Investiture of the Order of Companion of St. Michael and St. George to Professor Arthur J. Birch, FAA, FRS, by His Excellency the Governor General of Australia Sir Zelman Cowan, at Government House, Canberra, on 19th March, 1980.

The C.M.G. was awarded to Professor Birch by Her Majesty Queen Elizabeth the Second, in the Queen's Birthday Honours List, 1979.

Professor Birch was Foundation Dean of the Research School of Chemistry, and Professor of Organic Chemistry.

Investiture of M.B.E. to John Harper by His Excellency the Governor General of Australia Sir Zelman Cowan, at Government House Canberra 23 March 1982.

The M.B.E. was awarded to John Harper by Her Majesty Queen Elizabeth the Second, in the Queens New Years Honours List 1982.

MURDOCH POORER FOR LOSS OF PROFESSOR A.J. PARKER

A tribute prepared by Dr Dave Muir and Dr Dion Giles

The untimely and unexpected loss of Professor Jim Parker has left a sad emptiness in the laboratories and classrooms of the School of MPS and in the various University committees on which he served.

The many students and staff who have had the good fortune to be associated with him over the years will remember his warmth and caring attitude and the time he gave to others rather than to himself.

He was not the "God" Professor but rather the "Father" Professor with an open door, an open heart, and seemingly untiring energy.

Jim Parker was invited to be the Foundation Professor of Chemistry at Murdoch in 1973, a year before the first buildings were complete. Even then his name as a chemist was well-known and respected internationally. For the past 15 years his research at the Universities of Western Australia, Southern California, London, Bergen and finally at the Australian National University had earned him many distinctions.

It was at ANU, as Professorial Fellow, that he started to develop and apply his specialised research interactions to more practical and material problems. He was conscious of the need to share his knowledge not only with colleagues who had acquired many of his ways of thinking, but also with scientists in other fields and disciplines and, through its practical application, with the whole community. Thus it came as no suprise when his expanding research suggested new ways of making organic compounds or processing minerals. Suddenly his ideas were patentable with potential value to industry, so inevitably he found himself entering the rough and rocky areas of commercial enterprise. It was then that Murdoch offered him the Chair of Chemistry.

Dynamic

Murdoch was fortunate to attract such a dynamic Professor with a fresh and exuberant approach to chemistry and whose personality and reputation could attract the best of colleagues to the University. He sought to establish Murdoch as a centre for teaching and research, but this was not easy. He had to fight for staff and resources, fight the 'knockers' and fight to establish Murdoch's reputation in the local community, generally and as a centre of learning in Chemistry and Extractive Metallurgy. To his credit, he won most of those battles. With limited staff numbers, he inspired in the staff and research students loyalty to him and to one another, and brought out staff members' skills to provide students with new perspectives in chemistry and mineral science. He encouraged interdisciplinary skills and research and played an important part in the establishment and fostering of the Trunk Courses at Murdoch.

Excellence

His driving ambitions for research and excellence which flourished at ANU, did not abate with these new challenges at Murdoch. He fought to retain the core of the Mineral Chemistry Research Unit which he established at ANU, and started afresh. After a shaky and rather uncertain beginning, the MCRU has flourished under his direction and leadership. From the development of new processes for the recovery and refining of copper, Jim's imagination and foresight led to new processes in recovering gold, improved methods for making solar cells and new generation batteries for electric vehicles and energy storage. Over the years the MCRU has attracted postgraduates and postdoctoral staff from many countries and established to his credit an international reputation for its research. In a recent bid to become a nationally recognised "Centre for Excellence" it ranked in the top 15 out of over 300 groups nominated by all Australian universities and will remain an epitaph to his research and entrepreneurial skills.

Professor Jim Parker

Commitment

Despite the long hours he spent on his students, staff and research his commitment extended broadly to his profession and the general community. He served on the Council of Wesley College (where he was Dux in 1950), and on many committees advising on education and on science and technology. At the time of his death he was President of the WA Branch of the Royal Australian Chemical Institute.

The next issue of *Chemistry in Australia* will carry a comprehensive review of his scientific life, prepared by Professor Don Watts, Jim's close friend and scientific collaborator over many years.

Jim Parker will be remembered for his breadth of vision, his energy, his sportsmanship, his patience and skill as a teacher, his loyalty to colleagues, his quiet pride in his family, and his kindness. He is very sadly missed.

ANZAAS Medal

Professor Jim Parker has been nominated by the University for the Posthumous award of the ANZAAS Medal. The medal, to be presented at the 53rd ANZAAS Congress in Perth next May, is awarded for services in the advancement of science in Australia and New Zealand.

Research Grants

Murdoch University's Honorary Research Fellow in Education, **Dr David Mossenson,** has been awarded $50,000 under the Commonwealth Schools Commission's Special Projects Programme. The programme funds projects of national significance. Dr Mossenson will conduct a major study of recurrent resource standards in schools. The study will define what the Schools Commission sees as the target recurrent standards for the Australian schools in the 1980s and will result in the presentation of a report to the Commonwealth Minister for Education early in 1983 which will contain sections on:

— The objectives of schooling in the 1980s;
— an analysis of the research on the effectiveness of different levels and configuration of recurrent resources;
— current public opinions about schools;
— policies and provisions of education systems and schools;
— recommended target standards for recurrent resources for schools in the 1980s.

• • •

Eric Taylor, Lecturer in Beef Cattle Production & Medicine, has been awarded $9,888 by the Department of Agriculture for a project titled *A Study of Spiral Deviation of the Penis in Beef Bulls.*

• • •

Phosphorus Utilization by Eucalypt Seedlings, $7,000, Alcoa of Australia Ltd, to **Professor J.F. Loneragan** and **Dr B. Dell,** School of Environmental and Life Sciences.

FOR SAFETY'S SAKE

Following a suggestion from the Committee on Safety Policy, the University has upgraded the South-street underpass so that cyclists entering or leaving the campus will no longer be forced to negotiate fast-moving traffic on South-street.

A cycle track has been laid through the underpass located north of the Bush Court between the B and C car parks.

For safety sake use the underpass.

Cricket Strength

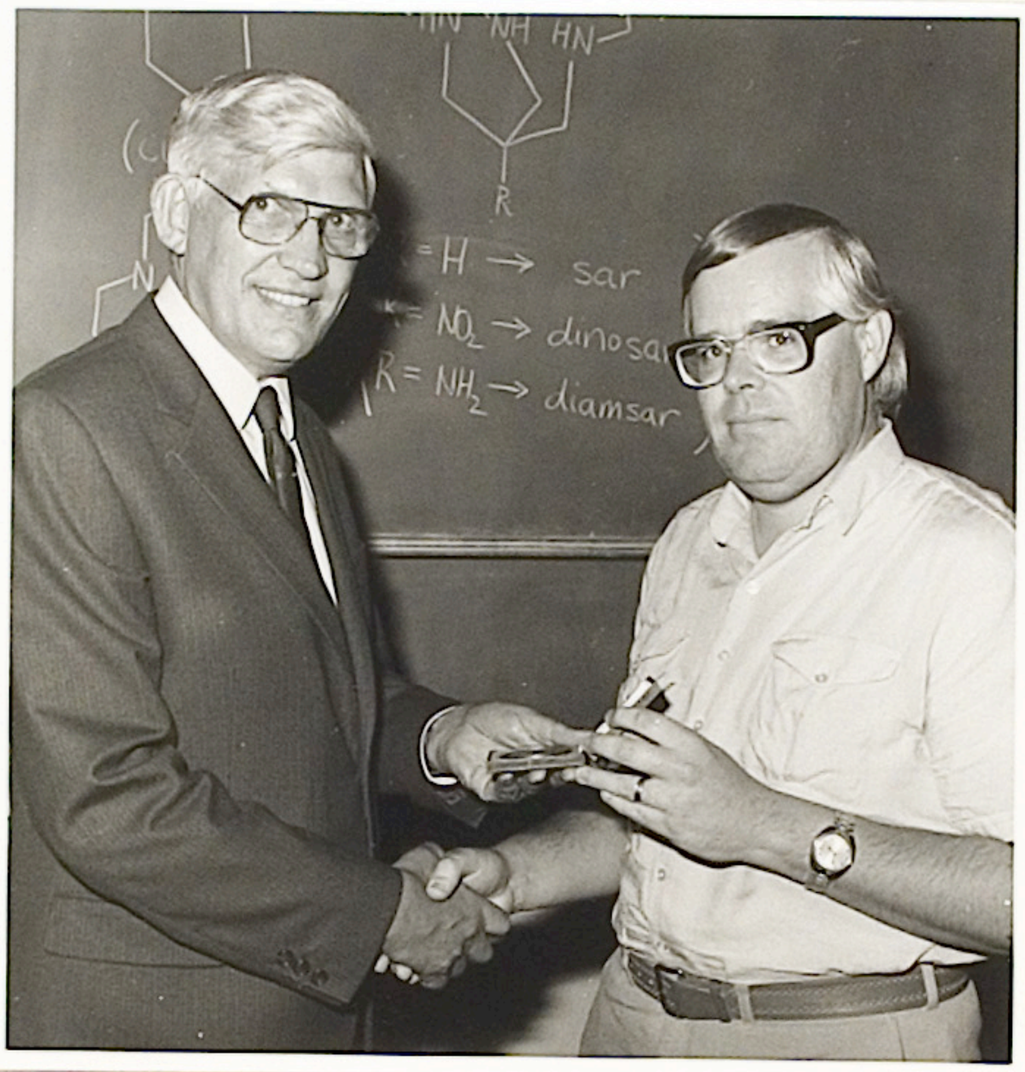
After its highly successful 1981-82 season the Murdoch University Cricket Club is keenly recruiting new talent.

The club is out to maintain the playing record which earned it the title of Champion Club.

If you want to get with the strength, then check with Dave Pethick (ext. 2246) or Ken Harrisen (2124), or come along to training at the University's sports grounds.

Matches are played between 1.30 p.m. and 6 p.m. on Saturdays.

MURDOCH NEWS SEPT 82'



PRESENTATION OF THE 1981 RENNIE MEDAL
OF THE R.A.C.I. TO DR. GEOFF LAWRANCE
BY THE 1983 PRESIDENT DR. DON WEISS

RESEARCH SCHOOL OF CHEMISTRY
SOLAR HEATING INSTALLATION
DECEMBER 1982

Fellowship

Professor Alan Sargeson, a professor of inorganic chemistry in the Research School of Chemistry at the ANU, has been made a Fellow of the Royal Society. He is the 20th academic from the ANU to be represented in the society. Also a Fellow of the Australian Academy of Science and of the Danish Academy of Science, he was one of the first appointees to the Research School of Chemistry when it was established in 1967.

CANBERRA TIMES
19/3/83

Society honours ANU professor

Alan Sargeson, a professor in inorganic chemistry in the Research School of Chemistry, has been made a Fellow of the Royal Society.

Professor Sargeson's inclusion in the Royal Society brings to 20 the number of ANU academics represented. In the Research School of Chemistry, Professor D.P. Craig and Emeritus Professor A.J. Birch are also Fellows of the Society.

Professor Sargeson is a graduate of Sydney University. He was one of the first appointees when the Research School of Chemistry was established in 1967.

A fellow of both the Australian Academy of Science and the Danish Academy of Science, Professor Sargeson is known for his research into the reaction of co-ordinated ligands as roots to the synthesis of organic molecules including amino acids.

ANU REPORTER
25 MAR 83.

Thai students look forward to work in their own land

There should be no unemployment problems for four Thai PhD students in the Research School of Chemistry when they return to Thailand as all have positions waiting for them.

The four Thai students, all women, are Mrs Uncharee Tooptakong who studies X-ray crystallography, Miss Yupayao Srikirin who studies organic chemistry, Miss Jintana Siripitayananon who studies physical and theoretical chemistry, and Miss Chindarat Chiraratvatana who studies organometallic chemistry.

They attribute the absence of male Thai PhD students in Chemistry at ANU to the tendency of Thai men to prefer engineering and physics. 'But of course, there are exceptions and the male faculty members in Thailand in chemistry are about equal to the women faculty members,' they said.

Uncharee, who holds a BSc and an MSc from Chulalongkorn University, said that two University of WA academics, Dr Jack Cannon and Dr A. W. White, when visiting Thailand, had recommended ANU to her as a centre for high-level chemistry research.

Yupayao, a BSc and MSc graduate from Mahidol University, said that Dr Surachai Nimgirawath, who trained at Sydney University and now teaches at Silpakorn University, and Dr Vichai Reutrakul at Mahidol University, had highly commended the RSC.

Jintana, who is from the northern capital of Chiang Mei, read in a copy of *Chemistry in Britain* scholarship offers from the RSC.

By contrast Chindarat was a Colombo Plan undergraduate at ANU and is now thoroughly at home here.

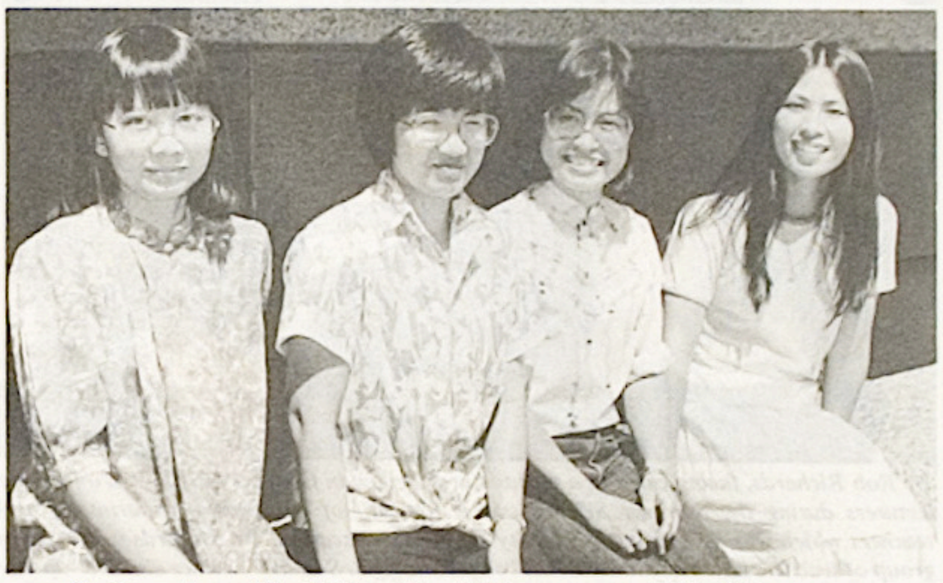
Although the four are Buddhists and there is no Buddhist temple in Canberra, they say this poses no problems for them as they can pray wherever they are. When in Sydney they visit the Thai temple, which is open to all Buddhists, and make their offerings.

Although Chindarat lives at University House, the others stay at Graduate House and prepare their own meals. 'All the foods and spices that we enjoy are readily available here, so we are very happy,' they told us.

When they return to Thailand they will all teach at universities, two at Silpakorn in Nakim Pathom, one at Kon Kean and one at Chiang Mei.

'We hope to combine our teaching with training students and pursuing our own research when time allows.' Chindarat said that there was a big need in Thailand for applied research and she was eager to apply her chemistry to work in the fields of medicine, agriculture and industry.

'Meanwhile,' she said, 'we are enjoying the clean, well-ordered country life of Canberra without the noise and traffic jams of Bangkok.'



Mrs Tooptakong, Miss Srikirin, Miss Siripitayananon and Miss Chiraratvatana.

ANU REPORTER
11 MAR '83

Chemistry school spreads the word

Two major chemistry conferences were held at the University during February.

The Research School of Chemistry organized the Fifth Summer School in Theoretical Chemistry, which was held at the RSC 12-20 February.

A conference on Solvation was sponsored in co-operation with the Division of Physical Chemistry of the Royal Australian Chemical Institute and took place 20-22 February.

The summer school attracted 85 graduate, undergraduate and staff members from universities throughout the country.

The Solvation conference was dedicated to the memory of Professor A.J. Parker of Murdoch University and formerly of RSC. Dr Don Watts of the Western Australian Institute of Technology delivered the eulogy.

Professor David Chandler of the University of Illinois spoke about the dynamics of elementary reactions in liquids and the breakdown of transition state theory.

The conference brought together inorganic, organic, physcial and theoretical chemists interested in the role of solvent structure and dynamics in chemistry.

There were exchanges between theoretical and experimental chemists, which arose because theoreticians are now more concerned with developing methods for examining complex systems.

For example, advances in theories of liquids and solutions have made possible investigations that will have a major impact on chemistry.

Major advances in chemistry tend to occur at the boundaries of the various subfields within chemistry and so meetings such as the conference on Solvation are necessary to maintain the vigor of chemistry in Australia.

The conference will have been a success if, through this meeting, the amount of dialogue between the sub-fields of chemistry has been increased.

Fifth Australian Summer School in Theoretical Chemistry

A.N.U. REPORTER
25 MAR 1983.

BRUCE MERZ FAREWELL DINNER

GINNINDERRA SCHOOL

HOUSE

Mr Bruce Merz is retiring from the University after 22 years service.

