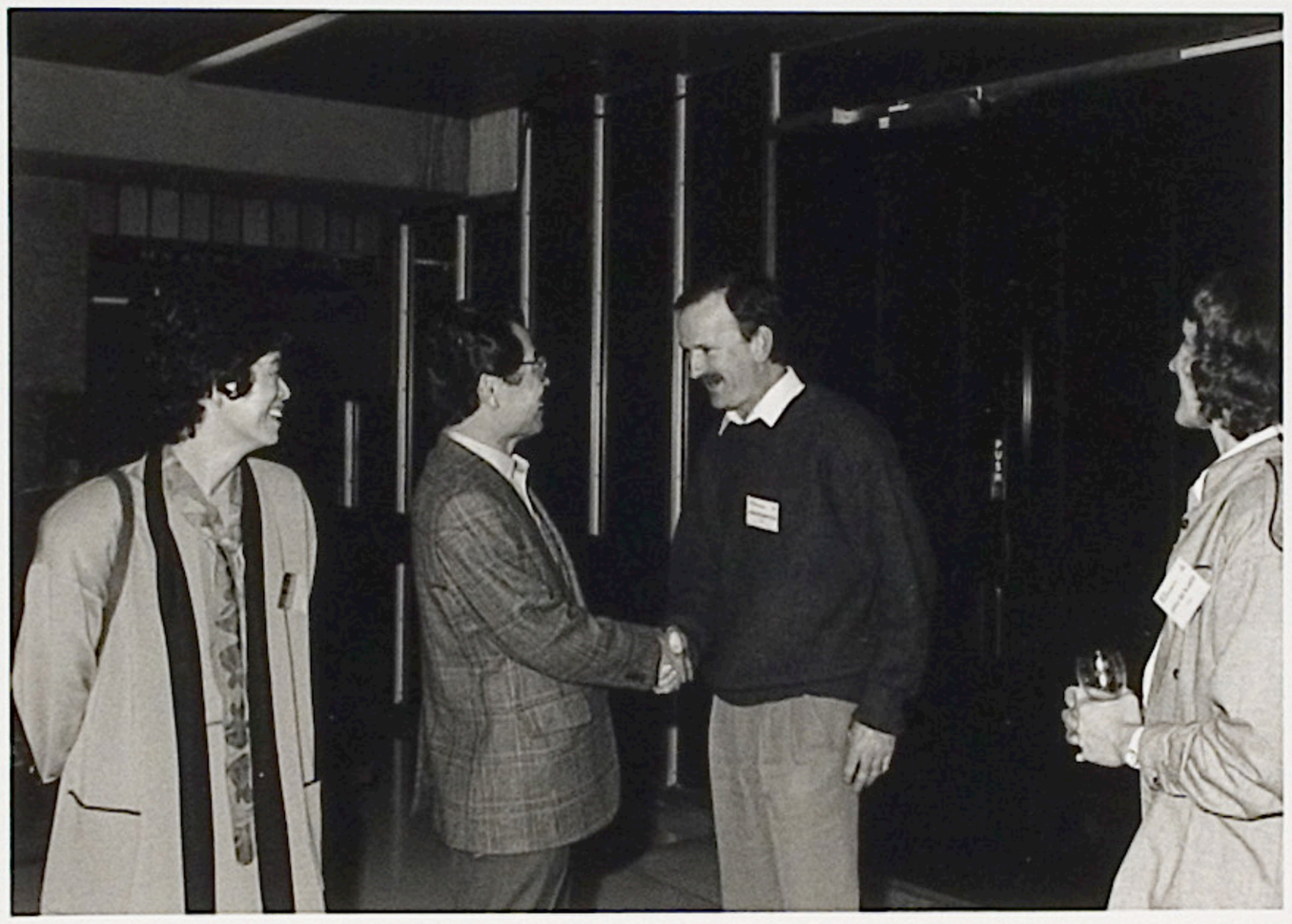


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RSC STAFF +

ATTENDEES AT

RSC-25.

Not killing the spirit

In the first of our staff profiles, LIZ TYNAN talks to the new Chair of the Board of the Institute of Advanced Studies.

Professor White, left, with Nobel Laureate Professor Pierre-Gilles de Gennes, at the Research School of Chemistry in August this year.