He had been a technical officer at CSIRO when he joined the John Curtin School of Medical Research in 1961.

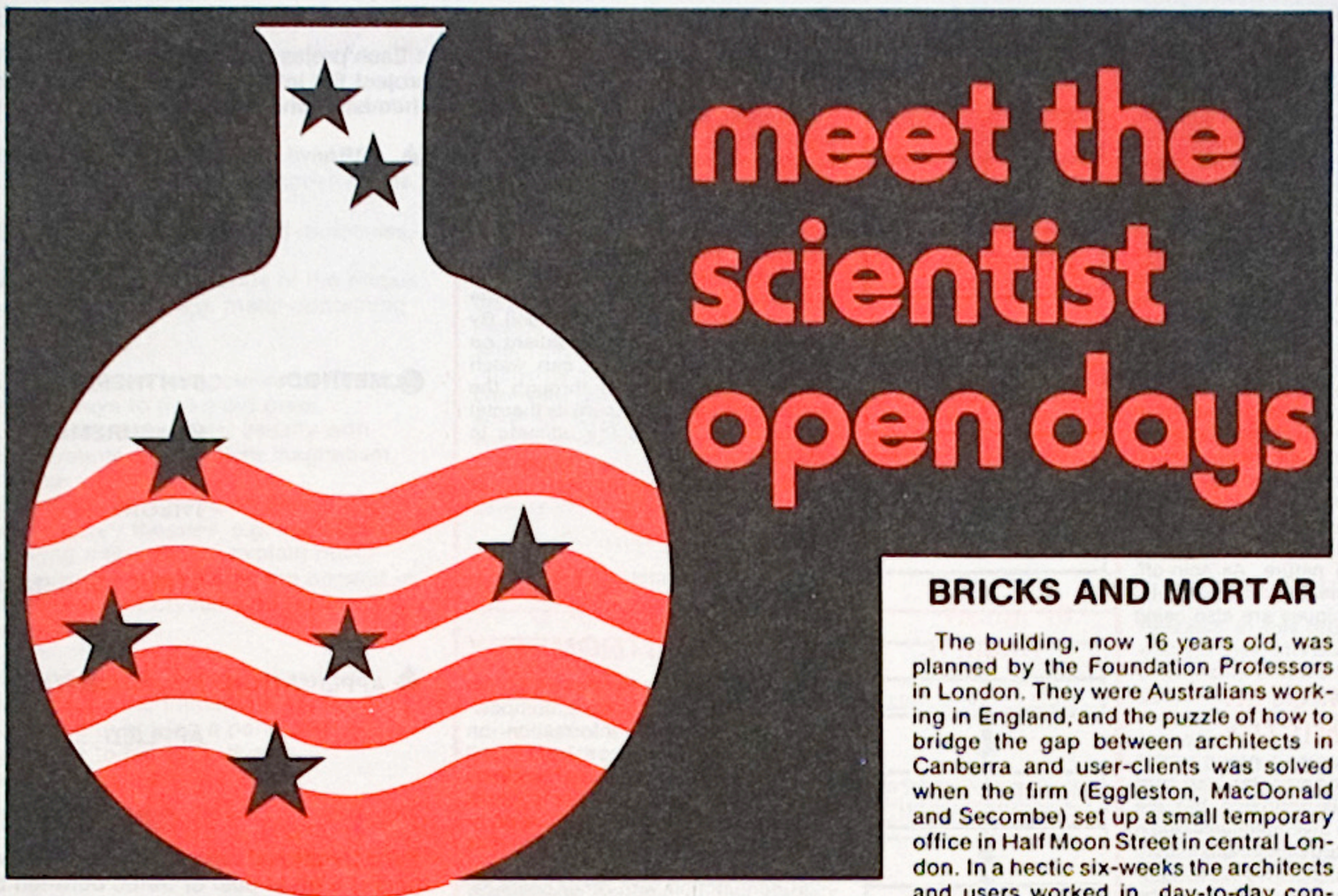
In 1967 he was appointed head technical officer in the Research School of Chemistry. He was responsible for establishing the workshops and since then has ensured their smooth operation.

In retirement Mr Merz will live in Canberra but spend time at his farm in Sutton.

12 APRIL 1983.

"OPEN DAY"

27-28 JULY 1983



meet the scientist open days

Wednesday 27 July....2-10pm
Thursday 28 July....2-10pm

The RESEARCH SCHOOL OF CHEMISTRY will hold its Open Days this month when they will invite you to meet and talk to scientists in their laboratories. There will be exhibits and models illustrating the work of the School and the scientists will guide you through a world of chemistry in the making. There will be guided tours, glassblowing, microscopy and spectroscopy as well as many other aspects of chemistry that will be of interest.

HISTORY

Chemistry is one of the more recent additions to the research schools of ANU, having been inaugurated in 1967. Australia's strength in the discipline called for the establishment of a school which would turn the tradition of excellence to the advantage of a country which had been unable to retain the services of its best minds.

Sir Robert Menzies, Prime Minister at the time when the new school was being planned, gave his support to the broad objective of attracting back to Australia some of the best of her young scientists who had left for wider research horizons abroad. The theme of reversing the 'brain drain' was underscored when the School was officially opened in 1968.

The School has succeeded in the aim of getting back able young Australians. Well over half of the research scientists who have worked here have been in that category.

RAISON D'ETRE

The School exists to do basic research in the chemical sciences and to train young scientists in research methods, seeking to meet Australia's needs in both. The School chooses some of its research problems in areas where the results ought to be of special value to Australia, such as finding new methods of extracting metals from mineral ores, in finding better ways to make substances to stimulate plant growth (gibberellins) or control animal reproduction (prostaglandins).

Many chemists in the School work on problems of fundamental chemistry, seeking to develop new ways of making compounds or to synthesize molecules so far unknown. Others study the properties of materials.

Fundamental science often has more trouble justifying its existence than applied science, and more trouble attracting money. But without it there would never be any science to apply. Those who practise it know that their discoveries may not be put to practical use for many years, but whether sooner or later, the day will surely come. Faraday could never have guessed the size of the electricity generation industry that would grow from his discoveries with electromagnets.

ADMINISTRATION

The Head of the School is the Dean, who is advised by the Faculty Board, made up of senior staff and two elected members. He is assisted by the Laboratory Manager and School Secretary, responsible for technical and laboratory management, and academic administration, respectively.

Inevitably, there are committees. They advise the Dean on a variety of matters and, in some cases, themselves care for such things as Safety, the Library, and the organisation of the Open Day. Another provides advice on Future Research Directions.

The current Dean is Professor Lew Mander, an organic chemist who specialises in devising novel ways to synthesise natural substances, most recently a hormone which stimulates plant growth.

COMMUNICATION

The research community is international. Journals of research publish accounts of new findings and are read by scientists in every country. Workers in the Research School of Chemistry in 1981 published 121 papers on their work, and described it at conferences, in Australia and abroad.

Maintaining contact with workers overseas is perhaps the greatest challenge to keeping research stimulus and vitality in a country as distant as Australia is from the major centres in Europe and the USA. The University helps with its outside studies program which enables members of staff to continue their work from time to time in overseas laboratories for periods up to six months. Also the School acts as host to visiting scientists, usually at least 20 a year, who spend varying periods in Canberra. Many more visit for a day or two to lecture and talk informally.

The activities of the School are recorded in the Annual Report, which is submitted through the Council of the Australian National University to the Commonwealth Parliament.

BRICKS AND MORTAR

The building, now 16 years old, was planned by the Foundation Professors in London. They were Australians working in England, and the puzzle of how to bridge the gap between architects in Canberra and user-clients was solved when the firm (Eggleston, MacDonald and Secombe) set up a small temporary office in Half Moon Street in central London. In a hectic six-weeks the architects and users worked in day-to-day contact, and the success of the building as a functional entity owes much to that close association.

THE FOYER: With its paintings, handsome finish, and the "Vanishing Lady" tapestry (based on the Vermeer painting) it contrasts with the rather Spartan appearance of the rest of the building. It is finished with Roman travertine imported from South Austrlia.

LECTURE THEATRE: Also quite pleasant. 100 seats. There are other smaller seminar and meeting rooms in the building and a Common Room used for business meetings and social gatherings.

The location of the building was chosen to be near the Department of Chemistry of The Faculties and the two are now married by a covered walkway. The close association of students, staff and research programs was designed to be as effortless as can be.

Students and staff of the School are also within a short walk of the Research Schools of Biological Sciences, Earth Sciences, Physical Sciences, and Medical Research, with all of which there is important research collaboration.

A striking feature of the northern end of the building is the spacious workshop, with large and well-equipped areas for glass blowing, machining and sheet-metal working, electronics etc.

Why such low ceilings? All the better to hide the unbelievable array of services needed by a school of this nature. Most commonly used services are compressed air, vacuum lines, exhausts for gases, and water (hot, cold and distilled). Also available are liquid oxygen and nitrogen and, for work near absolute zero temperature, liquid helium. Considering the potential hazards it is not surprising that the School is paranoid about safety. The Safety Committee has a great deal of 'clout' and its requirements are very rigorously followed: proper protective clothing, disposal of flammable liquids, etc.

EQUIPMENT

Scattered through the building are numerous examples of standard chemical research instruments. They include:

(a) Mass spectrometers, for splitting molecules apart and weighing the fragments.
(b) NMR spectrometers, for identifying the geometrical arrangement of atoms in molecules.
(c) X-ray diffraction equipment, for determining exact distances and angles between atoms in crystals.
(d) Electron microscope: powerful enough to observe directly the microscopic arrangements of atoms in crystals.
(e) ESR spectrometers, for studying the magnetic properties of electrons in molecules.
(f) Spectrometers for the precise measurement of the colour of molecules, in infra-red and ultra-violet light as well as ordinary light.
(g) High-power lasers, for irradiating molecules with intense light of precisely determined colour.
(h) Gas chromatographs, for separating molecules from mixtures.
(i) Automatic analysers, for determining chemical compositions to be sure the compounds really are what they are thought to be.

Projects of the kind which RSC undertakes require a large amount of computer power and the School is a major user of the University's UNIVAC installation with several direct lines to serve its terminals. In addition there is the School's own mini-computer (ground floor) regularly used for 50-60 projects. It provides data banks as well as computation. There are also a number of microcomputers attached to the more sophisticated items of equipment to aid in data collection and data reduction.

IMPORTANT NUMBERS

64 Academic staff made up of:

16 permanent staff (Professors and Fellows) each leading a research group made up of short-term staff and research students,

48 short-term staff (Research Fellows and Post-doctoral Fellows) stay 3-5 years. About half are Australians returning from appointments overseas. Formerly many used to go from here to the universities or CSIRO but today more are turning to the Public Service or Australian industry. In addition, there are

15 Visiting Fellows, from universities and research institutions all over the world;

25 research students working towards the PhD degree. They come from Australian universities and from overseas. Most are funded by ANU scholarships or Commonwealth post-graduate awards;

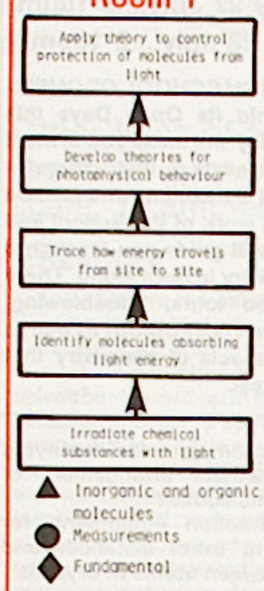
78 technical and laboratory staff. Modern scientific research depends on the support of highly-trained specialists in the workshop and the laboratory; and

16 administrative, secretarial and clerical staff. Prudent use of resources requires the expertise of competent management and administrative staff.

Research School of Chemistry

ANU REPORTER

Room 1

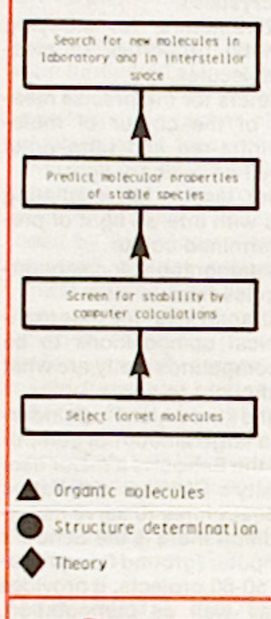


PHOTOPHYSICS

Photochemistry is familiar to all in the form of plant life, faded curtains, and plastics that have spoiled in sunlight. However, before light absorption produces such chemical reactions, many physical processes may have intervened. These include fluorescence, phosphorescence, and transport of the light energy from the point of absorption to suitable sites for chemistry. The work of the photophysics group is principally concerned with these processes. Out of this research the chemical industry will develop dyestuffs that don't fade, plastics that have controlled stability or bio-degradability in sunlight, more efficient solar collector surfaces, and materials for conversion of sunlight to electrical energy.

The investigative techniques used are mainly magnetic resonance ones since many photophysical processes are magnetic in nature. As spin-off, some developments in magnetic resonance techniques are also being made.

Room 2

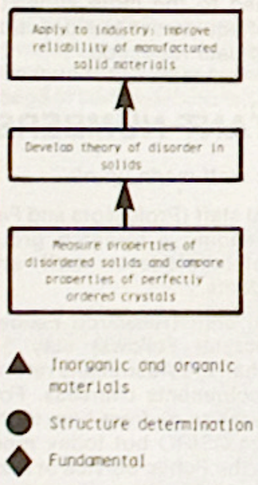


COMPUTER CHEMISTRY

The theoretical organic group carries out chemistry in a computer, instead of a test tube. This approach has the major advantage that molecules which are difficult to study experimentally—because, for example, they are dangerously explosive or toxic—may be studied with ease in the computer. In addition, for certain types of problems, the reliability and cost-effectiveness of predictions from this so-called *ab initio* approach to chemistry now rival those of conventional experimental techniques. Theory and experiment are often complementary and the theoretical studies can assist in the interpretation of experimental results.

For the most part, the theory is being used to study the structures of molecules (i.e. how they are put together) and the mechanisms of chemical reactions (i.e. how molecules react). Much of the theoretical work is concerned with predicting properties of molecules which so far have not been observed.

Room 3

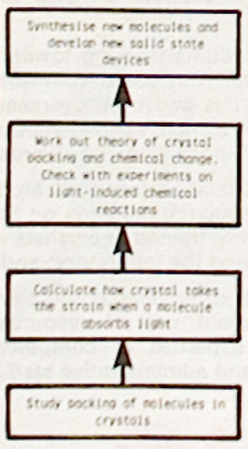


DISORDERED MATERIALS

Many branches of physics and chemistry involve the study of crystalline materials, because the regular repetitive arrangement of atoms which characterises a 'crystal' greatly facilitates the study of their properties. However in the real world very few materials are perfectly crystalline (even diamonds contain many defects and impurities), and practically all solid materials are imperfect or disordered to some extent.

To understand the effects of this disorder on the properties of materials a class of 'crystals' which are almost, but not quite, perfect is being studied. These are crystalline enough to give the advantages afforded by true crystals but are sufficiently imperfect to give clues to what happens in more drastically disordered materials.

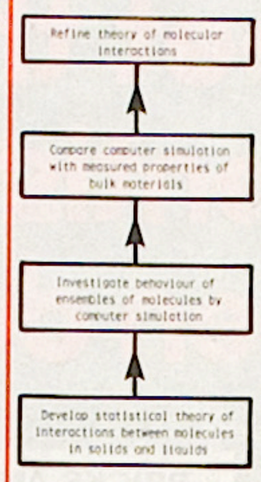
Room 4



CHEMICAL CHANGE IN CRYSTALS

Calculations which relate to photochemical reactions in molecular crystals will be described. A region of crystal containing a number of host molecules, and one guest (impurity) molecule is modelled by computer. After finding the ground (unexcited) configuration of the molecules, an excitation is introduced, localised on one of the host molecules adjacent to the impurity. The changes in configuration of the excited system as (i) only the excited molecule, (ii) excited molecule and impurity and (iii) additional selected neighbouring host molecules are allowed to move give an indication of the time evolution of the system, and so an insight into the initial stages of photochemical reactions.

Room 5

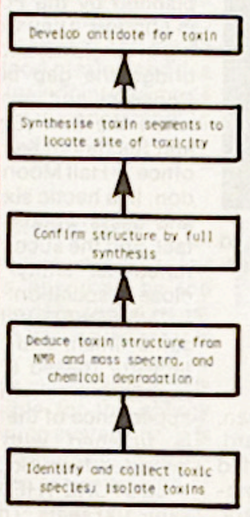


STATISTICAL MECHANICS

Theoretical predictions of the bulk properties of materials have become much easier to make with the advent of computer simulation techniques. We make a mathematical model of a few hundred to a few thousand individual molecules and simulate their behaviour. We can watch these model molecules form into crystals. If we heat the system we can watch it melt or boil. By imposing a temperature gradient on our computer model we can watch heat being transported through the system and hence measure its thermal conductivity. This is the ultimate in computer games!

- ▲ Organic and inorganic molecules
- ● Theory
- ◆ Fundamental

Room 6



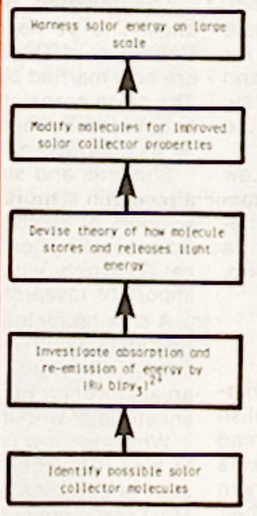
MASS SPECTROMETRY

Mass spectrometry is used to obtain molecular weight, chemical composition and structural information on molecules. These range from small molecules containing only a few atoms to complex biological compounds. Only a few micrograms of the compound are required to provide this information.

In conjunction with other chemical investigative techniques, mass spectrometry is being used in a study of the chemical structures of plant and insect toxins. These are known to cause deaths of grazing animals in Australia and some have been implicated in human fatalities.

- ▲ Biological molecules
- ● Structure determination
- ◆ Fundamental

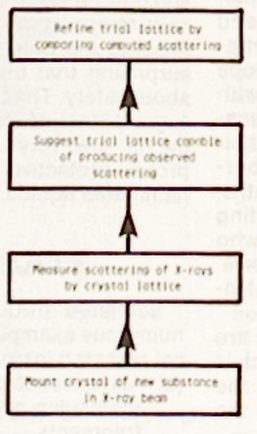
Room 7



SPECTROSCOPY AND PHOTOCHEMISTRY

This group concentrates on molecules which respond chemically to light, especially those with a poorly understood photochemistry. An example is a molecule suspected of being able to absorb solar energy and release it by splitting water into hydrogen and oxygen—the ruthenium tris-bipyridine complex. Experimental techniques include magnetic studies (Zeeman spectroscopy), light scattering (Raman spectroscopy) and the use of minute pulses of laser light (duration as short as 10 picoseconds).

Room 8



CRYSTALLOGRAPHY

Single crystal X-ray diffraction analysis is used to obtain detailed information about the shapes and dimensions of molecules—factors which can profoundly affect their physical and chemical properties. The technique relies for its success upon the fact that any crystalline solid, when illuminated by a beam of X-rays, generates its own fingerprint—a pattern of scattered X-rays whose distribution is determined entirely by the arrangement of the atoms in that solid. Once the scattered beam pattern has been recorded it is generally, though not always, possible to infer the precise arrangement of the atoms in the scattering solid. It remains the only technique capable of providing such information with any degree of generality. Its use in this School is directed largely towards the study of transition-metal complexes. Elsewhere, it is widely used in such diverse areas of study as metallurgy, mineralogy, protein function and enzyme substrate reactions.

DIRECTION

Each project will be identified with three la
project fits into the larger field and where it
chemistry, what method is being used, and wh

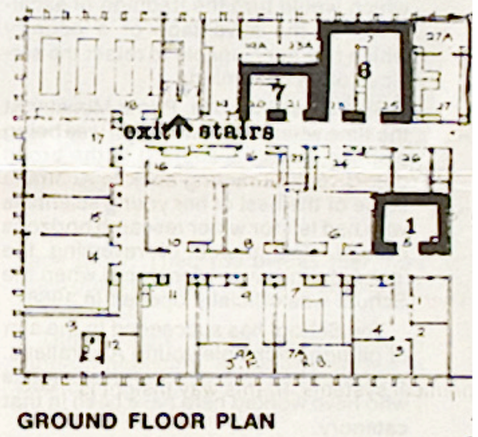
▲ **AREA:** BIOLOGICAL CHEMIS
ORGANIC CHEMISTRY
INORGANIC CHEMIST

● **METHOD:** SYNTHESIS .....
MEASUREMENT .....
THEORY .....
STRUCTURE DETERMI

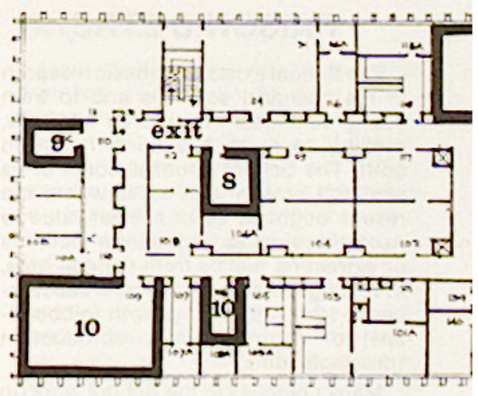
◆ **APPLICATION:** FUNDAMENTAL .....
APPLIED .....

ORGANIC, INOI

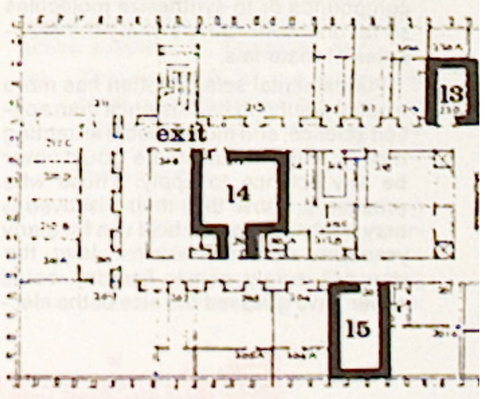
The traditional subdivisions of chemistry a
there is a great deal of traffic between the th
Ground Floor: Physical & Theoretical Chem
ces (like their colour or magnetism) and usir
First Floor: Inorganic Chemistry, devising n
lysts for industry), mimicking nature in the te
atoms in crystals.
Second Floor: Organic Chemistry, synthesi
nature (new hormones), some just to find be



GROUND FLOOR PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

TO PROJECTS

and a flow chart. The flow chart shows how the benefits will be felt. The labels define the area of er the project is applied or fundamental (or both).

..... Chemistry associated with living things, e.g. insecticides, cancer, drugs, vitamins.
..... Chemistry of carbon-based molecules, e.g. plastics, detergents.
..... Chemistry of compounds of the metals and non-metals, e.g. metal-containing catalysts.

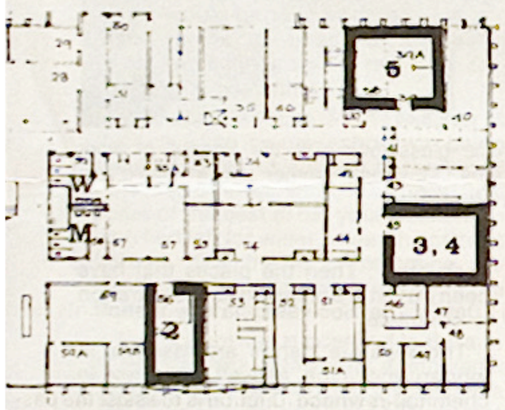
..... Preparing new compounds or finding better ways to make old ones.
..... Measuring properties, usually with instruments, e.g. nuclear magnetism, colour.
..... Chemistry by computer; developing explanatory theories, e.g. statistics of moving molecules to explain heat.
TION Discovering what atoms are present in a molecule or crystal, and how they are arranged.

..... Contributing to general chemical knowledge, no immediate application.
..... Devoted to solving a particular problem to benefit industry, agriculture, medicine, etc.

ANIC, PHYSICAL

etained at RSC but the barriers are kept low and floors.
y, measuring the properties of chemical substan- computers to explain why.
metal-containing molecules (such as new cata- ube, discovering the lattice-like arrangements of

new compounds of carbon, some to improve on ways to make them.



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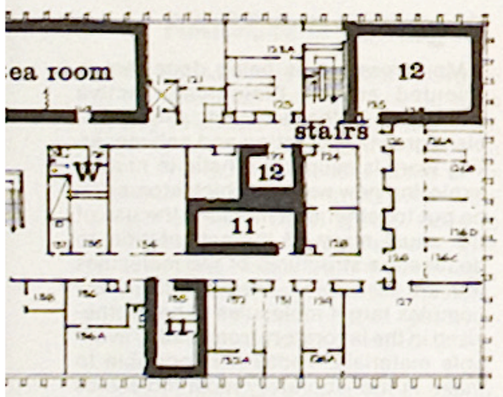
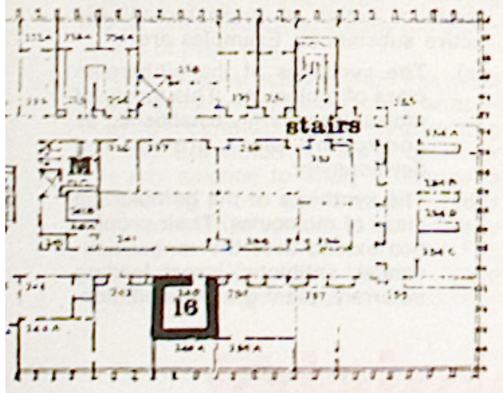




ORGANOMETALLIC CHEMISTRY

Room 9

Organometallic chemistry deals with compounds which contain a bond between a metal atom (or group of metal atoms) and a carbon atom (or group of carbon atoms). Such compounds are involved, sometimes only as transient intermediates, in the large-scale metal-catalysed industrial synthesis of many everyday materials, including polyethylene, polypropylene, detergents, acetic acid and refined petroleum. The organometallic chemistry group is interested in how some of these important processes work the way they do and in finding new organometallic compounds from which new processes can be developed.

Improved production of organic chemicals for industry
Develop improved hydrogenation and carbonylation catalysts
Test for catalytic properties
Synthesise new metal-organic compounds; determine structure and reactivity
Survey binding of aromatic and olefinic molecules by metals

▲ Inorganic molecules ● Synthesis ◆ Fundamental

COORDINATION CHEMISTRY

Room 10

Coordination chemistry is concerned with compounds between metals and other molecules or ions. These complexes, as they are called, are important in industrial processes and in biology. Recently, the group has made a series of large organic molecules which can bind metal at their centre to yield extremely stable caged metal complexes. Because of this stability and other properties these molecules have possible uses for making hydrogen peroxide and, as relays in photochemical and electrochemical methods, of producing hydrogen from water.

Part of the group's research involves attempts to mimic nature's enzyme chemistry involving metals with simple model systems. All this chemistry needs a basic understanding of what reactions are possible, by what route they occur and how fast and how far they go. Much of the group's time is spent elucidating these basic facts.

Efficient large-scale production of hydrogen from water
Select for catalytic activity without breakdown of catalyst
Select caged-metal compounds and test for catalytic potential
Synthesise cage molecules and measure electrochemical properties
Theory of water-splitting processes

▲ Inorganic molecules ● Synthesis and measurement ◆ Fundamental

SOLID STATE RESEARCH

Room 11

This group investigates the structures of a wide range of crystalline metals, alloys, minerals and man-made materials, by studying them at the atomic level of resolution. Using the electron microscope, the relative positions of atoms in a crystal are examined, the pattern is related to other structures and so our knowledge of how the different structures are formed, and transform among each other, is increased. These studies promote understanding and possible prediction of the ways in which, for example, new ceramics, aircraft alloys and semiconductors will behave, and how engineering materials and minerals in the earth's crust will be affected by extremes of temperature and pressure.

Improved solid state devices, abrasives, etc
Develop theory of cohesive forces in solids
Develop methods to determine properties of solids
Electron microscopy of thin slices of solids and X-ray structural analysis of crystals

▲ Inorganic materials ● Structure determination ◆ Fundamental

STEREOSPECIFIC CATALYSIS

Room 12

Work in this group is concerned with the separation of left- and right-handed molecules that can attach themselves to metals. The method involves attaching a reference molecule of known handedness (say left-handed) to a particular metal, and then attaching to the same metal the molecule to be resolved (a 50:50 mixture of the two hands). This results in a pair of metal derivatives with quite different physical properties (a left-left and a left-right derivative). These can be separated by fractional crystallisations. When this has been done the desired left-handed (say) component of the original mixture can then be displaced from the metal.

Production of new left and right handed molecules
Develop efficient handed catalysts
Separate left and right handed compounds and screen for catalytic activity
Synthesise metal-binding compounds of phosphorus and arsenic

▲ Inorganic molecules ● Synthesis ◆ Fundamental

ORGANIC SYNTHESIS

Room 13

Plant growth is regulated by a complex interplay of natural hormones. The organic synthesis group has developed new methods for synthesising a selection of these hormones and a number of analogues with a view to understanding the mechanisms by which they function, and with the ultimate aim of applications in agriculture.

Synthesise modified plant growth hormones and select most effective
Program computer to select best method of synthesis
Check availability of raw materials. Check yield. Estimate human effort involved
Survey known methods of synthesis

▲ Organic molecules ● Synthesis ◆ Fundamental

BIO-ORGANIC CHEMISTRY

Room 14

Research in this group is concerned with the chemistry and biochemistry of biologically active compounds which occur in living systems. Antibiotics constitute a major area of interest—the isolation of new antibiotics from microorganisms, the elucidation of their complex molecular structures, the use of radioactive and non-radioactive isotopes to study the way in which antibiotics are formed biologically from small molecules, the use of such small molecules to increase antibiotic production, and the synthesis of antibiotics in the laboratory by routes which in some cases mimic the natural processes.

Improve production of antibiotic by microorganism and develop laboratory synthesis
Study formation of antibiotic in microorganism
Determine molecular structure of antibiotic
Isolate new antibiotic from microorganism

▲ Biological molecules ● Structure determination and synthesis ◆ Applied

FREE-RADICAL CHEMISTRY

Room 15

This group is interested in the mechanisms of reactions—the intimate details of the way in which one molecule interacts with another to form new molecules. The chemical behaviour of species containing an odd number of electrons—the so-called free radicals—is of particular interest. Although they are generally very short-lived (about 1/1000 second under typical conditions) they can be studied by special techniques and the rules that govern their chemical behaviour can thus be recognised.

Develop effective methods of protection from oxygen damage
Devise theory of oxygen damage to oils, plastics, etc and biological systems
Deduce how fragments recombine
Trace fragments produced in reactions with oxygen
Develop methods to detect molecular fragments (free radicals)

▲ Organic molecules ● Measurements ◆ Fundamental

ANALYTICAL CHEMISTRY

Room 16

This group provides a specialised analytical service for the experimental chemists. Pure compounds, either natural or synthetic, are analysed quantitatively to verify or to calculate their elemental compositions.

Modern microanalytical methods have been developed or modified to match the chemical nature of the samples. The range of determinations includes carbon, hydrogen, nitrogen, oxygen, sulphur, phosphorus, all the halogens, many metals, and molecular weight. One to seven different determinations are made on each sample; a larger number are required for the more complex multi-elemental compounds.

Measure physical properties; determine atomic structure
Determine molecular weight; is the molecule in the predicted size range?
Perform exact analysis; is the molecule composed of the predicted elements in the right proportions?
Synthesise molecule and propose formula
Plan synthesis of new chemical compound

▲ Organic and inorganic molecules ● Structure determination ◆ Fundamental

Research School of Chemistry

Other lines of research, apart from that of the major research groups, are being pursued on a smaller scale. Examples are on this page.

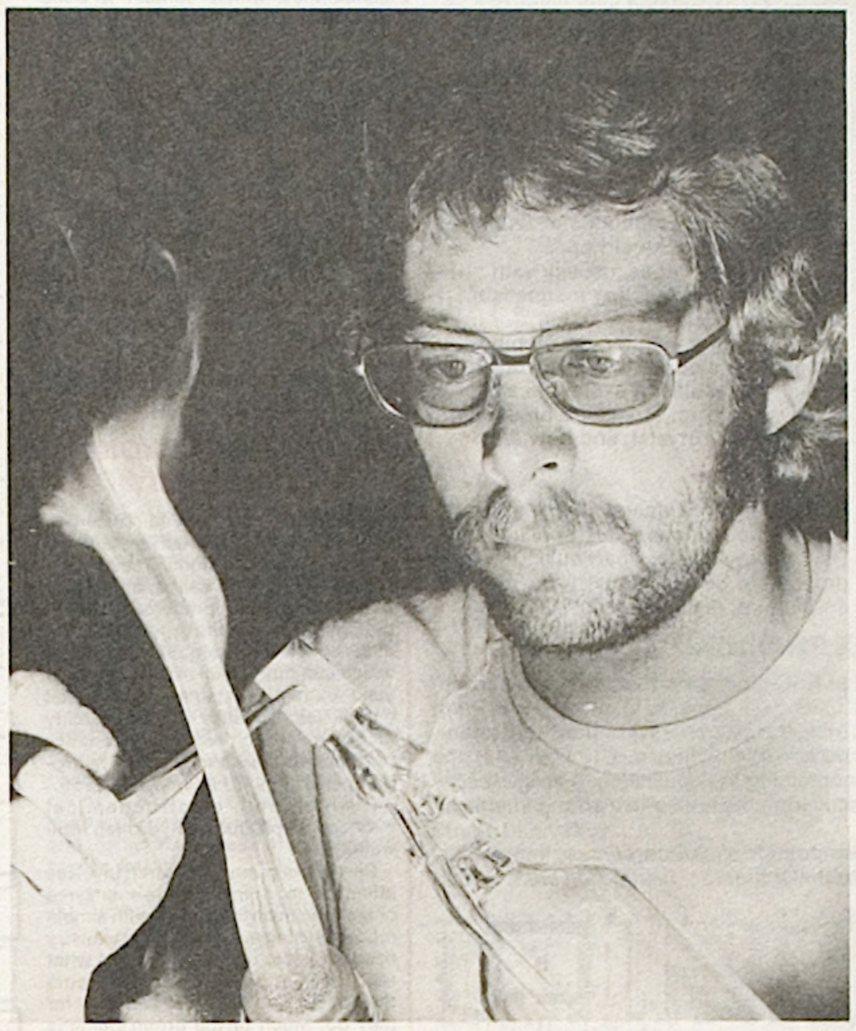
Enzymes

Enzymes are the catalysts involved in the chemistry of plant and animal life. Catalysts are the chemicals which facilitate chemical change without themselves being used up in the process. One research project is concerned with the design and synthesis of chemicals which block the action of a group of transferase enzymes. These enzymes are vital for the biosynthesis of phytosterols. Phytosterols are ubiquitous and are the components of the membranes, including the plasma membranes. Most advertised of sterols is cholesterol—a component of membranes in man, while phytosterols are its plant kingdom relatives. Interestingly, cholesterol is present only in trace amounts in plants. Therefore, in order to gain fundamental information regarding the structure and function of plasma membranes in higher plants, inhibitors of phytosterol biosynthesis have been prepared. This exercise has led to a vital concept for devising inhibitors of enzyme catalyzed reactions which proceed by the intervention of electrically charged species called carbocations. These inhibitors are likely to have important applications in medicine and agriscience, especially given the fact that it is now generally recognised that pathogenic fungi and phytophagous insects attack plants to obtain phytosterols which are absolutely essential for completion of their life cycle including sexual reproduction. Thus, this might offer a rational approach to making insect resistant plants, an area of immense economic and ecological value.