•Profile•

Professor John White
Research School of Chemistry

PROFESSOR JOHN WHITE is optimistic about his new role as Chair of the Board of the Institute of Advanced Studies (BIAS). He relishes the challenge of preserving the academic spirit while facing up to the greater bureaucratic control of universities that has come with abolition of the "arm's length" relationship with government through the Dawkins "reforms".

He said that the recently increased direct involvement of the Department of Employment, Education and Training (DEET) in determining the fate of Australian universities, and of the ARC's potential role with reviews of the ANU's Institute of Advanced Studies in particular, had to be thoughtfully dealt with by academics. He said it was not a question of thwarting bureaucrats who had their own pressures and responsibilities, but rather ensuring that the intellectual vigour of universities wasn't crushed.

'There are tremendous challenges facing the Institute,' Professor White said. 'Also, there are tremendous opportunities. I think we have a very important role in the future of Australian education; at the practical level of continued excellence here, continued strong collaboration with our peers in other universities, and at the level of principle in our responses about intellectual values.'

'It is the duty of a University to stand up on its hind legs and say what it believes to be true. We must stimulate debate and inform public opinion for our own and the general good'.

'One of the things we can contribute to the educational debate is to show that diversity in teaching and research is vital. Australia needs pluralism.'

A major initiative for the Institute, he said, in the wake of the Stephen Committee review, is to experiment in the way it functions and develop broad indicators of this performance while maintaining the quality of research and teaching. Through this, new aspects of the national role of this place are developing.

Professor White, who is a physical and theoretical chemist at the Research School of Chemistry, has more than enough on his research plate as his work in polymer and surface science enters exciting new areas involving extensive outside collaboration. He is also keen on graduate and undergraduate teaching.

In his own research he is true to his stated aim of fostering greater research collaboration to make the whole tertiary sector stronger. Being Chair of BIAS has not diminished his laboratory work. Now he regularly works long days, essentially fulfilling the two jobs.

He rose to the challenge of the BIAS job in the light of his growing involvement in the debate about quality in higher education, which he outlined in a submission to the Higher Education Council in April this year. He contributed further as part of an ANU working group which responded to NBEET's Higher Education Council in August. Through BIAS, he will be involved at the highest level in the debate which presently centres on the proposal for a DEET based National Quality Assurance Structure.

'If there were more effective interaction between universities we could possibly avoid such a new central bureaucracy to monitor quality for the whole country. Traditional quality assurance structures involving promotion, mobility, student feedback are strong in many places and one inimical aspect of centralism could be that academics will be always looking over their shoulders at the central body's norms of quality. That destroys diversity,' he said.

Professor White, who has been at RSC for seven years, isn't new to long hours and heavy responsibility, having been Director of the eminent *Institut Laue-Langevin* at Grenoble in France between 1975 and 1980. During that period he maintained his research group at Oxford University as well as starting a new group involving physical chemistry at Grenoble. Also, he was a driving force behind a radical new forward plan for the *Institut*, colourfully called "Deuxieme Souffle" or "Second wind". 'So I don't mind taking on things from time to time,' he said.

He has been impressed by the recent book by American academic Page Smith of the University of California, called *Killing the Spirit*, which sounds a

Continued on page 10

Continued from page 7

Professor John White

Not killing the spirit

timely warning about the dangers facing academia.

'It is an excellent book.' 'Basically Smith says that the spirit of quality teaching and quality research is under threat because of exigencies that come from simplistic ideas of accountability.' 'Smith talks, inter alia, about the fact that American academics are "looking over their shoulders" too much at performance indicators. These rank researchers in America in such an aggressive way, and promotion and mobility prospects are so determined by them, that not enough time is being given to the calm and reflective enterprise of intellectual enquiry and challenge to students.

This point has been touched on by other ANU academics. For instance, Professor Iain Wright of the English Department, dubbed DEET's draft on quality of education 'Gradgrindery', after the arch utilitarian in Dickens' *Hard Times, Gradgrind*. The character says from the outset 'What I want is the facts. Teach these boys and girls nothing but the facts...'.

A very austere attitude,' said Professor White. 'That is what we are being asked for - lots and lots of figures, simplistic performance indicators and things of this kind. To some extent we have got to show that there are better ways or the academic spirit will be ground down.'

'I think that that apart from the John Curtin Medical School recommendations the Stephen Committee Review was positive about the Institute and its role. We have had something like an 18th Century bloodletting to improve our health. I suppose that following this procedure in some cases the patient died.