Transport Protein Mechanisms

All living cells contain special proteins (transport proteins) in their outer envelopes whose function is to assist the passage of particular chemicals into and out of the cell. These chemicals include nutrients, which the cell seeks to ingest, waste products which are to be eliminated and certain salts whose concentrations inside and outside the cell must be maintained at fixed values for healthy function.

Although many types of transport protein are known, the detailed working mechanism is not fully understood for any of them. Here the weak magnetic properties of dissolved chloride ions (from sodium chloride—common salt) are being used to study the interaction of salt with a transport protein found in red blood cells. This protein maintains the correct salt balance between the inside of the cell and the blood plasma and it is hoped that a deeper insight into its mode of action will be useful in understanding transport proteins in general.



Mr Chris Tomkins, one of the two scientific glassblowers in the School, at work constructing a piece of the complex apparatus that is not commercially available and which has to be made.

Bio-inorganic Group

All animals require oxygen for survival. Oxygen is absorbed by the blood in the lungs or gills and is transported to the various tissues where it is put to use in a variety of ways: it may be converted directly to water, and in this process is responsible for the energy production necessary to sustain life; it is also required for the synthesis of structural components, and for getting rid of foreign compounds (e.g. drug detoxification system); it may also be used as a defensive weapon to kill invading microorganisms. The efficient control of oxygen's reactivity as performed by living organisms would have far-reaching consequences for chemical-energy technology and alternative energy sources.

It is an aim of this research to mimic the essential features of certain oxygen-utilising enzymes by using simpler chemical systems. In this way insight is gained not only into the structural make-up of the 'working part' of the enzyme, but ultimately into the manner in which oxygen is utilised. Attention is focussed on modelling those systems which contain molecules called porphyrins at their active centres (a well-known example is the oxygen-carrying protein called haemoglobin, which is responsible for the red colour of blood). Various metal ions such as iron, copper and manganese are also essential parts of some of these systems, and the research involves the study of porphyrins containing these metal ions, and their reactions with oxygen.

A cluster of sawfly larvae on a eucalyptus branch. In areas of Central Queensland, large cattle losses can occur from poisoning caused by eating such sawfly larvae.

Ambidextrous Chemistry

A great many molecules in nature, like those in our bodies, share an important property with the shoes you wear on your feet. They come in two forms, left- and right-handed. The analytical chemist can't tell the difference, because right- and left-molecules are made of the same atoms in the same numbers and types. But nature can select them with perfect accuracy, using only one form to build and break down in the endless drive of growth and decay.

Chemists try many tricks to separate the two forms, or 'hands', in the laboratory. A new and powerful step forward here is to start with a metal atom, like nickel or cobalt, and first attach to it a substance of known hand. Then, if a mixuture of hands of another substance is offered, the metal forms two different compounds, often easily divided from each other. Then the pieces that have been put on are taken off, and separation is complete.

The separate 'hands' are essential in modern medicine, as well as for use in chemical research. The new method is having notable successes.

Organic

More research is being done that is oriented around biologically active molecules in the areas of: antibiotics, plant growth regulation and anticancer. The work is mainly synthetic in nature, exploring new ways in which atoms can be put together and includes the use of the usual array of instrumentation to deduce the structures of the molecules that are assembled. These studies allow complex target molecules to be synthesised in the laboratory from readily available materials. Today it is possible to make in the laboratory most molecules that occur in nature and to carry out modification of the structures of these molecules in order to understand the mode of action of these biologically active substances. Examples are:

(a) The synthesis of the gibberellin class of molecules. This family of molecules is firmly established as controlling plant growth and development.

(b) The synthesis of the germacrane class of molecules. Their properties extend over the range: anticancer, antibiotic, insect feeding deterrent, plant growth inhibition.

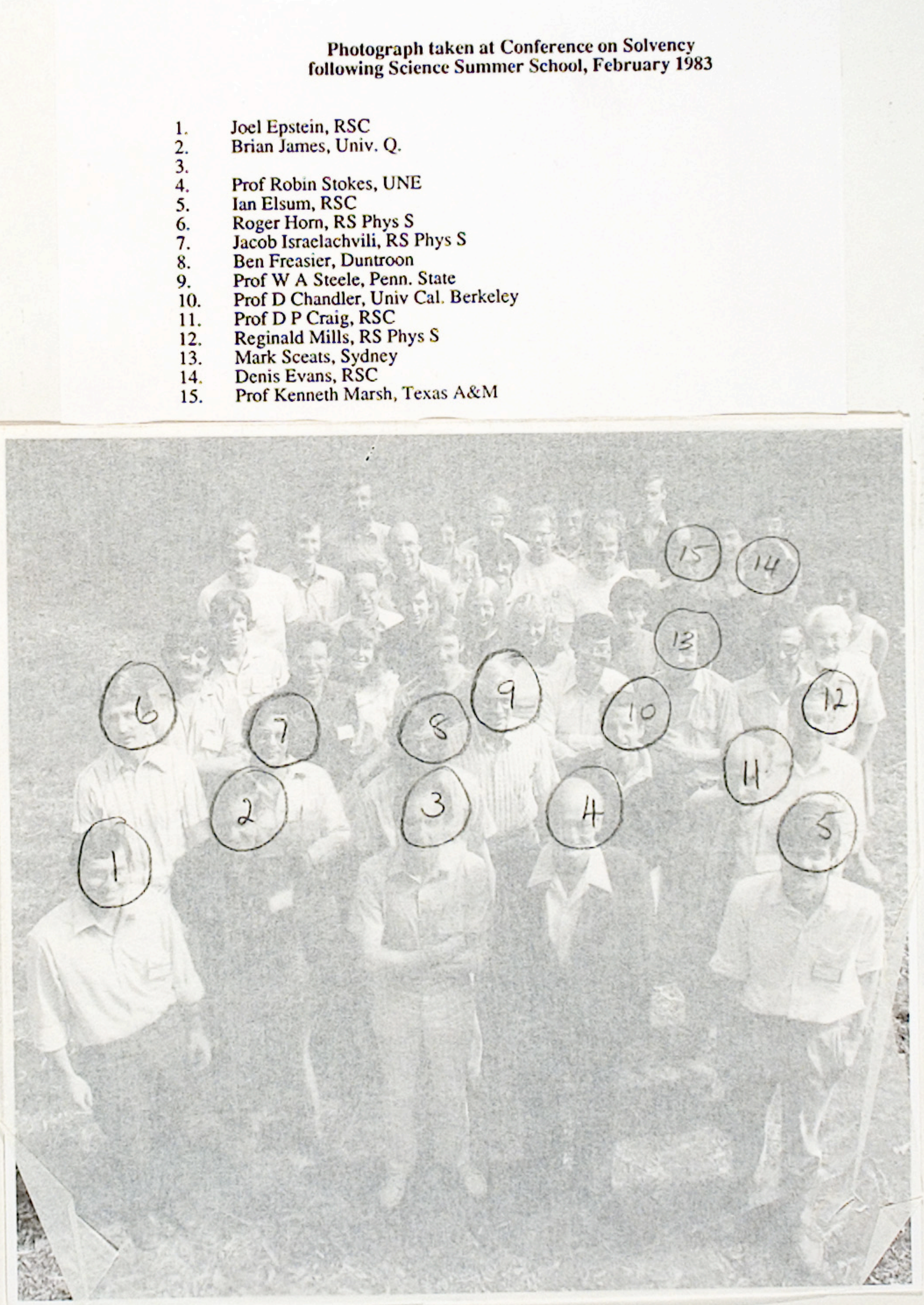
Research School of Chemistry

"OPEN DAY"

27-28 JULY 1983

Photograph taken at Conference on Solvency following Science Summer School, February 1983

1. Joel Epstein, RSC
2. Brian James, Univ. Q.
3.
4. Prof Robin Stokes, UNE
5. Ian Elsum, RSC
6. Roger Horn, RS Phys S
7. Jacob Israelachvili, RS Phys S
8. Ben Freasier, Duntroon
9. Prof W A Steele, Penn. State
10. Prof D Chandler, Univ Cal. Berkeley
11. Prof D P Craig, RSC
12. Reginald Mills, RS Phys S
13. Mark Sceats, Sydney
14. Denis Evans, RSC
15. Prof Kenneth Marsh, Texas A&M



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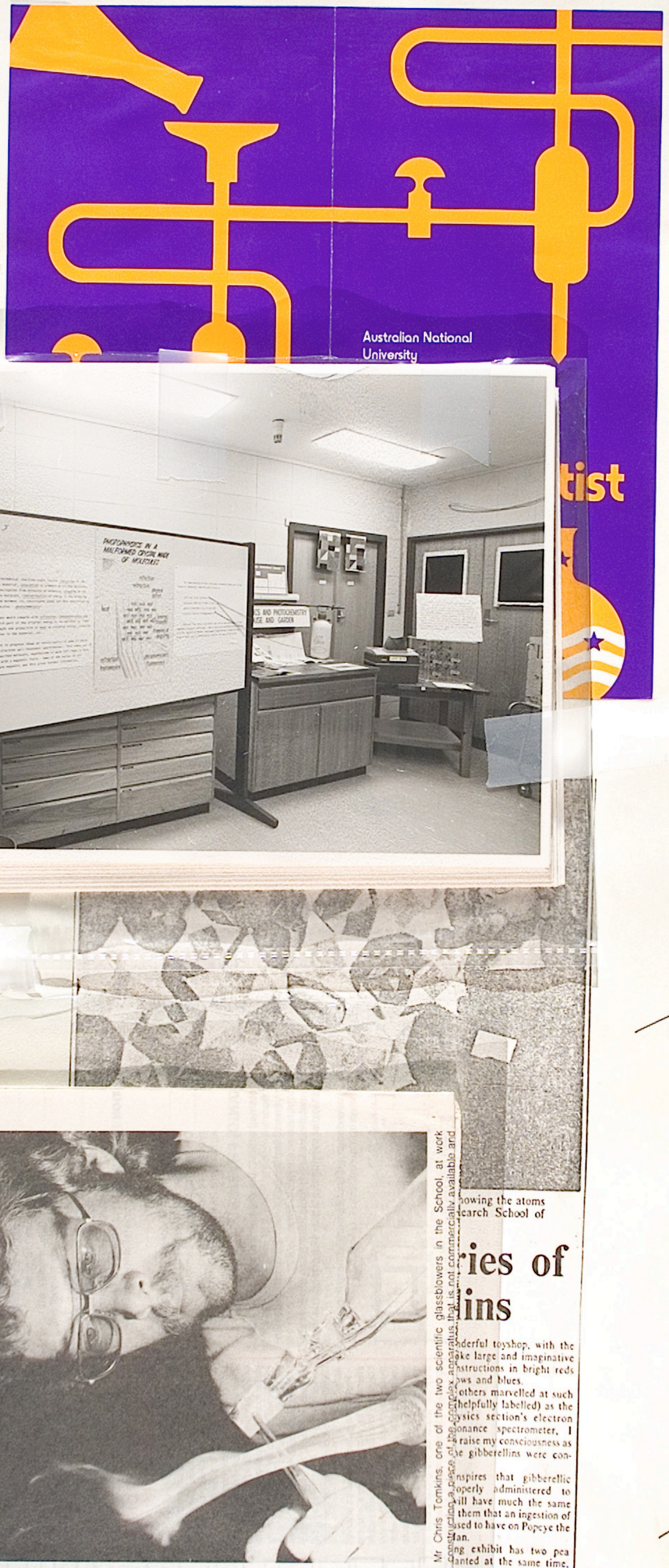


ol of Chemistry

ries of lins

The co-ordinator of the Open Days, Dr Richard Bramley, said yesterday afternoon that 350 schoolchildren had already been

laboratory whose shelves, stacked with what he explained were "building models of various crystal structures" looked like the shelves

Mr Chris Tomkins, one of the two scientific glassblowers in the School, at work constructing a piece of the complex apparatus that is not commercially available and

nderful toyshop, with the ke large and imaginative nstructions in bright reds ws and blues.

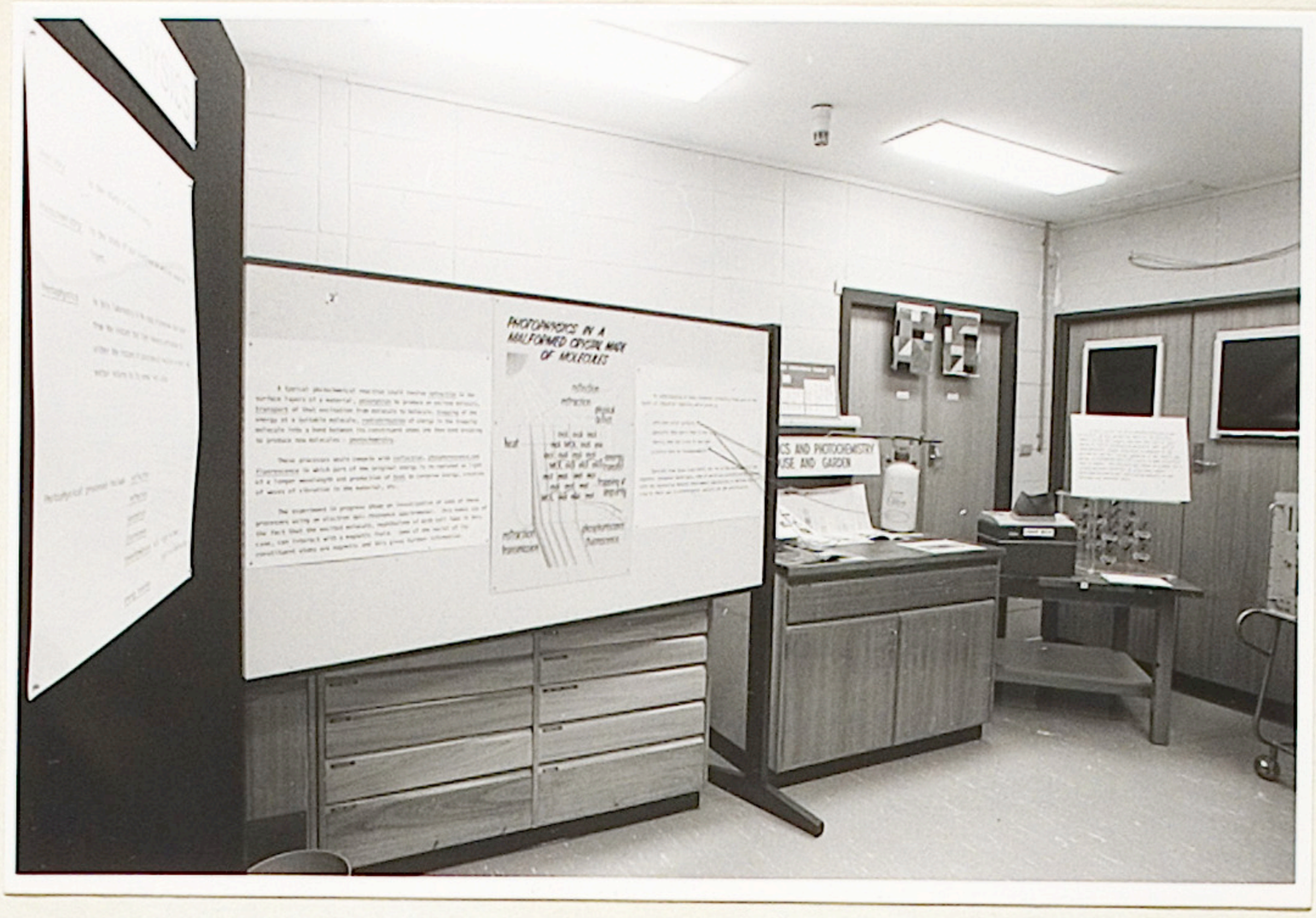
others marvelled at such helpfully labelled) as the ysics section's electron onance spectrometer, I raise my consciousness as e gibberellins were con-

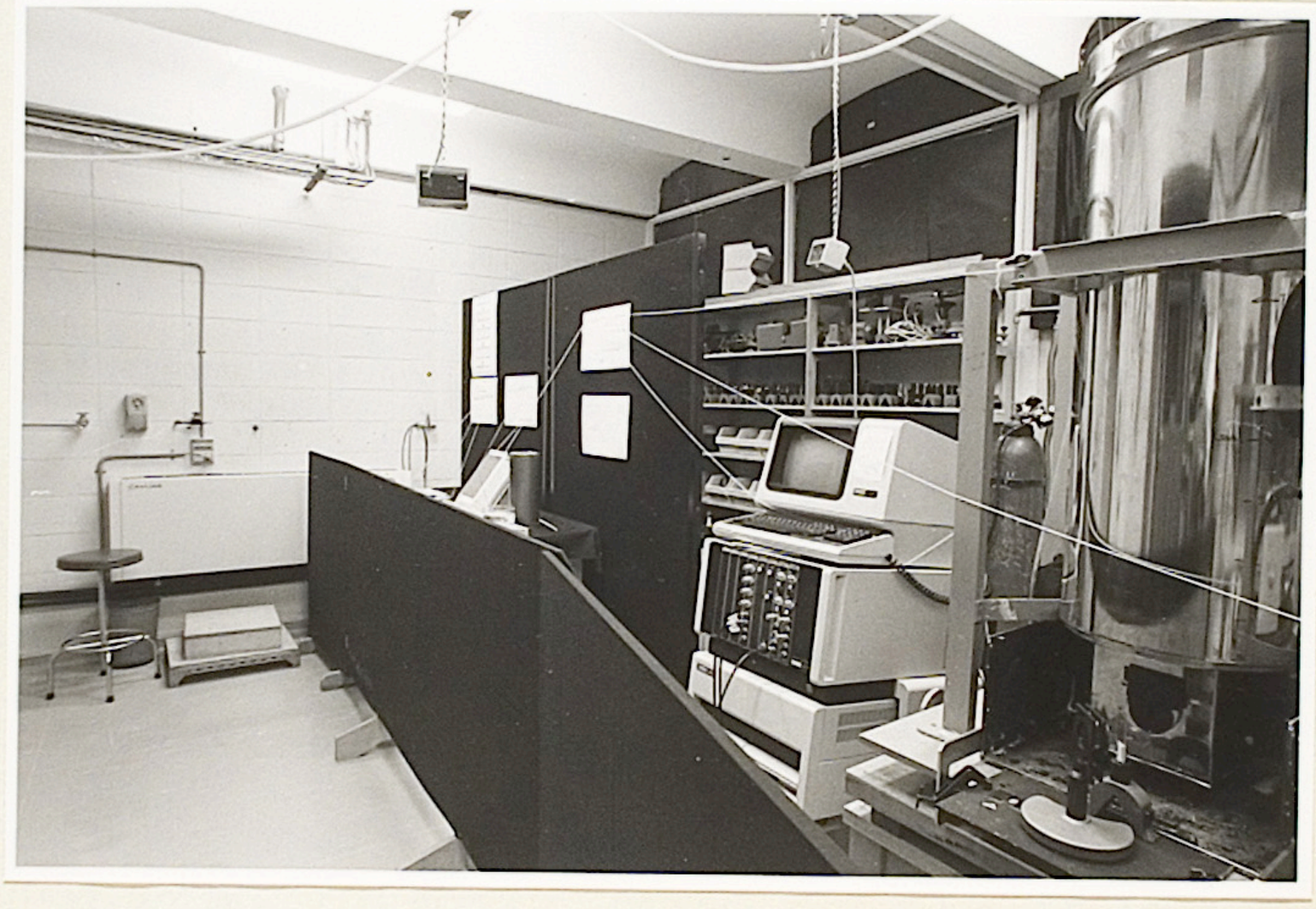
nspires that gibberellic operly administered to ill have much the same them that an ingestion of sed to have on Popeye the lan.

ng exhibit has two pea anted at the same time, hem granted the boon of gibberellins and the other denied them. They look, needless to say, like the seven-stone weakling before and after his correspondence course with Charles Atlas.