'We have a healthy patient which through its current and developing responses might just have benefitted from the trauma.'

Continued from page 9

Promotions

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Promotions to Fellow

Dr J. G. Thompson; Research School of Chemistry; **Dr T. R. Vidyasagar**, John Curtin School of Medical Research; **Dr J. I. E. Urbas**, School of Mathematical Sciens; **Dr J. Howard**, Research School of Physical Sciences and Engineering; **Dr P. Kekicheff**; RSPhysSE; **Dr J. W. Handmer**, Centre for Resource and Environmental Studies.

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Thursday 1 October 1992

Scientific Societies' Lecture Theatre
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Centenary Lecturer: **Professor A M Sargeson**
Australian National University, Canberra, Australia

Presidential Address: **Professor R J P Williams**
University of Oxford

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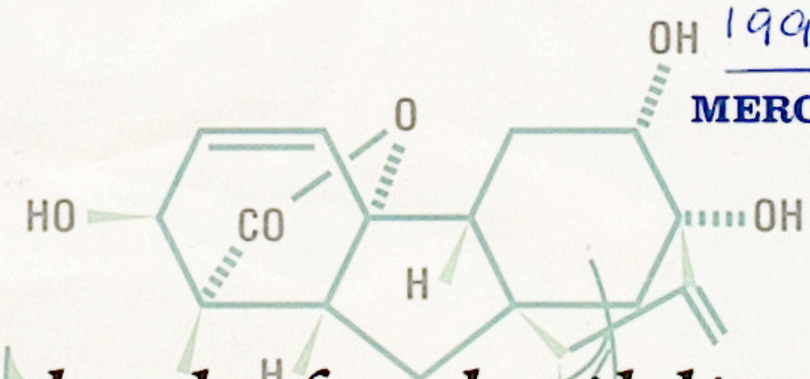


New methods for building molecules

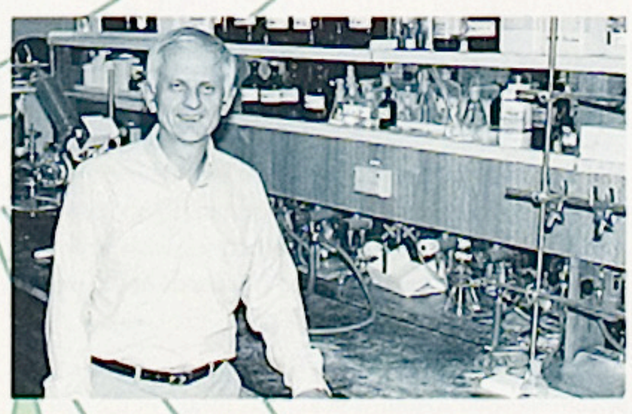
The synthesis of complex natural products, which have interesting biological properties, and the molecular basis of plant growth regulations are areas of special interest to Professor Lewis Mander, Dean of the Research School of Chemistry at ANU.

As the first Australian recipient of the Merck-Schuchart Lectureship, Professor Mander recently spent three weeks in Germany speaking at nine universities, including Hamburg, Dresden, Hannover, Gottingen and Munich, and the Institute of Organic Synthesis in Berlin. Once a year Merck-Schuchardt organises and sponsors this lecture tour of German universities and awards the prize to an internationally renown preparative organic chemist.

Professor Mander also made a special visit to the Merck parent company at Darmstadt and lectured at the city's Technische Hochschule. His German lectures were titled 'Cyclopropyl Ketones: Valuable Units for the Synthesis of Complex Natural Products', and 'Recent Progress Towards the Development of New and Useful Plant Hormones'.

Professor Mander said that he had always been interested in plants. He is especially interested in mechanisms for their growth and development.

'There are perhaps about a dozen groups of scientists around the world who are conducting research in this area. At its simplest, they are concerned with the biology while I'm doing the chemistry.'



Professor Lewis Mander

He said that many valuable drugs are obtained from plants. 'You can, however, enhance their efficiency by modifying, adding or subtracting various groups.

'By synthesis of complex natural molecules we can learn how to develop more efficient and powerful ways for putting molecules together.

'The methodology of these processes is, of course, of enormous importance to manufacturers, such as Merck, in that it can improve efficiency and manufacturing costs. We can also block out harmful effects of a particular substance,' he added.

Merck

"VISION"

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