owing the atoms
earch School of

CANBERRA TIMES
28 JULY 1983

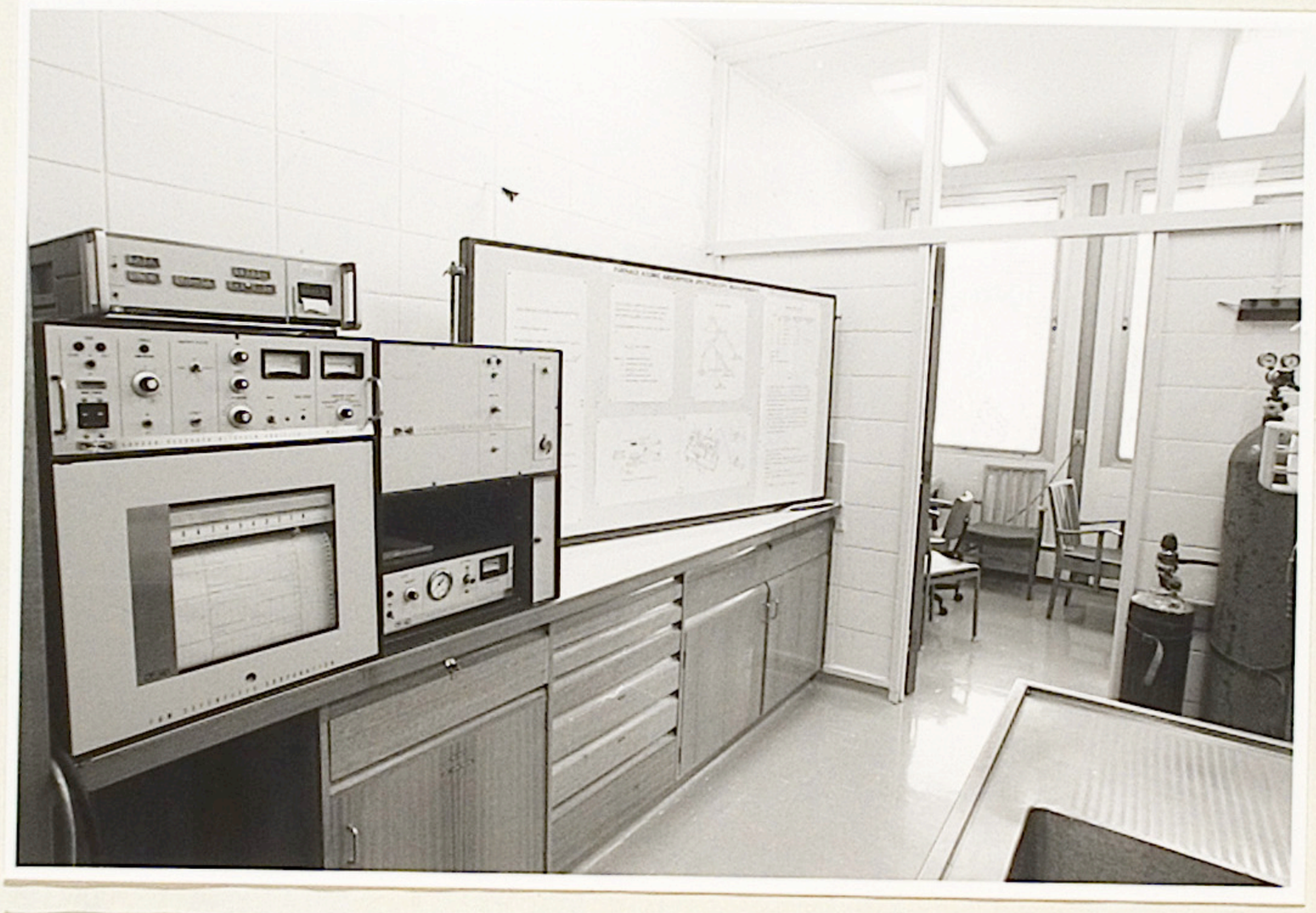

PHOTOPHYSICS IN A
MALFORMED CRYSTALLINE MASS
OF MOLECULES
S AND PHOTOCHEMISTRY
USE AND GARDEN

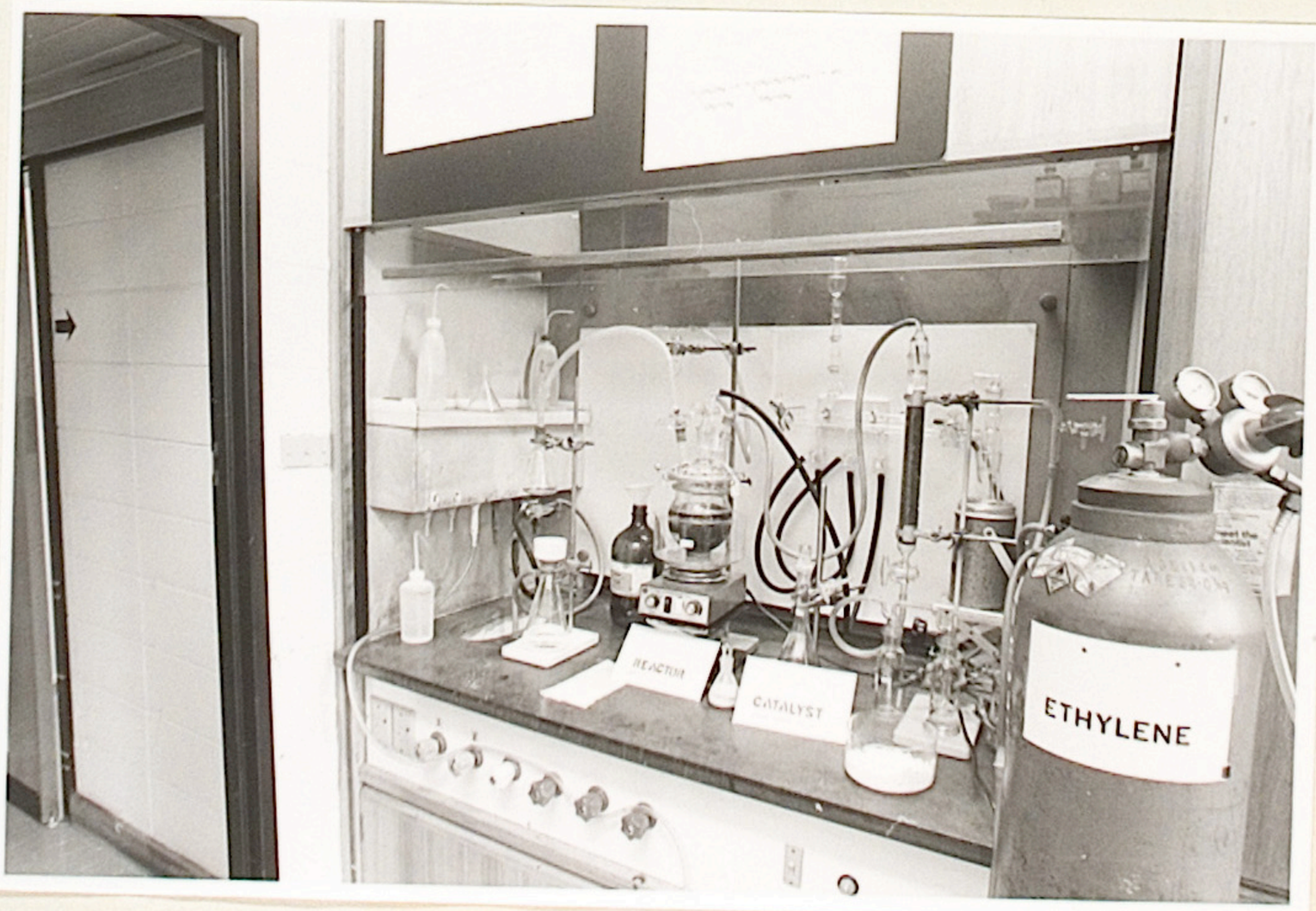


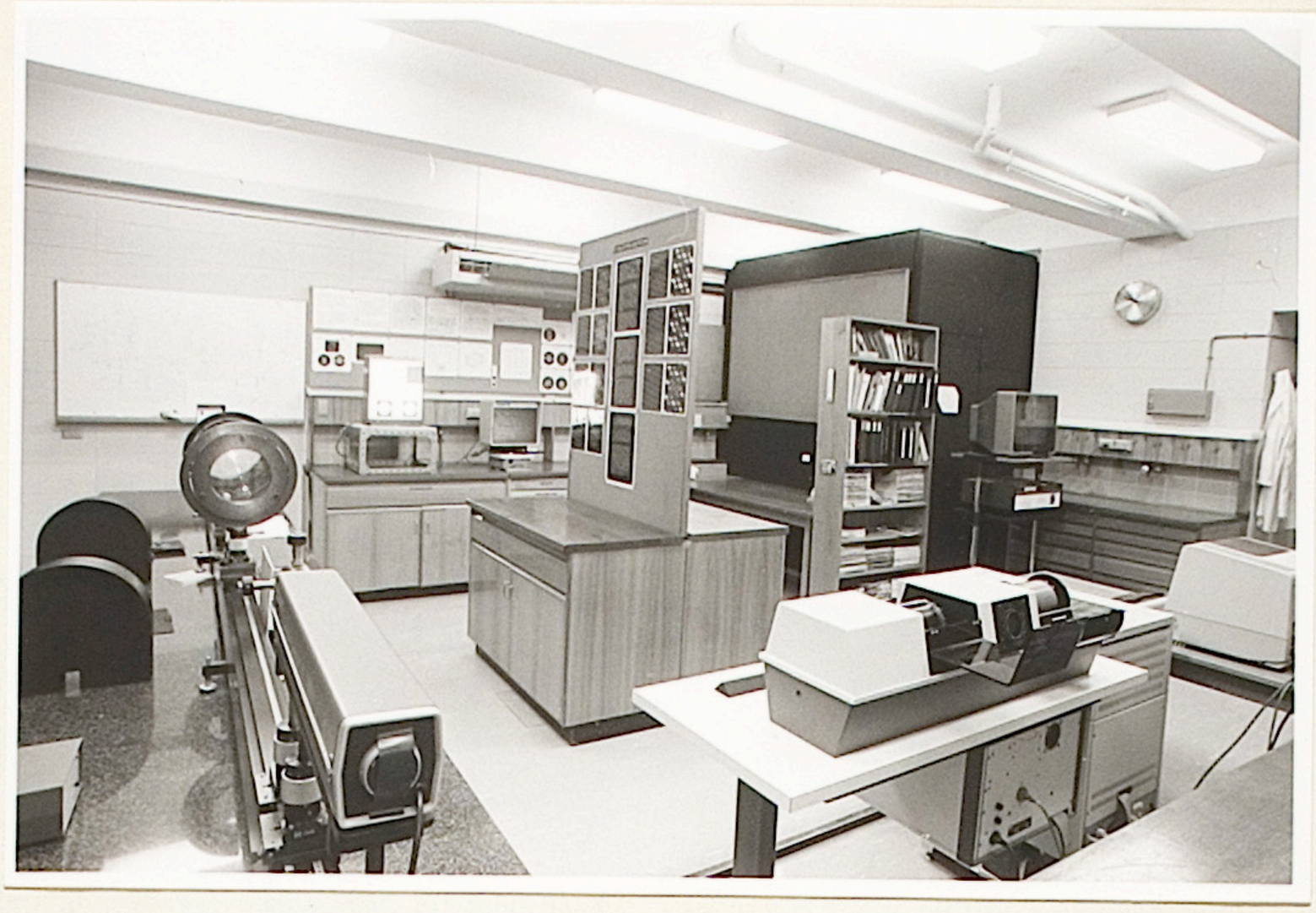

DANGER
NO
SMOKING
START
HERE
CARE! HYDROGEN IN USE

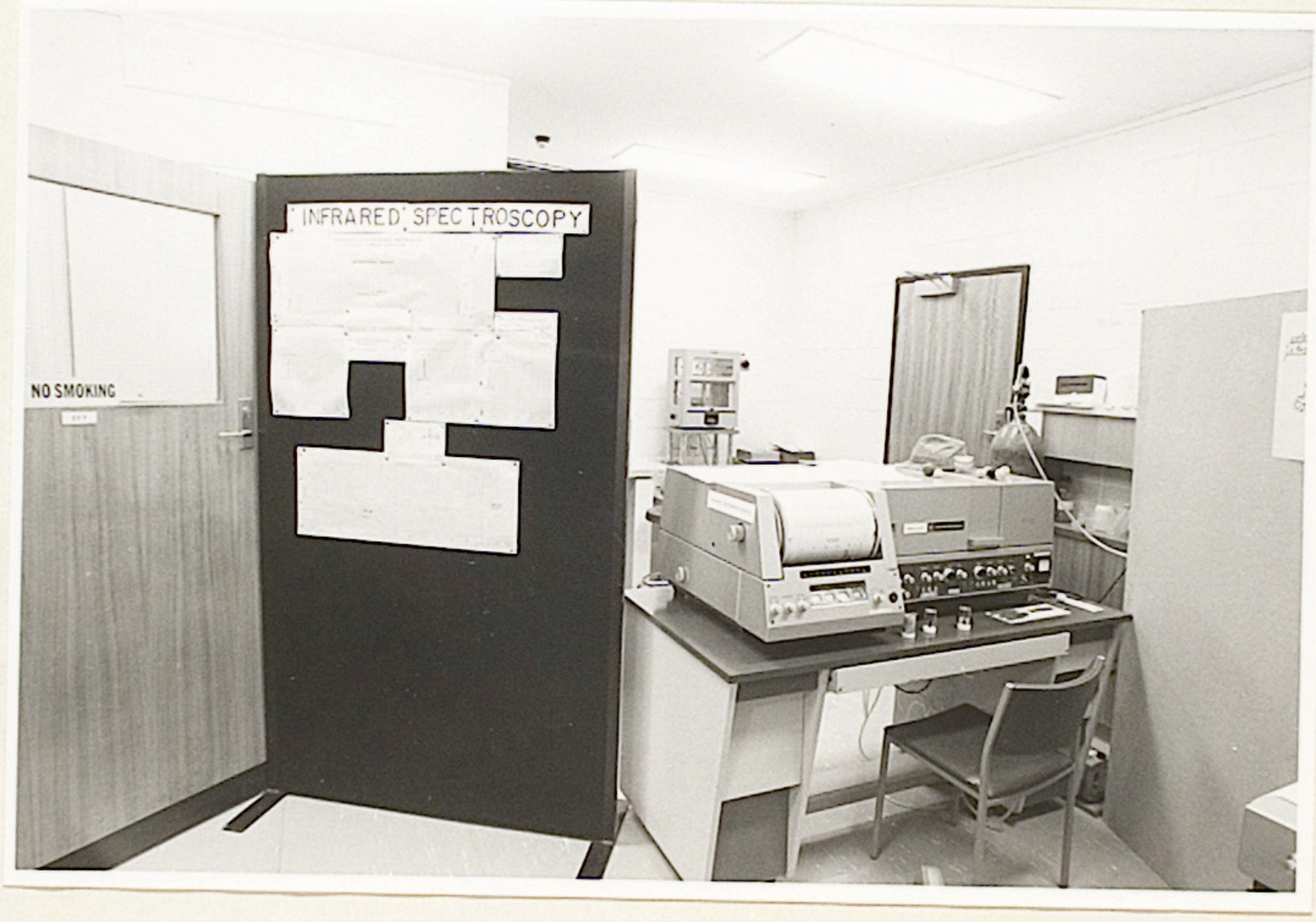

DANGER
NO
SMOKING
START
HERE

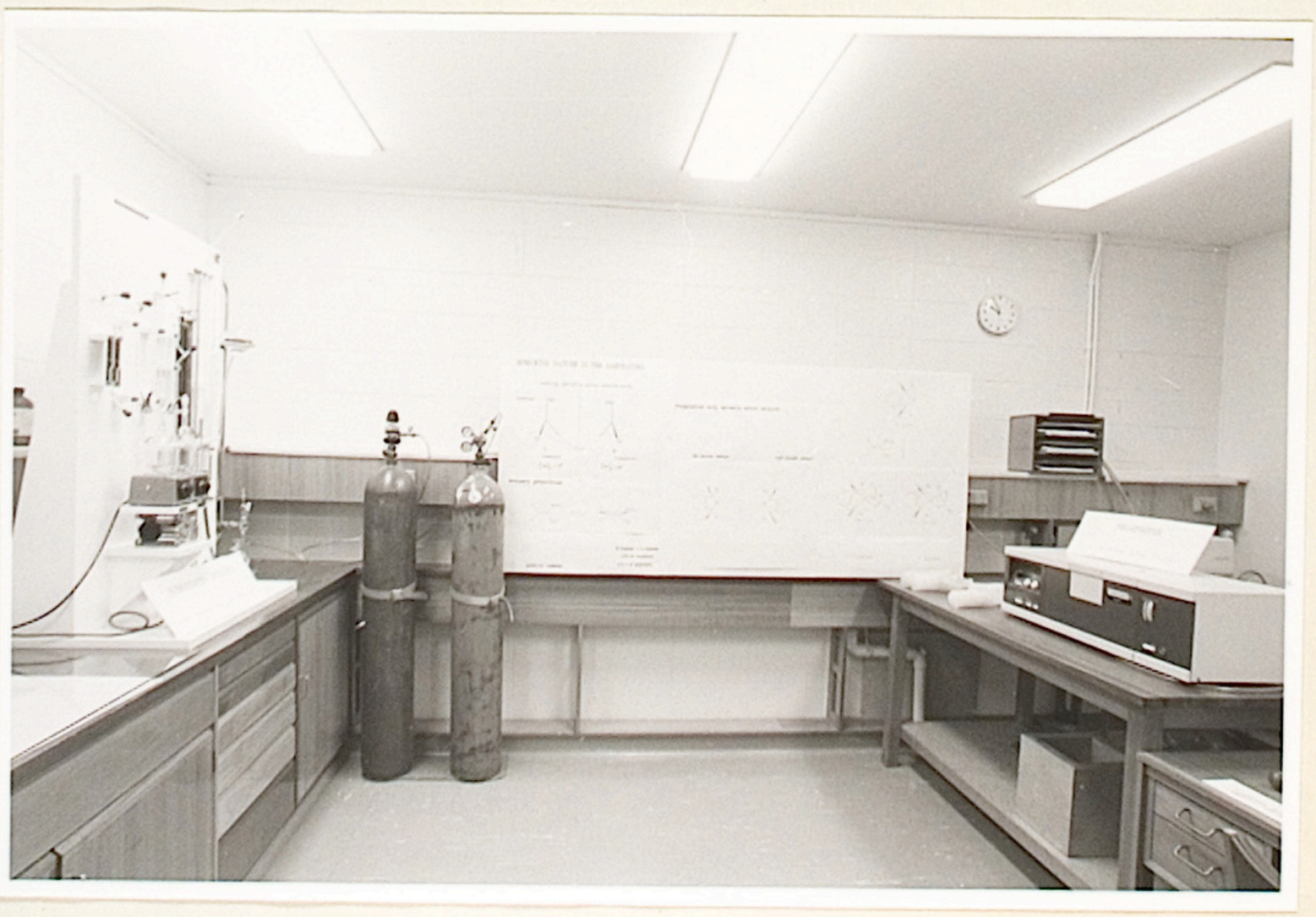

START HERE




REACTION
CATALYST
ETHYLENE



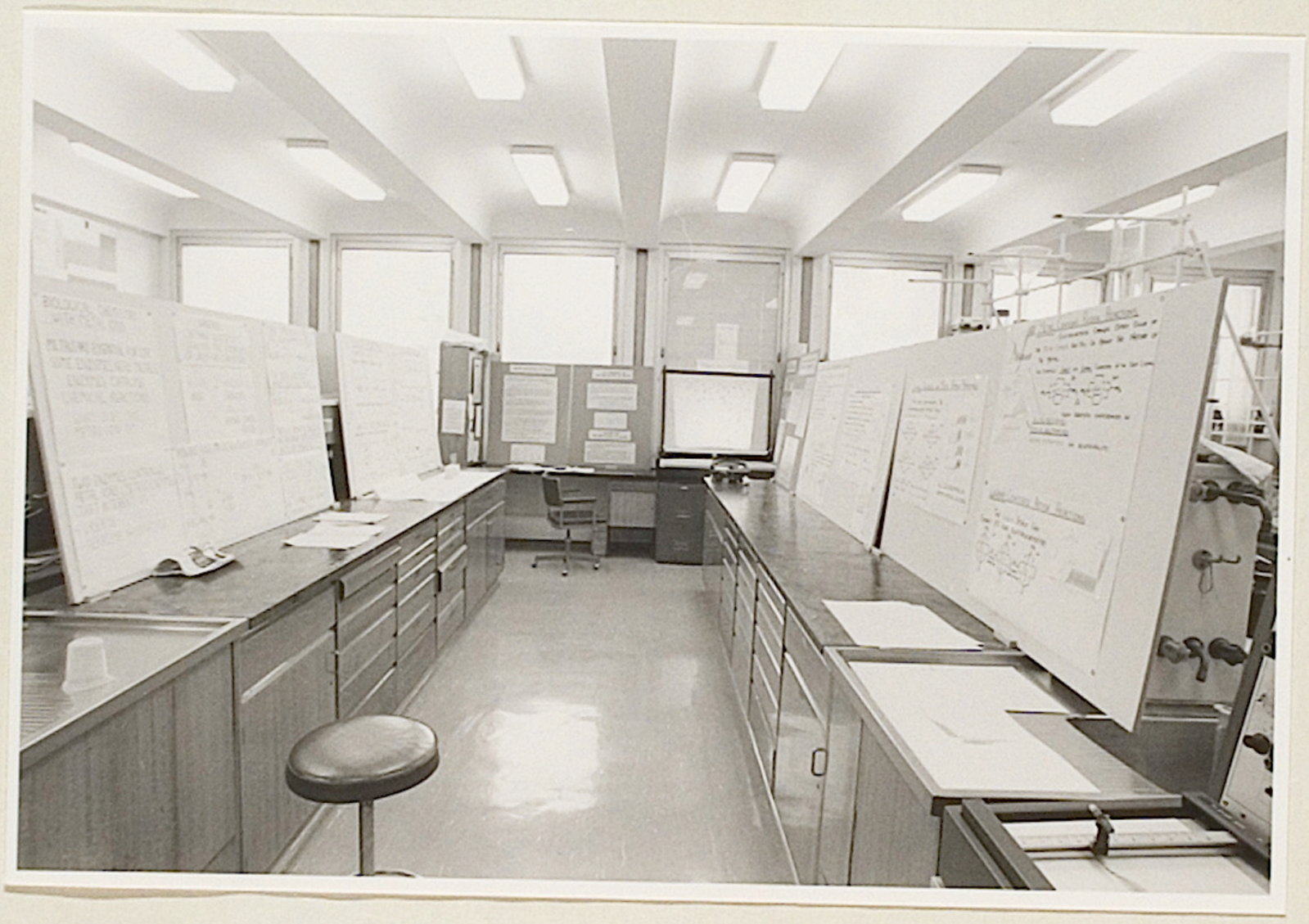

INFRARED SPECTROSCOPY
NO SMOKING

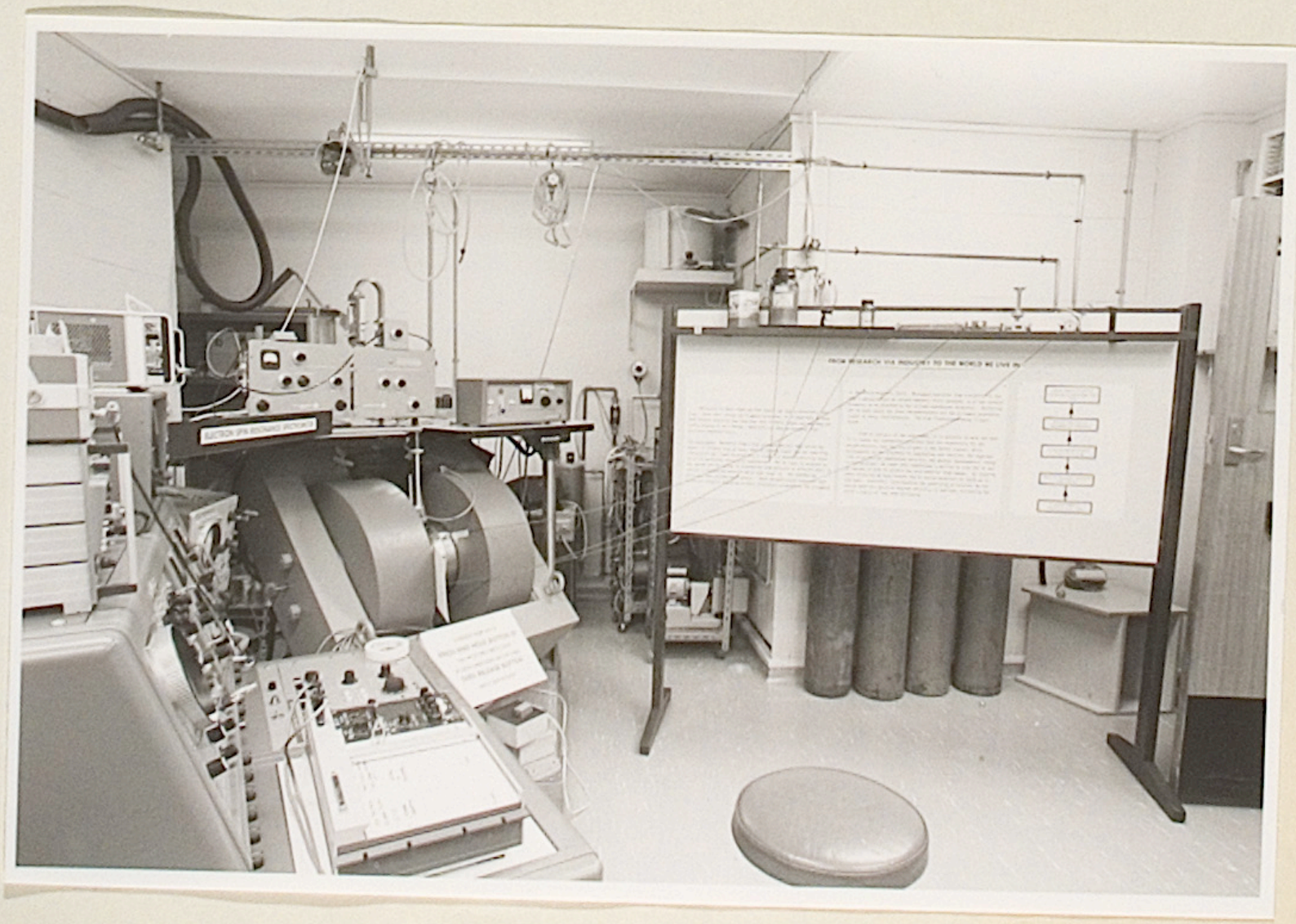



ANTIBIOTICS FROM THE SOIL

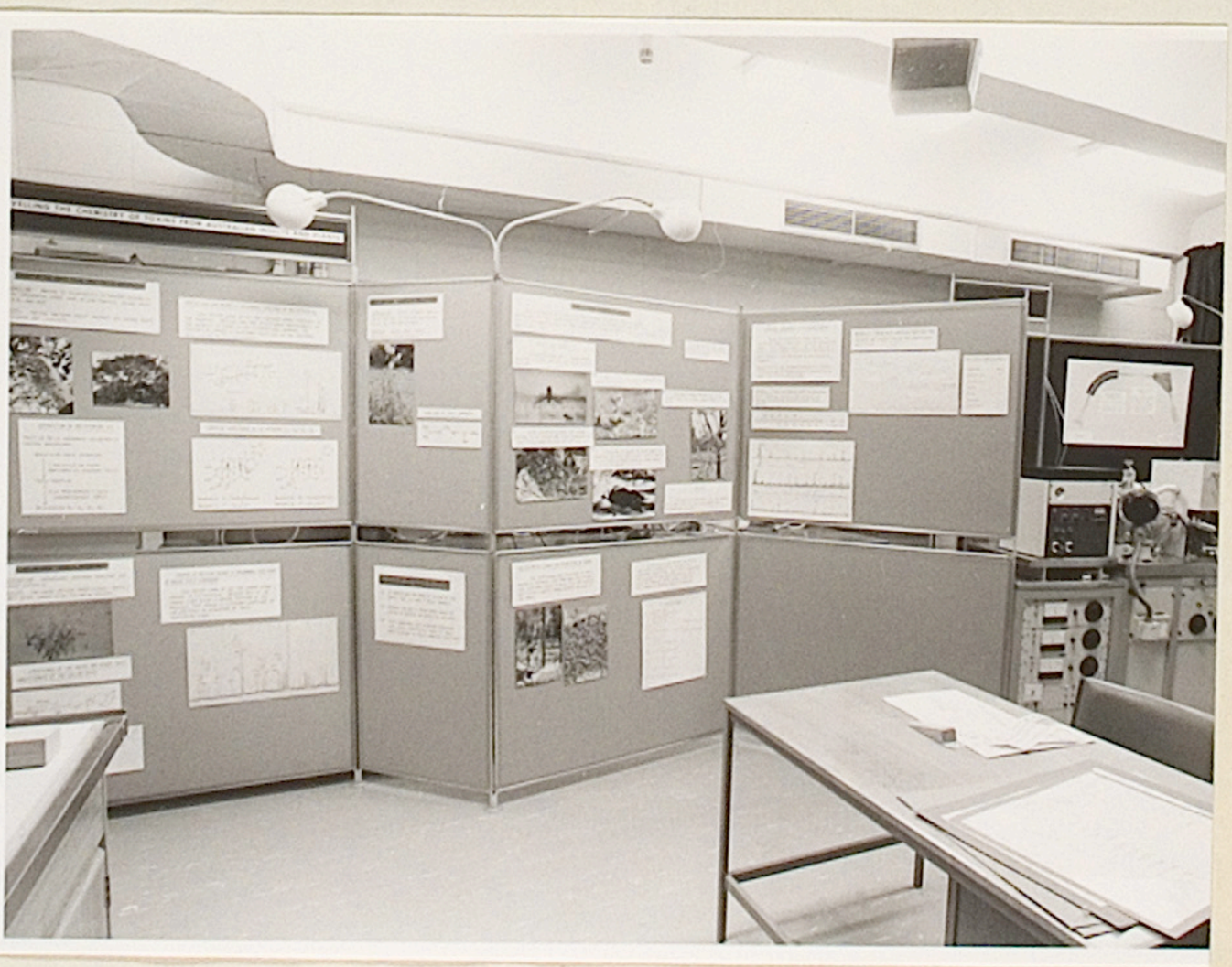

WHAT
IN THE
WORLD
ISN'T
CHEMISTRY?

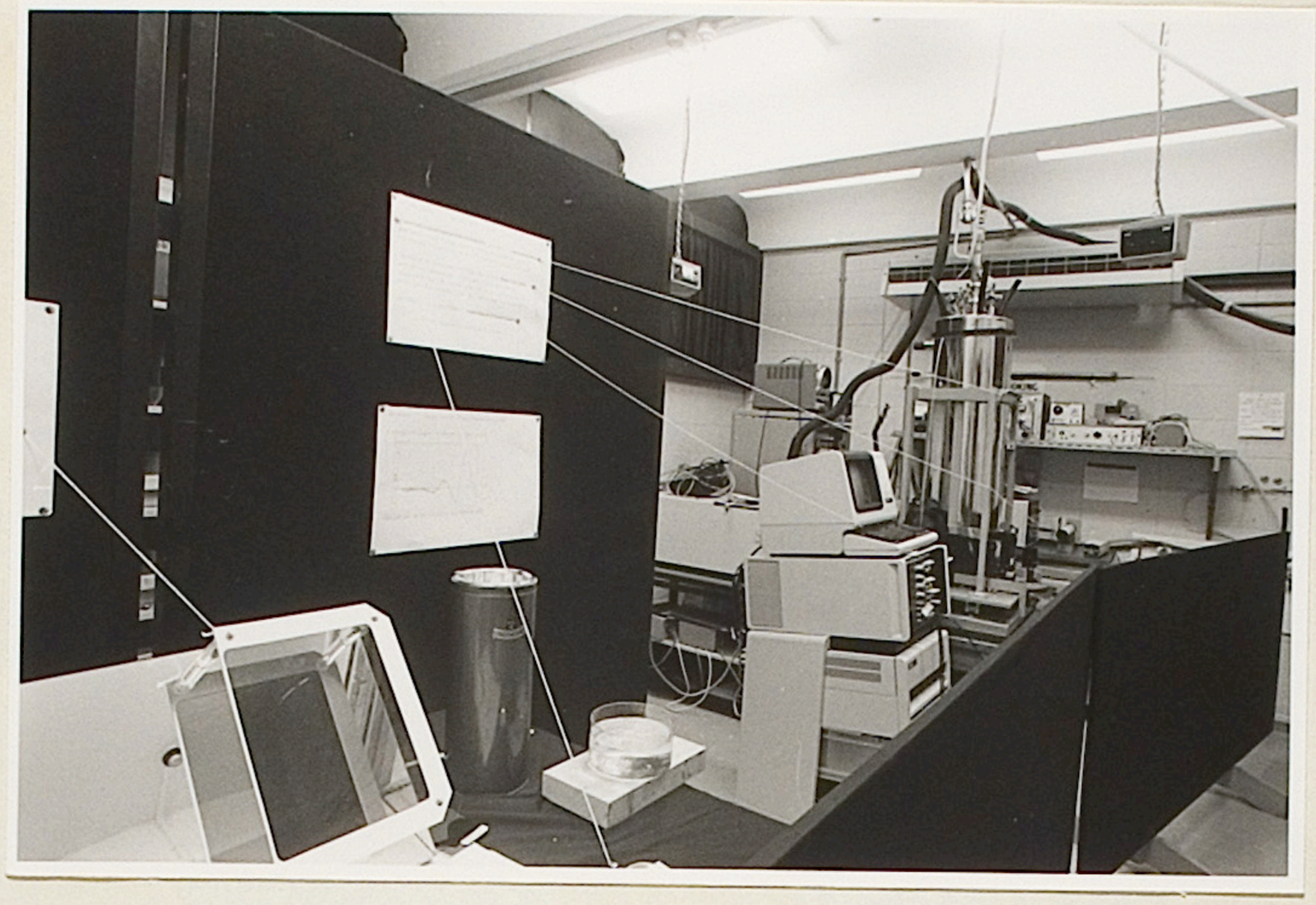

NMR - NQR PERIODIC TABLE
adidas




FROM RESEARCH VIA INDUSTRY TO THE WORLD WE LIVE IN


THEORETICAL ORGANIC CHEMISTRY
RESEARCH SCHOOL OF CHEMISTRY
AUSTRALIAN NATIONAL UNIVERSITY
COMPUTER CHEMISTRY



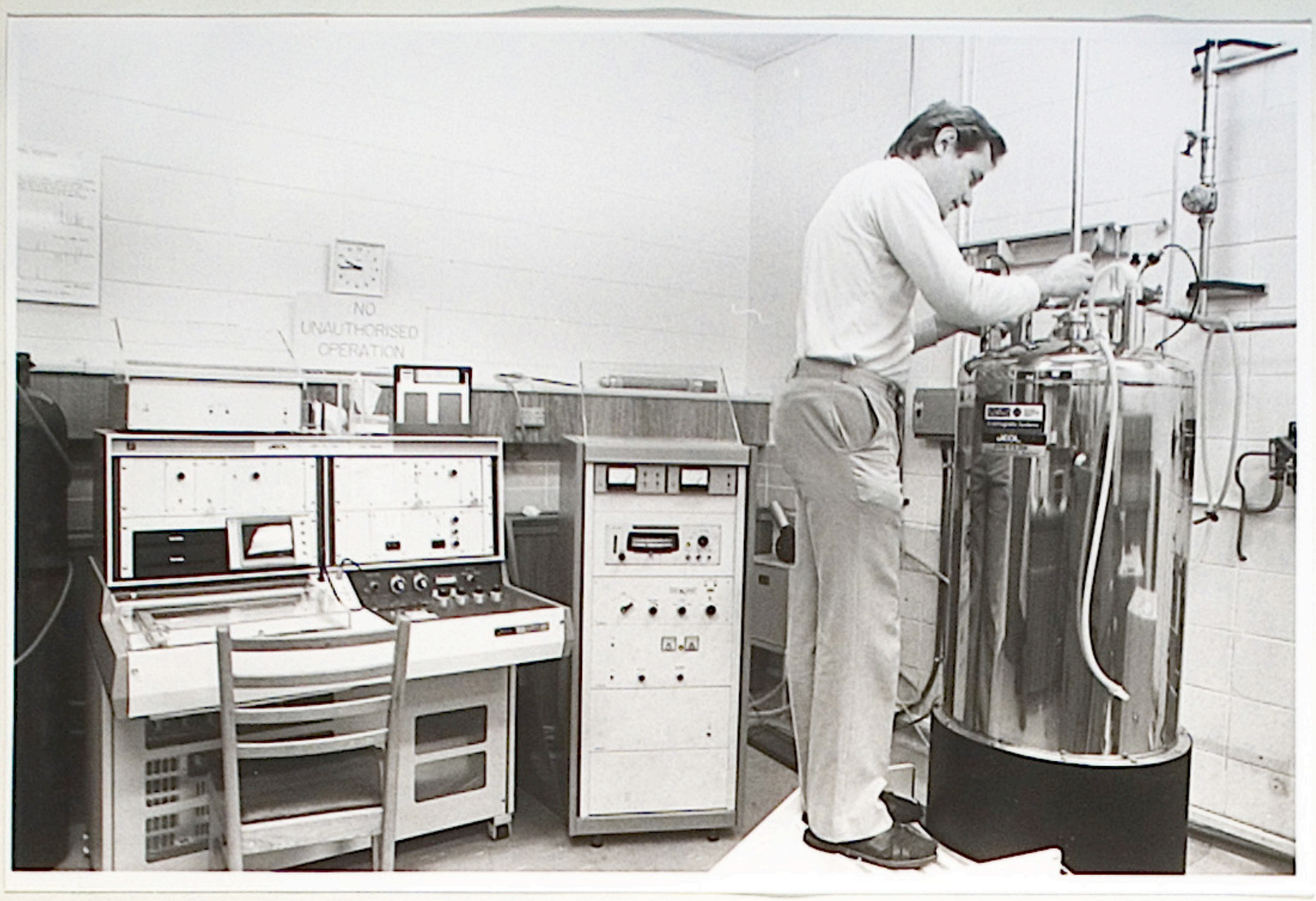


WATCHING OPEN DAY VIDEO -

'MEET THE SCIENTIST'

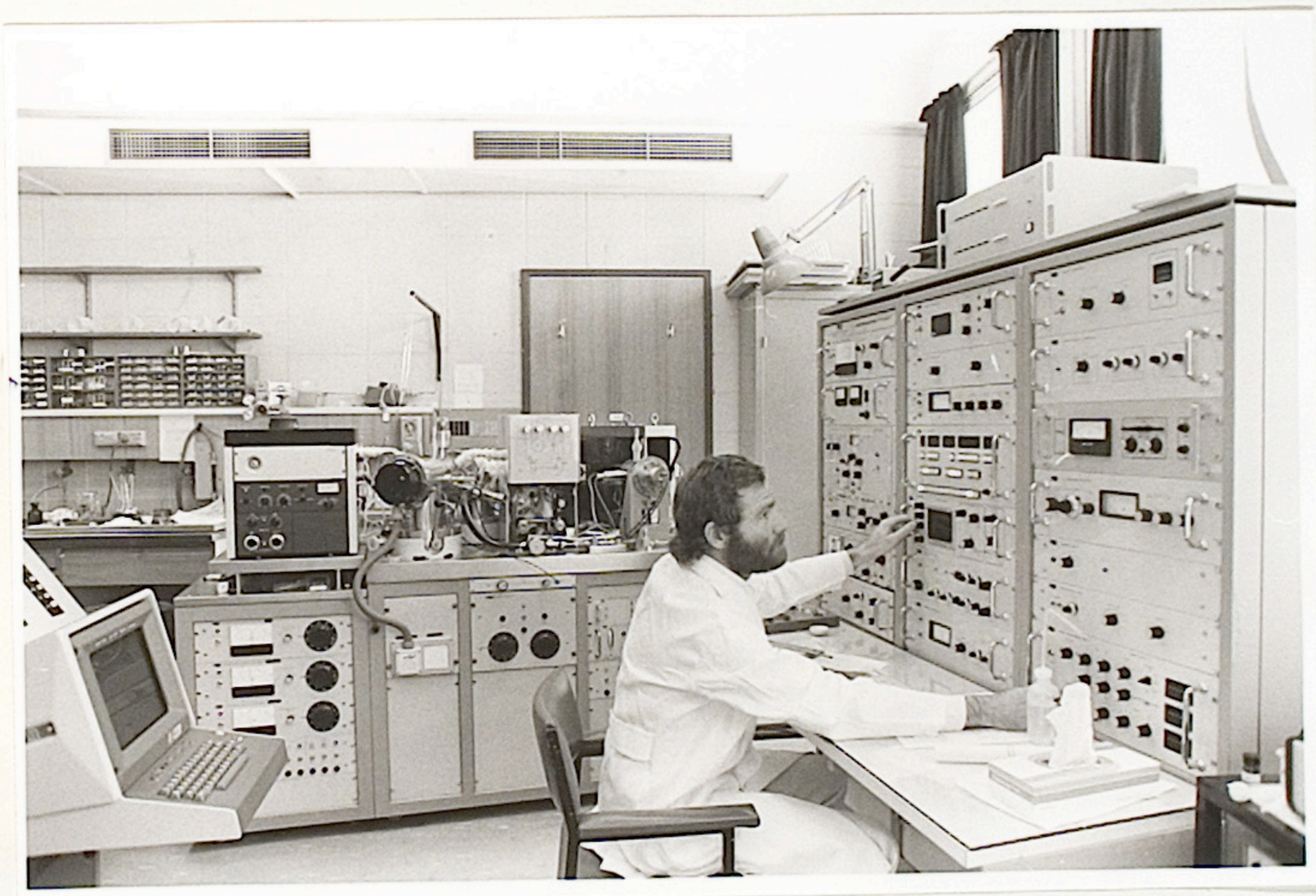
GLASS BLOWERS. H. ADLER & C. TOMKINS

GLASS BLOWING DISPLAY



MR. MICHAEL WHITTAKER -

USING NMR

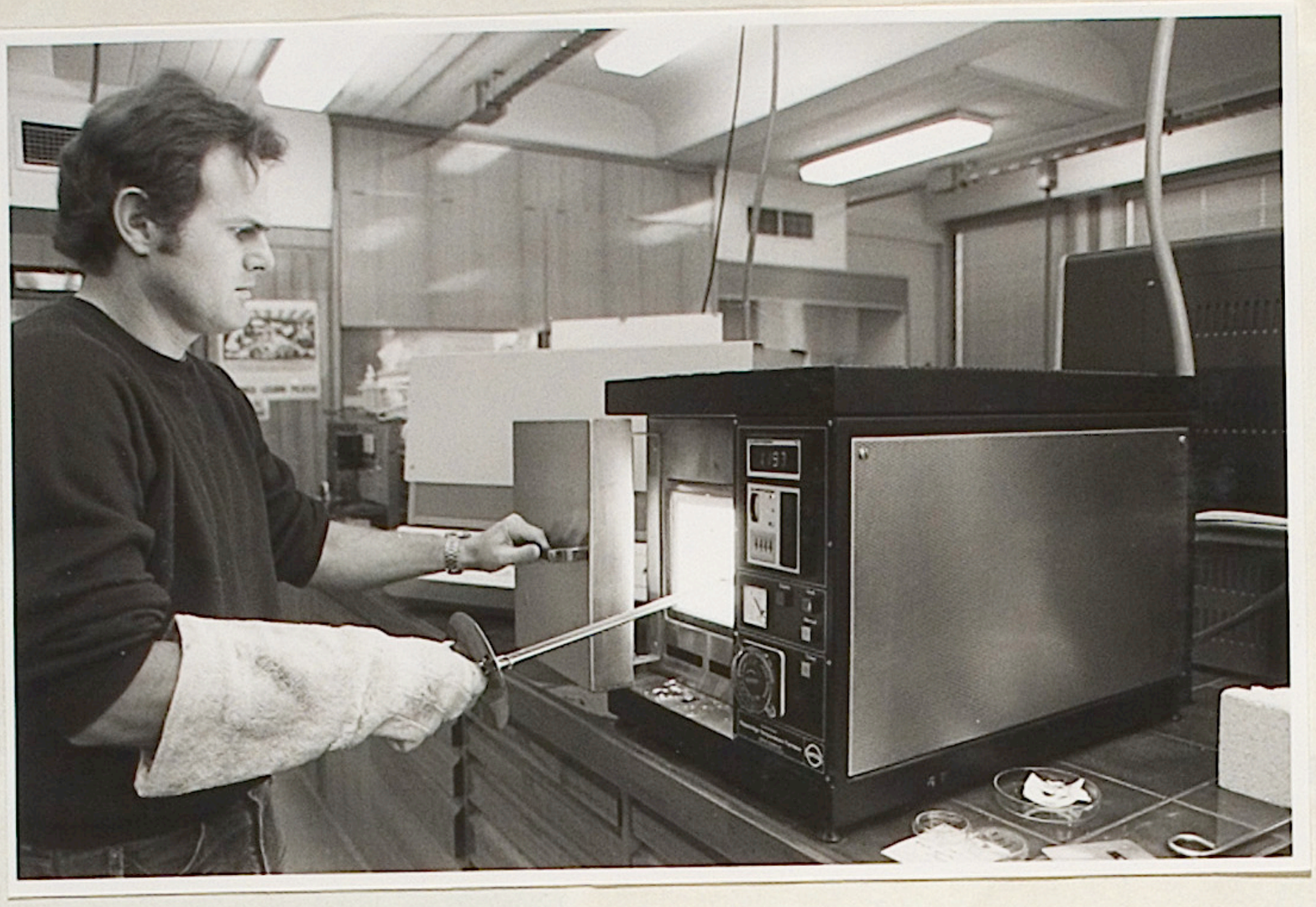


MR. WAYNE WHEATE USING MASS SPECTROMETER

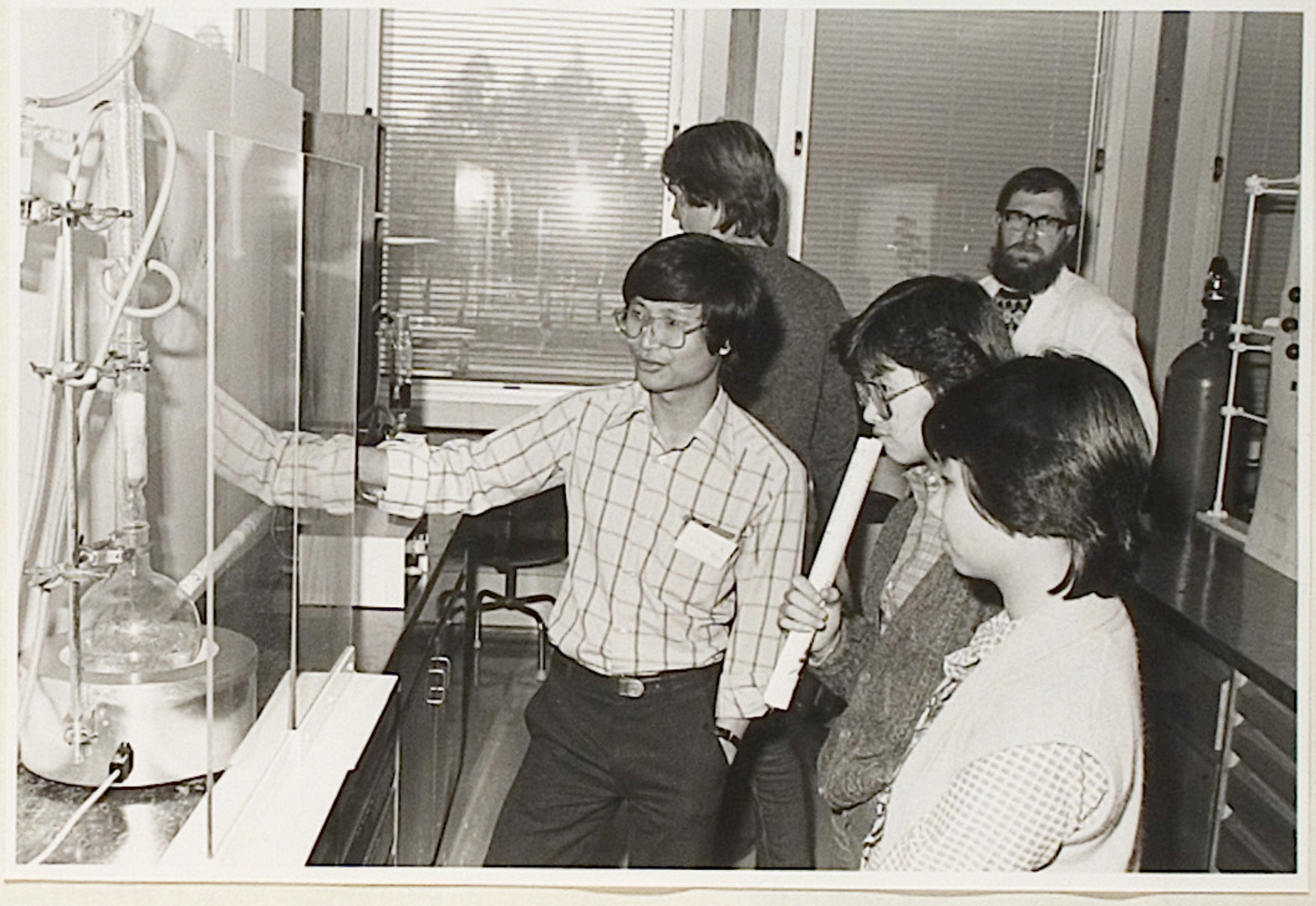
TO ANALYSE CHEMICAL SAMPLES

MODELS OF CRYSTAL STRUCTURES IN PROF.

HYDES AREA

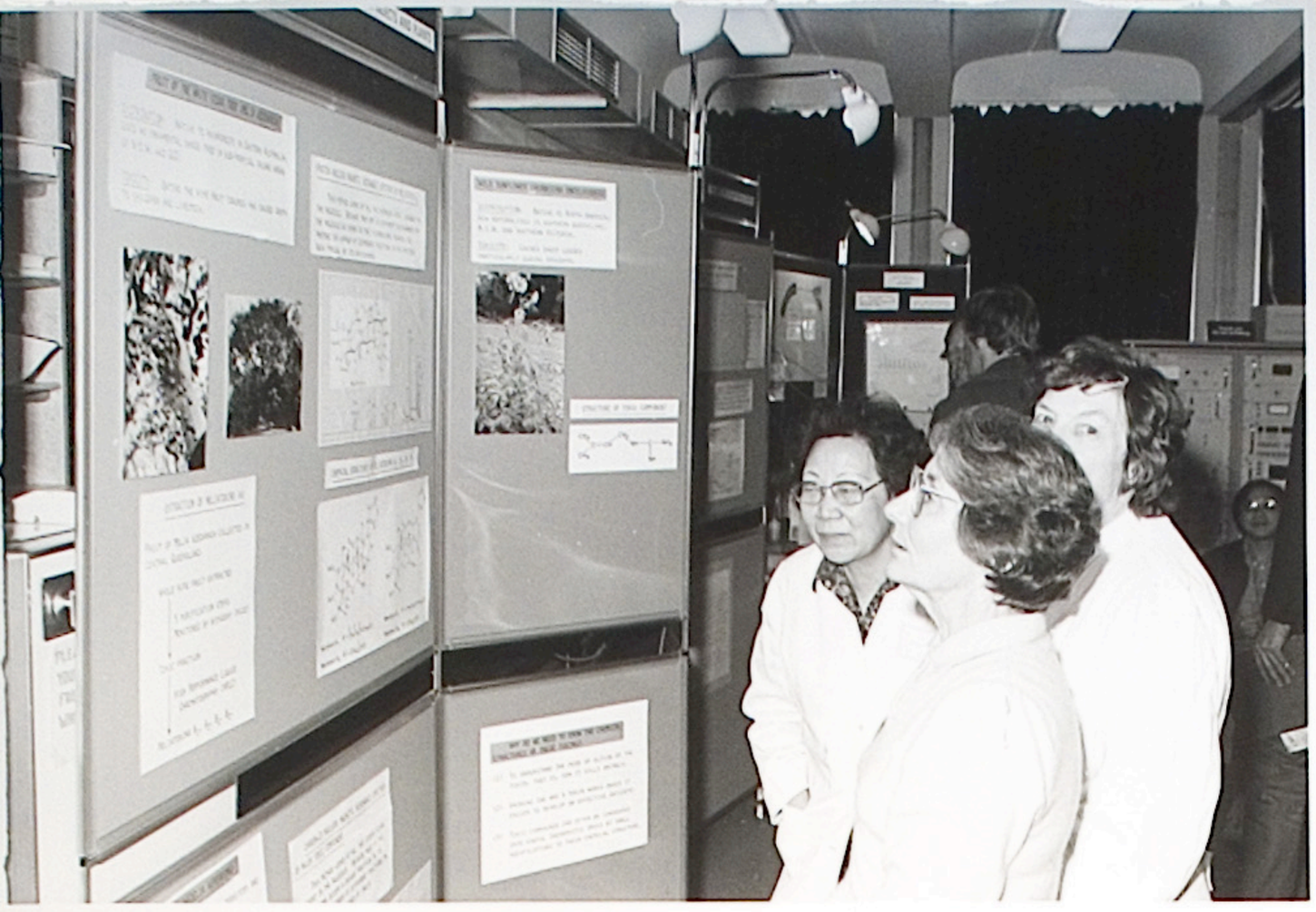


MR. PETER BARLOW UNLOADING A HIGH TEMP. FURNACE USED FOR GROWING CRYSTALS STUDIED AT ATOMIC RESOLUTION BY THE SOLID STATE GROUP.



DEMONSTRATING SOHXLET EXTRACTION STILL IN DR. WILDS AREA BY MR. LEUNG AND DR. MARTIN.

DR. D. WOOD DEMONSTRATING STERO CHEMICALS IN DR. WILDS AREA.



MASS SPEC. DISPLAY DEMONSTRATING NATURAL POISONS AND HOW THEY ARE ANALYSED.

MR. MARTYN STILE USING SPECIALISED DISTILLATION STILL.

LASER USE

Dear Chris

Thank you for letting us come to the A.N.U to see you do some glass blowing. It was very good

from Katherine Rosser

APPRECIATION OF GLASS BLOWING DISPLAY SHOWN BY SCHOOL CHILDREN IN LATER CORRESPONDENCE.

CAUSE FOR CELEBRATION...*A small celebration was recently held*
School of Chemistry to record the fact that in the last twelve months five m
had been recognised for their scientific contributions in one way or another
right: Dr Denis Evans (Rennie Memorial Medallist of the Royal Aus
Institute. Professor Alan Sargeson (elected to Fellowship of the Royal S
Rickards (H.G. Smith Medallist of the Royal Australian Chemical Ins
Arthur Birch (recipient of the Royal Society of Chemistry Natural Prod
Professor Lew Mander (elected to Fellowship of the Australian Acad

Long s

Mr Sid Lind (above) is retiring from the University after 23 years. He worked for five years at the John Curtin School of Medical Research as an administrative officer, purchasing equipment and working in the ledger area. At the Research School of Chemistry he has been assistant laboratory manager with responsibility for financial aspects of the School. In retirement he will live in Tyenna, near the Mount Field National Park in Tasmania.

when it opened. In retirement he will stay in Canberra but will visit his children in Queensland and Tasmania.

CAUSE FOR CELEBRATION...*A small celebration was recently held in the Research School of Chemistry to record the fact that in the last twelve months five members of its staff had been recognised for their scientific contributions in one way or another. They are, left to right: Dr Denis Evans (Rennie Memorial Medallist of the Royal Australian Chemical Institute, Professor Alan Sargeson (elected to Fellowship of the Royal Society), Mr Rod Rickards (H.G. Smith Medallist of the Royal Australian Chemical Institute), Professor Arthur Birch (recipient of the Royal Society of Chemistry Natural Products Award) and Professor Lew Mander (elected to Fellowship of the Australian Academy of Science)*

Grants and Gifts to the University

The Vice-Chancellor has accepted on behalf of the Council the following grants and gifts over $1,000:

Shaik Ahmad Salah Jamjoom $107,000—Faculty of Asian Studies. To support until the end of 1985 Islamic and Arabic Studies.

Department of Defence $37,264—Professor B.D.O. Anderson, Department of Systems Engineering, Research School of Physcial Sciences. For work on Kalman filtering methods for linear array prediction and maximum entropy signal processing.

Department of Administrative Services $33,750—Research School of Earth Sciences. To assist in the operation of seismograph stations until June 1985.

Long service staff retirements

Mr Sid Lind (above) is retiring from the University after 23 years. He worked for five years at the John Curtin School of Medical Research as an administrative officer, purchasing equipment and working in the ledger area. At the Research School of Chemistry he has been assistant laboratory manager with responsibility for financial aspects of the School. In retirement he will live in Tyenna, near the Mount Field National Park in Tasmania.

Mr Norm Shiels is retiring from the University after 19 years. Mr Shiels joined the Research School of Physical Sciences as a laboratory craftsman and joined the workshop of the Research School of Chemistry when it opened. In retirement he will stay in Canberra but will visit his children in Queensland and Tasmania.

SID LIND'S FAREWELL AT THE RSC ON THE

4 AUGUST 1983.

PROF. BIRCH PRESENTING MR. RICKARDS WITH
THE 1982 H.G. SMITH MEDAL OF THE ROYAL
AUSTRALIAN CHEMICAL INSTITUTE.
OCTOBER 11, 1983, RSC LECTURE THEATRE.

30 MAY 1984

1984.

Conclusions

Is the field of pesticide residue analysis here to stay? It appears that pesticides will be around for a long time, and their development and practical use, as well as the adequate protection of both our health and environment, demand accurate residue measurements. However, while food monitoring is important and continuing, I have tried to demonstrate that the role of pesticide residue analysis is changing. At its cutting edge are major concerns with pesticide movement and breakdown —the legacy of 'nonpersistence'. Methodology also must keep pace with emerging new types of pesticides, especially the pheromones, growth regulators, and other substances which contain none of the elements or functional groups for which we presently are prepared.

In particular, we need methods which are simpler, more rapid, and less expensive, not only for the USA and Australia but for developing nations which rely so heavily on pest control. Except for research and other special instances, we have sufficient method sensitivity; our ability to detect and measure now far outstrips toxicological significance. Today, new methods of residue analysis are moving into the femtogram (10^{-15} g) region.

Pesticide residue chemists also need to be increasingly aware of several important nontechnical roles of residue analysis. Residue data are being exploited as a political tool; nations find that they can regulate trade selectively, to their own advantage, according to the residue levels of particular pesticides they allow in imported food and other goods, levels which need have no clear relation to toxicity. The data and their implications also are open to exploitation by anti-pesticide organizations—by *any* political organizations, in fact—which can rely on the lack of analytical understanding among the public and public officials. For example, an anti-pesticide news release stating that 'residues of 2, 4-D were the same in both a treated wheat-field and the untreated adjacent field' proved to be true; neither one showed detectable 2, 4-D.

There is real need for increased education of the public and news media representatives in some of the principles which underlie analytical chemistry: probability and error, significant figures, analytical and sample variability, interferences, even the simple concept of concentration as mass per unit mass or volume. This is a role in which pesticide residue analysis might excell, as a subject of great public interest, concern, and newsworthiness. And could not residue analysis, with its combination of theoretical and practical applications, service to humanity, delicacy of technique, and current environmental excitement, also assume an important role in enticing science-oriented young people back into chemistry as a profession?

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H. G. Smith Memorial Medal

The 1982 H. G. Smith Memorial Medal was presented to Mr R. W. Rickards (F) at a ceremony in Canberra, by Professor A. J. Birch (F). Mr Rickards (l.) delivered the Occasional Address on the topic 'Interactions of Organic Chemistry with Biology'.

ANU REPORTER 20-11-84

Foundation Professor of Chemistry retires

The foundation Professor of Physical and Theoretical Chemistry, Professor David Craig, who played a major role in setting up the Research School of Chemistry in 1967, is to retire at the end of the year.

To mark his retirement, a symposium on 'The interface between theory and experiment' will be held by the School during early February.

Professor Craig came to the ANU as the Professor of Physical and Theoretical Chemistry in 1967. He had done his undergraduate work at Sydney University, where he later returned as Professor of Physical Chemistry.

Professor Craig gained his doctorate at University College, London, where he became a Lecturer in Theoretical Chemistry. After returning to Sydney University, he went back to UCL to become Professor of Theoretical Chemistry before finally settling in Canberra.

At the time he was helping to establish the Research School of Chemistry, along with Professor Arthur Birch, the University was interested in reversing the drain of talent from Australia. One of its major aims was to carry out work of a long-term nature with relevance to Australian interests.

Professor Craig told the *ANU Reporter* that while the school had achieved its early aims, there were now new problems. A brain drain continued, largely because there were few academic appointments in Australia once people had qualified. There was also a lack of research in industry. However, it appeared that things were changing.

He said the school played an important role in helping to maintain a high level of research

Professor Craig

in chemistry in Australia, and it also played a role in providing a strong base for the development of high technology industries.

Birch Lecture by Harvard professor

Professor E.J. Corey, Sheldon Emery Professor at Harvard University, will deliver this year's A.J. Birch Lecture on 30 July on 'Total synthesis of biologically active molecules'.

Over the past three decades, Professor Corey's group has achieved the synthesis of an impressive range of biologically active molecules, including numerous mammalian and plant hormones, and antibiotics. His group has developed a large number of new and important synthetic methods and reagents, which have become a standard part of the synthetic repertoire. Professor Corey also originated the use of computers in synthesis design and his LHASA (Logic and Heuristics Applied to Synthetic Analysis) program is now in extensive use.

Professor Corey's achievements have received widespread recognition in the international scientific community. He is a Fellow of the American Academy of Arts and Sciences and the National Academy of Sciences and has received numerous awards, the most recent of which has been the prestigious Tetrahedron Prize for Creativity in Organic Chemistry.

Professor Corey will give his lecture at 8pm on Monday 30 July in the Research School of Chemistry lecture theatre. The lecture is free and the public is invited. Further information from ext. 2633 or 4144.